Improved Learning Outcomes of Descriptive Statistics Through the Test Room and Data Processing Features in the Mobile Learning Model

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***Abstract*— Descriptive statistics plays an important role in processing and presenting data. Therefore descriptive statistics is one of the topics that must be mastered by all students, including Informatics Engineering students. Unfortunately, the high mathematical content in this topic is often considered as a threat to students. It makes them get bored and distracted their attention to other things, mostly to their smartphones. This study conducted to develop a mobile-based descriptive statistical learning media that facilitate student work feedback. The feedback was given through the Test Room and Data Processing Features. The media was developed using the prototyping method. The analysis is done by conducting interviews, distributing questionnaires, and trying similar applications. Verification is done using the black-box testing method, which provides input and sees the output. Validation is done by analyzing the results of examinations from two groups of students, the treated group and the control group. The validation results show that the learning outcome from the treated group was improved. The percentage of students who experienced an increase in exam scores from the treated group was 144% greater than the control group.**

Keywords—descriptive statistics, mobile learning model, learning outcome Introduction (Heading 1)

I. INTRODUCTION

Descriptive statistics is a part of statistics that provides a variety of data processing and presentation techniques so that it becomes more informative. The use of descriptive statistics as a tool for processing and presenting data has been done by researchers from various fields of science. Jeenanunta, et al. used descriptive statistics to help analyze internal and external factors that have an impact on innovation in the Thai manufacturing and service industries [1]. Hans-Jürgen Zepernick and Thi My Chinh Chu used descriptive statistics analysis of subjective experiments in mobile imaging [2]. Descriptive statistics are also widely used in education to measure learning outcomes [3, 4, 5, 6, 7, 8].

Descriptive statistics plays an important role in processing and presenting data. Therefore, descriptive statistics is one of the topics that must be mastered by all students, including Informatics Engineering students of a leading private university in East Java. However, descriptive statistics material that contains a lot of mathematics makes this material often feared by students [9]. Exam results for the last 3 semesters in the Informatics Engineering program of University 'X' show that the average test scores are not good and tend to fall (Table 1). The number of students who score below 55 is still above 25% (on a scale 0 – 100, 55 is the lower limit for students to get a grade of C). The teaching and learning process at this time is still dominated by the learning process in class so students get bored easily and their attention is easily diverted to other things. As a result, the material submitted was not well received. Strengthening the understanding that should be done independently is not much done because students have difficulty getting feedback about the results of independent learning. This was confirmed by research conducted by Rahma on descriptive statistics learning in the Syariah Economics program. In her research, Rahma explained that one of the main causes of low student test scores was the lack of feedback on the results of the exam so that students did not know their mistakes and had no opportunity to correct them [10]. The same problem is experienced by other researchers in the teaching and learning process [8, 11, 12, 13].

One way to improved student learning outcomes is to apply effective and fun learning models [6]. The use of appropriate learning media in the teaching and learning process can encourage positive changes in one's knowledge and behavior [6, 9, 14, 15, 16, 17, 18]. Descriptive Statistics learning multimedia developed by Baso Ali and Bobby Poerwanto succeeded in increasing the motivation and learning outcomes of the University of Cokroaminoto Palopo (UNCP) Informatics Engineering students [8]. Learning media in the form of videos has been proven to increase the interest in learning Natural Sciences of Third Grade Students of Inpres Lanraki 2 Elementary School, Tamalanrea District, Makassar [6]. The used of Multimedia Computer Assisted Language Learning (MCALL) could improve the learners 'listening skills on Iranian EFL

Learners' L2 Listening Comprehension [15]. Learning media in the form of comics seem to increase student achievement in statistical learning [9]. There are still many other studies that showed the use of appropriate learning media in teaching and learning can increase student motivation and learning outcomes.

Very rapid technological developments add to the function of a tablet or smartphone to expand the learning environment in order to overcome the limitations of time and traditional learning space [12]. The existence of tablets or smartphones is also familiar to students [11]. Research conducted by Ika Lestari and Gusti Yarmi showed that all students who were respondents in the study used cellphones and some even had more than one cell phone [19]. Asep Irpan Nugraha's research showed that 24.6% of students use smartphones for learning activities [20], while Ika Lestari and Gusti Yarmi's research showed that at least 50% of students use mobile phones for learning purposes [19].

TABLE I. DESCRIPTIVE STATISTICS TEST RESULTS IN THE INFORMATICS ENGINEERING PROGRAM, UNIVERSITY 'X'

	Academic Year		
	2017-2018	***2018-2019***	***2019-2020***
Number of Students	92	128	76
Students with a score of less than 55	34 (36.96%)	34 (26.56%)	37 (46.68%)
Mean standard deviation	57 18.2	56 15.5	53 26.7

Various learning media using computers and/or smartphones are proven to increase motivation or student learning outcomes. However, various learning media that have been developed have not been able to provide feedback on data entered independently. The research conducted developed a mobile-based descriptive statistics learning media that facilitates student work feedback. The learning media developed provides a test room feature, where students can input data independently and will automatically get feedback in the form of processing steps and/or presentation of the inputted data.

The study was developed using the prototyping method. The workflow of the prototyping method can be seen in Figure 1. The analysis was done by conducting interviews, distributing questionnaires, and trying similar applications. The interview was conducted in a semi-structured manner with two statistics lecturers in the Informatics Engineering program, University 'X'. The first lecturer has a background in Informatics Engineering and the second lecturer is a mathematician. The questionnaire was distributed using the cluster sampling method. Samples are selected from students who have taken statistics courses. The number of respondents who responded to the questionnaire was 42 students. Similar applications analyzed were "Descriptive Statistics" by Neteru Studio and the website "Quipper" by PT Quipper Edukasi Indonesia. The results of the analysis are used to design and build prototypes. The complete prototype was consulted with 2 statistics lecturers and evaluated by 16 students who were taking statistics courses. Input obtained from respondents is used to improve the prototype. The final prototype is used to build applications. The application was developed using framework 7. To ensure that the application built is running as it should and could help improve student motivation and learning outcomes, verification, and validation are carried out. Verification is done using the black-box testing method, which provides input and sees the output. Validation is done by analyzing the results of examinations from two groups of students participating in statistics courses, the treated group, and the control group. Each group consists of 16 students. In the first stage, the learning process is carried out in all groups without using any application. At the end of the first stage, all students were asked to take the same exam questions. In the second stage, the two groups were asked to relearn descriptive statistics material, the first group used the application to be tested, while the second group was without application. After that, the two groups were asked to work on the same problem but different from the questions in the first stage.

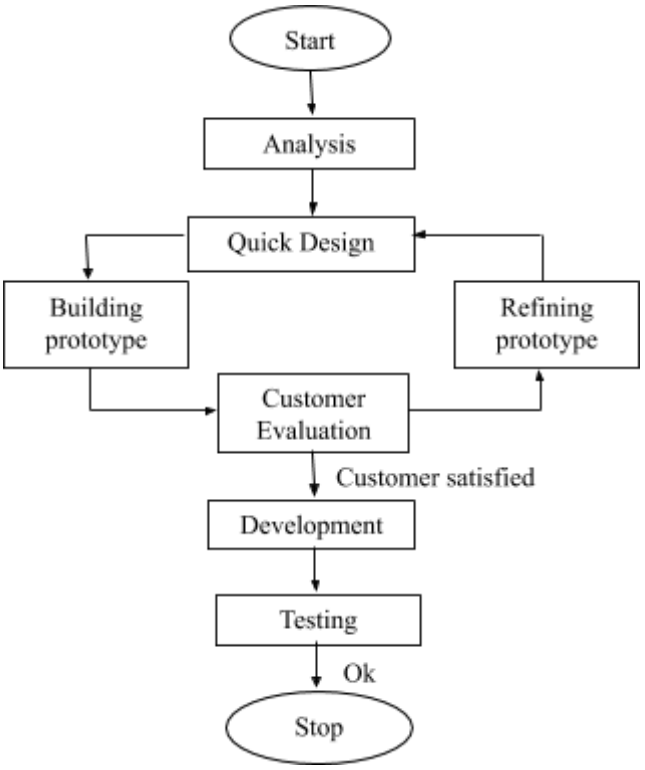

Fig. 1. Prototyping Method Flow Diagram

II. RESULTS AND DISCUSSIONS

Based on interviews with lecturers it was found that students get bored easily and their attention is easily diverted to other things. This kind of situation is found when the number of students participating in statistics courses is very large, around 90 students. A large number of participants and the limited teaching time in the class resulted in the teacher limiting student time in working on the practice questions. Whereas the results of the

questionnaire to the participants in the statistics course show that:

- only 17% of respondents received an A (81-100) and 19% of respondents did not pass the statistics course (got a score of less than 55),
- 26% of respondents were reluctant to listen to lecturers' explanations in class, so they most likely did not have lecture notes,
- 79% of respondents who encountered difficulties when studying would ask friends, lecturers, or try to find their own solutions via the internet. The positive side of this data showed that there are still many students who want to learn. The obstacle that was often encountered when students want to ask a friend or lecturer is to adjust the schedule. As a result, many students were reluctant to study independently because they found it difficult to get feedback. Students also still found it difficult to learn through the internet because in general, they were looking for answers to questions that were exactly the same as the practice questions given by lecturers in class.
- 74% of respondents studied just before the test
- 33% of respondents who have used learning applications stated that the material discussed in the application was too simple and incomplete, other than that the user interface was boring.
  The material provided in the "Descriptive Statistics" application is not accompanied by step by step problem solving using the formula provided so the user must look for additional references. In the "Descriptive Statistics" application users could practice with their own problems, but the solution given is not accompanied by a detailed explanation that often confuses the user. The "Quipper" application allowed users to create learning schedules, mark material, add notes to the material but did not allow for input questions themselves, and this application was not free or paid.

The results of the analysis are used as a basis for building prototypes before being implemented in an application form. Interface flow diagrams of the application built can be seen in Figure 2. The main features provided in the application include Material, Practice Questions, Test Room, and Data Processing. The material is presented interactively with detailed step by step so users can play an active role. This method is expected to make the user not easily bored and can follow the explanation well, see Figure 3. At the end of each material, an example is provided with a step-by-step solution. The data used in the example is generated randomly or can be replaced by input by the user. The Practice Questions feature can be used by users to measure a certain level of material mastery. Practice questions are taken randomly from the question bank and the data used on these questions are also generated randomly. This is done so that each time the user practices, the user will get a different problem so the user does not just memorize the answers or get bored quickly. At the end of the exercise, feedback will be given so that the user can find out where the mistakes he/she might have made. The Test Room feature is almost the same as the Practice Question feature. The only difference is in the Test Room feature, users can set the time and number of questions they want to work on. The purpose of this feature is as a test simulation in accordance with the actual exam conditions. It is hoped that after practicing using this feature the user will be better prepared mentally to face the real test. The Data Processing feature is provided so that users can process their own data. The feedback provided on this feature is in the form of a detailed step by step way of processing the data. Feedback from this feature is expected to motivate students to practice independently.

The validation results showed that the percentage of students who experienced an increase in exam scores from the first group (the treated group) was 144% greater than the second group (the control group). On the other hand, the percentage of students who experienced a decline in exam scores from the first group was 50% less than the second group. Details of the validation results can be seen in Table 2. Evaluation of the validation results showed that the application was able to improve the learning outcomes of respondents. Further analysis showed that each feature provided in the application was useful to help the learning process of at least 66.67% of respondents in the first group even though the majority of them use the application less than three times a week.

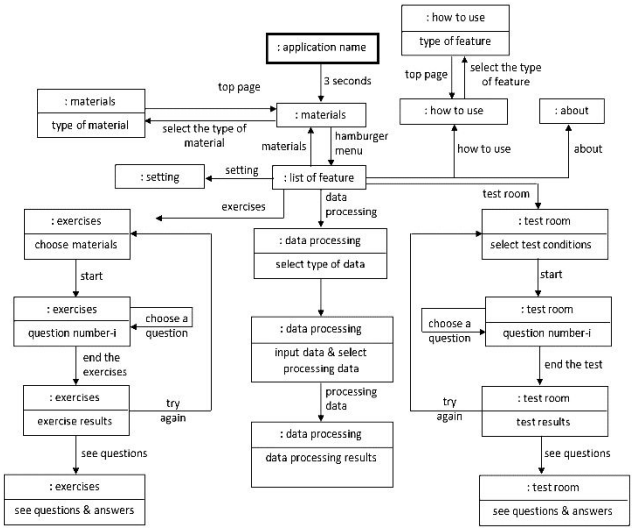

Fig. 2. Interface Flow Diagram

TABLE II. VALIDATION RESULTS

Group	Comparison of Stage 1 and Stage 2 Test Results			
	Decrease	*Equal*	*Increase*	*Total*
Treated	18.75%	0%	81.25%	100%
Control	37.5%	6.25%	56.25%	100%

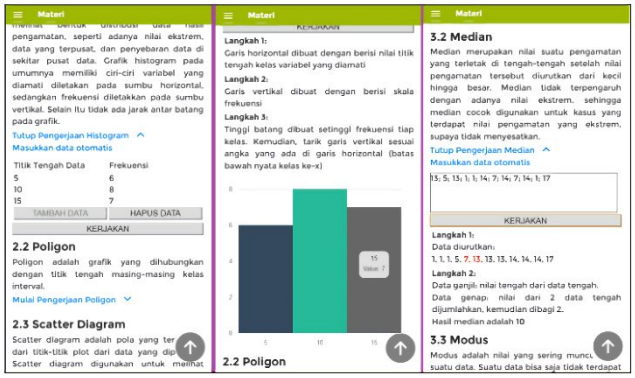

Fig. 3. Application Interface

III. Conclusion

This application was built to overcome the problems that occur when descriptive statistics are given to large classes where the number of students is around 90 people. Lack of feedback was one of the obstacles for students to learn independently. The validation results showed that the application can improve student learning outcomes. 81.25% of students in the treatment group experienced an increase in test scores. This percentage was 144% higher than the number of students from the control group who experienced the same thing. All features in the application, including the test room and data-processing features that provide feedback to the users, were felt to be useful in helping the learning process. This application can be developed by adding an animation effect to the step-by-step explanation of problem-solving to increase student motivation.

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20 – 21 October 2020

Department of Electrical Engineering

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Foreword from General Chair

Assalamualaykum warohmatullahi wabarakatuh and Good Day, Ladies and Gentlemen,

In the name of Allah, the Most-Merciful, the All-Compassionate, Praise be to Allah, we seek His help and His forgiveness. May He send peace and blessings on Prophet Muhammad, his family, his companions, and his followers until end of the day.

We would like to welcome all participants from academicians, government, and industry to attend the Second International Conference on Industrial, Electrical and Electronics (ICIEE 2020) virtually.The health and safety of the ICIEE participants is of paramount importance to the Committee. Hopefully the pandemic pass soon.

ICIEE 2020 is organized by Department of Electrical Engineering, the Universitas Sultan Ageng Tirtayasa, supported by FORTEI (Electrical Engineering Higher Education Forum of Indonesia), and technical sponsored by IEEE Indonesia Section.

This conference is a great event in the field of Industrial, Electrical and Electronics. World Class Speakers are scheduled to deliver speech on hot topics in data science so as it can be beneficial to all delegates.

On behalf of the organizing committee, I would like to express my sincere gratitude and appreciation to all participants for joining this virtual conference to share and present your research findings. We are also indebted to all the international reviewers for helping us in reviewing all the papers for ensuring high quality of all the accepted papers. I would like to thanks all sponsorships for their valuable supports. We believe that the conference will be a key stage to improve our research and show great development to the world in the field of industrial, electrical, electronics and information technology

I would also like to extend my thanks to all the organizing committee for working very hard to make this conference as today and record my personal apology for any shortcomings. Any recommendations and suggestions for improvement are very much appreciated and most welcome.

I believe this international event can encourage our spirit to move on a better condition as well as expand our collaboration and networking.

Thank you.

Wassalamualaykum warohmatullahi wabarakatuh

Associate Professor Dr. Supriyanto, M.Sc., IPM.

General Chair ICIEE 2020

Foreword from Rector Universitas Sultan Ageng Tirtayasa

It is our great pleasure to join and to welcome all participants of the Second International Conference on Industrial, Electrical and Electronics (ICIEE 2020) virtually. I am happy to see this great work of the Department of Electrical Engineering on organizing this international event.

On this occasion, I would like to congratulate all participants for their scientific involvement and willingness to share their findings in this conference. I believe that this conference can play an important role to encourage and embrace cooperative, collaborative, and interdisciplinary research among the engineers and scientists especially on the theme of data science.

I do expect that this kind of similar event will be held in the future by other department within UNTIRTA as part of activities in education research and social responsibilities of universities, research institutions, and industries internationally. My heartful gratitude is dedicated to Organizing Committee members and the students of Department of Electrical Engineering for their generous effort and contribution toward the success of ICIEE 2020.

Thank you.
Wassalamualaykum warohmatullahi wabarakatuh

Prof. Dr. H. Fatah Sulaiman, ST., MT.
Rector of Universitas Sultan Ageng Tirtayasa.
Indonesia.

KEYNOTE SPEAKER'S PROFILE

Professor Junseok Hwang is a full professor at the Technology Management, Economics, and Policy (TEMEP) Program, College of Engineering, Seoul National University (SNU), South Korea. Currently, Prof. Hwang is also a director of International Technology Professional Program (ITPP) which is fostering global ICT talents from around the world with more than 100 alumni since 2003. In addition, Prof. Hwang serves as director for SNU Global RnDB Center (GRC) for academic-industry cooperation in Korea and around the world with a strong relation to world class organizations such as World Bank, UN, GFC, etc.

Prof. Hwang received his B.S. degree from Yonsei University, Seoul specializing in Mathematics, his M.S. degree in Telecommunications from the University of Colorado, and his Ph.D. in Information Science and Telecommunications from the University of Pittsburgh, Pennsylvania in the United States. Prof. Hwang has convergence backgrounds and expertise, from mathematics, economics, engineering, telecommunications, information science, transdisciplinary convergence, to the information education philosophy. His convergence thinking and global networking lead him to be involved in the Siheung Smart city planning and development, which is aimed to be a leading global open innovation city hub, and initiated a special Smart City graduated convergence major program at SNU.

Along with teaching and advising his master and Ph.D students, Prof. Hwang is co-chairing and organizing for Symposia of GSDV (Green, Smart, Development, and Vision) since 2011, and Supreme S Seminar since 2020, co-chaired and organized Global Seoul ICT Forum 2018, World Innovation Network of IT 2018, and Global Seoul Innovation Forum 2019.

KEYNOTE SPEAKER'S PROFILE

Nurfadhlina Mohd Sharef is an Associate Professor at the Department of Computer Science and is currently the Deputy Director of Innovation in Teaching and Learning at the Centre for Academic Development (CADe) in UPM.

Dr. Fadhlina's main research interest is in data science especially in solving sentiment analysis, question answering, chatbot and recommendation system problems.

She has various experience in both academic and industrial projects involving development of intelligent computing methods especially adaptive and deep learning models for data science. Among her recent projects are the (i) deep learning based tensor factorization for recommender system,(ii) multi-objective particle swarm optimization for breast cancer recurrence prediction, (iii) improvement of consistency and meaningfulness of a chatbot model, and (iv) multi-channel based transfer learning model for multiclass classification of tweets.

She was also engaged in several consultation projects such as in the (a) online logistics aggregation web-based and mobile-based service, (b) pre-university intake requirements analysis, and (c) the fuzzy aggregation based data analytics for security threat profiling from heterogeneous resources.

She is usually assigned to teach courses related to Artificial Intelligence and general computer science skills such as Data Mining, Intelligent Computing, and Programming I and II. In her teaching, she usually emphasizes on experiential learning and believes blended learning is the best method to learn and teach. She uses multiple teaching modalities to ensure engaging delivery and so that higher order thinking skills could be obtained.

KEYNOTE SPEAKER'S PROFILE

Prof. Richardus Eko Indrajit was born in Jakarta, Indonesia, January, 24th 1969. Graduated from Surabaya Institute of Technology as Computer Engineer in 1992 and received full scholarship from Pertamina Oil Company to finish his study as Master of Applied Computer Science at Harvard University, Massachusetts, USA. He is also a holder of Master of Business Administration from Leicester University, United Kingdom, Master of Communication from London School of Public Relations – Jakarta, and Master of Philosophy from Masstricht School of Management, the Netherlands.

His Doctor of Business Administration degree was from Pamantasan ng Lungsod ng Maynila (University of the City of Manila), the Philippines. He started his business, management, and information technology practices in Price Waterhouse Indonesia as Senior Consultant before joining several prominent corporations such as: Prosys Bangun Nusantara – Cap Gemini Consulting, Renaissance Indonesia, the Jakarta Consulting Group, Soedarpo Informatika Enterprise, and IndoConsult Utama. As an academician, he has been appointed as Chairman of Perbanas School of Information System and Technology, Research Director of Swiss-German University, and participated as active faculty members in several universities, which are: University of Indonesia, Atma Jaya Catholic University, Bina Nusantara University – Curtin University of Technology, Trisakti University – Edith Cowan University, and IPMI – Monash University. Currently he is the President of the Association of Higher Learning Institution in Computing and Information Technology Studies. Leading more than 700 universities and 1,500 program of studies all over the nation. He is also known as a President of International Association of Software Architect – Indonesian Chapter.

In government sector, he has been asssigned as a special staff and advisor to various institutions, such as: Secretary General of National Auditing Board, Ministry of Communication and Information Technology, National Defense Board (Lemhannas), National Narcotics Body, and Central Bank of Indonesia – before finally appointed as the first Chairman of ID-SIRTII (Indonesia Security Incidents Response Team on Internet Infrastructure). He is also assigned by the government of Indonesia to become the member of the Board of National Educational Standard (BSNP-Ministry of Education), the Board of Indonesian Professional Certification Authority (BNSPMinistry of Labour and Transmigration), and the Board of National Research Council (DRN-Ministry of Research and Technology).

He has been actively publishing more than 30 books and hundreds of national journals in the area of business, management, and information technology – most are coming from his experiences of practicing his knowledge and skills in different fields: banking and finance, telecommunication, manufacture, retail and distribution, aviation, oil and gas, transportation, education, healthcare, and other service-based industries.

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Virtual Conference, October 20, 2020

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Opening Ceremony	
08.00 – 08.30	Online registration
08.30 – 08.40	Opening from MC
80.40 – 08.55	Sing National Anthem of Indonesia Raya
08.55 – 09.00	Chanting prayers
09.00 – 09.05	Report from the chairman of the committee
09.05 – 09.15	Signing of Cooperation Agreement
09.15 – 09.25	Remarks from representatives of the IEEE Indonesia section
09.25 – 09.35	Remarks from the rector of the University of Mataram
09.35 – 09.45	Remarks from the rector of the Sultan AgengTirtayasa University
09.45 – 09.55	Remarks from the Chancellor of Telkom University
Keynote Speakers	
10.00 – 10.25	Prof. RichardiusEkoIndrajit (APTIKOM – Indonesia)
10.25 – 10.50	Assoc. Prof. Dr. NurfadhilaMohdSharef (Universiti Putra Malaysia – Malaysia)
10.50 – 12.00	Prof. Jun Seok Hwang (Seul National University – South Korea)
Parallel Sessions	
13.00 – 15.00	Parallel Session #1 room 1,2 ,3, 4
15.30 – 17.30	Parallel Session #2 room 1, 2, 3, 4
	Closing ceremony at each room - Photo session - Best presenter

PARALLEL SESSION SCHEDULE (OCTOBER 20, 2020)

Room 1		
Parallel Session 1# (13.00 - 15.00)		
ID	**Title**	**Authors**
5	Life Assessment of Aluminum and Copper Winding Distribution Transformers Using Loss of Life Analysis	Zainal Arifin, Nugroho Adi, M. Herdy Ardiansah and Hastuti Aziz
18	Study Operation Demonstration Project STT - PLNofthe Battery Energy Storage System InButon Island (Baubau Southeast Sulawesi)	Erlina Erlina, Heri Suyanto, Retno Aita Diantari and Tony Koerniawan
20	Analysisof Modelling and Engineering Building Power Integration System Based on Renewable	Frengky Panjaitan and Syamsir Abduh

	Energy	
23	Micro-Spatial Electricity Load Forecasting Using Clustering Technique	Christine Widyastuti, Adri Senen and Oktaria Handayani
26	Feasibility Study for Development of Micro Grid System in Rural Island	Mansur Mansur, Salama Manjang, Ardiaty Arief and Yusri Syam Akil
87	Transient Stability Analysis of a Hybrid Grid-Connected Battery-PV in Baubau Power System	Heri Suyanto, Muhammad Hafidz and Ginas Alvianingsih
Parallel Session 2# (15.30 - 17.30)		
44	Control Strategy for Active Power Filter Based On P-Q Theory Under Non-Ideal Mains Voltages	Moh. Jauhari, Abdillah Fashiha Ilman, Lin Prasetyani and Tresna Dewi
51	Modeling for Diesel Power Plant Replacement	Tyas Kartika Sari, Dianing Novita Nurmala Putri, Fajardhani, Syamsir Abduh, Maula Sukma Widjaja and Chairul Gagarin Irianto
52	Photovoltaic and Diesel Power Plant Optimization for Isolated Island	Dianing Novita Nurmala Putri, Eddie Widiono Suwondo, Andrie Syatriawan, Syamsir Abduh, Ishak Kasim and Nazmia Kurniawati
53	Performance of PV Rooftop System Affected by Near Shadings Losses in Urban Area	Handrea Bernando Tambunan, Andreas P Purnomoadi, Putu Agus Aditya Pramana, Brian Bramantyo SDA Harsono, Anindita Satria Surya and Achmad Syerif Habibie
54	Design of Multistage Fast Charging Strategy on Lead-Acid Batteries	K.G.H Mangunkusumo, M. Ridwan, P.A.A Pramana and A.S Habibie
64	SCADA System Implementation for Small System Electricity	Kemas M.Tofani, P. A. Permana, B. B. S. D. A Harsono, Dhandis R Jintaka and K. G. H Mangunnkusumo
Room 2		
Parallel Session 1# (13.00 - 15.00)		
ID	**Title**	**Authors**
17	Early Warning and Information on Ultraviolet Radiation (200-800 Nm), Carbon Monoxide Gas and Temperature in Open Public Areas Using A Microcontroller-Based Fuzzy Logic Method	Vector Anggit Pratomo, Gunady Haryanto, Adhi Mahendra and Agung Saputra
32	Design of Prototype Measuring Motor Vehicles Velocity Using Hall Effect Sensor Series A-1302 Based on Arduino Mega2560	Muhammad Ifan Saputra, Sri Ratna Sulistiyanti, Sri Purwiyanti and Umi Murdika
55	Infusion Liquid Level Detection Tool Using IR Sensors and Photodiode Based on Microcontroller	Iswanto, Muhammad Sholeh Masnawan, Nia Maharani Raharja and Alfian Ma'arif
57	Control of DC Motor Using Proportional Integral Derivative (PID): Arduino Hardware Implementation	Alfian Ma'arif, Iswanto, Nia Maharani Raharja, Phisca Aditya Rosyady, Ahmad Raditya Cahya Baswara and Aninditya Anggari Nuryono

68	DC Motor Speed Control Based on Fuzzy Adaptive with Fuzzy Model Reference Learning Control (FMRLC) Algorithm	Masjudin, Alimuddin, Siti Nur Aisah and Romi Wiryadinata
59	Nutrient Film Technique for Automatic Hydroponic System Based on Arduino	Iswanto, Prisma Megantoro and Alfian Ma'arif
Parallel Session 2# (15.30 - 17.30)		
70	Growth of Yttria-Stabilized Zirconia Thin Films on Silicon-Wafer (100) By PLD - Pulsed Laser Deposition Technique	Agusutrisno, Abu Khalid Rivai, Edi Suharyadi, Mardiyanto and M. A. Shulhany
74	Data Transmission and Storage of Local Meteorology Station in Hybrid Power Plant System (Photovoltaic and Wind Turbine)	Romi Wiryadinata, Citra Nurizati, Anggoro Suryo Pramudyo, Irma Saraswati and Sabah Benzeghda
83	Cloud Classification from NOAA Satellite Image Using Learning Vector Quantization Method	Ceri Ahendyarti, Romi Wiryadinata, Neneng Rohana and Fadil Muhammad
45	Automatic Cataract Classification System Using Neural Network Algorithm Backpropagation	Ri Munarto, Mochtar Ali Setyo Yudono and Endi Permata
62	Detection of Hypoxic Symptoms System Based on Oxygen Saturation and Heart Rate Using Arduino-Based Fuzzy Method	Iswanto and Prisma Megantoro
58	Design of Automatic Headlight Based on Road Contour and Other Headlight Light	Fadil Muhammad, Dzulfiqar Dwi Yanto, Wahyuni Martiningsih, Vembi Noverli and Romi Wiryadinata
Room 3		
Parallel Session 1# (13.00 - 15.00)		
ID	**Title**	**Authors**
4	Utilization of Three-dimensional Spatial Maps in Access Point Placement Optimization	A. Bayu Primawan
7	Evaluation of Implementation of The Use of Enterprise Resource Planning System in Service Company	Priskila Christine Rahayu, Kornelius Feki Abednego and Rudy Vernando Silalahi
15	Optimization of Sugeno Fuzzy Logic Based on Wireless Sensor Network in Forest Fire Monitoring System	Setiyo Budiyanto, Lukman Medriavin Silalahi, Freddy Artadima Silaban, Ucuk Darusalam, Septi Andryana and Fajar Rahayu I. M
34	Towards Sustainable IOT Ecosystem	Shafiq Ul Rehman, Parminder Singh, Selvakumar Manickam and Supriyanto Praptodiyono
38	Improved Learning Outcomes of Descriptive Statistics Through the Test Room and Data Processing Features in The Mobile Learning Model	Susana Limanto, Fitri Dwi Kartikasari and Merlin Oeitheurisa
56	Heart Rate and Body Temperature Monitoring Based on Android Operating System	Anna Nur Nazilah Chamim, Jalu Rinaldi, Yudhi Ardiyanto, Iswanto and Alfian Ma'arif
Parallel Session 2# (15.30 - 17.30)		
84	True Random Number Generator Based on Wake-Up Ring Oscillator Utilizing Post-Processing Optimization to Generate Random Bit Sequence	Anang Adi Permana, Aprilia Kusuma Dewi and Magfirawaty

75	Design of Intelligent Decision Support System for Sugar Cane Supply Chains Based on Blockchain Technology	Ratna Ekawati, Yandra Arkeman, Suprihatin and Titi Candra Sunarti
81	Comparison of Authentication Schemes on IoT	Aulia Nurul Azizah, Fauzan Budi Setiawan and Magfirawaty
60	Integration of Firewall and IDS on Securing Mobile IPv6	Supriyanto Praptodiyono, Moh. Jauhari, Rian Fahrizal, Iznan H. Hasbullah, Azlan Osman and Shafiq Ul Rehman
82	Implementation Multipath Routing with Equal Cost Multipath (ECMP) And Per Connection Classifier (PCC)	Rian Fahrizal, Muhammad Iman Santoso and Muhammad Zainul Arifin
Room 4		
Parallel Session 1# (13.00 - 15.00)		
ID	**Title**	**Authors**
30	Random Forest Regression for Predicting Metamaterial Antenna Parameters	Nazmia Kurniawati, Dianing Novita Nurmala Putri and Yuli Kurnia Ningsih
10	Performance Evaluation of Body Temperature Data Transmission Using Turbo Codes In 4G-LTE	Damar Widjaja and Dimaz Damar Wisya Wicaksana
22	Size Reduction of Multiple Feedline Microstrip Antenna Using Peripheral Slit Technique	Syah Alam, Lydia Sari, Indra Surjati, Rakesh, Yuli Kurnia Ningsih and Newton Onasie
35	5G NR Planning at Frequency 3.5 Ghz: Study Case in Indonesia Industrial Area	Rai Nur Esa, Alfin Hikmaturokhman and Achmad Rizal Danisya
66	Design of A Microstrip Antenna Dual Band Patch Rectangular Using A Combination Stub and Slit Methods for LTE And Wi-Fi Applications	Herudin, Anggoro Suryo Pramudyo and Teguh Firmansyah
48	Performance Comparison of GPRS And LTE Telecommunication Network Using Openairinterface And OpenbtsWith USRP	Yeremia Nikanor Nugroho, Riri Fitri Sari and Ruki Harwahyu
Parallel Session 2# (15.30 - 17.30)		
36	5G NR Planning At Microwave Frequency : Study Case In Indonesia Industrial Area	Ghina Fahira, Alfin Hikmaturokhman and Achamd Rizal Danisya
67	Design of A Microstrip Antenna Array Dual Band Using Stub Method	Herudin, Teguh Firmansyaha and Anggoro Suryo Pramudyo
89	Gain Improvement of Array Microstrip Antenna For Microwave Radio Communication System	Yuli Kurnia Ningsih, Syah Alam, Indra Surjati and Marsun

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