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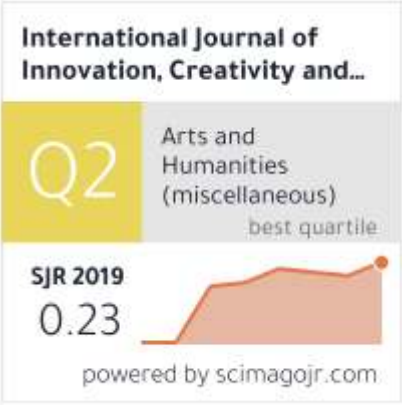

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Special Edition: Blended Learning, Education and Technology

Implementation of Blending Learning, Education technology and Innovation in Industrial Revolution 4.0

Guest Editor: Eko Susanto

Universitas Muhammadiyah Metro, Kota Metro, Lampung, Sumatra, Indonesia

Pdf (/images/vol5iss6/5601_Ponto_2019_E_R.pdf)

Developing Students' Science Process Skills in the Learning of Electricity

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The science process skill (SPS) is one of the skills needed by humans to face the challenges of the industrial revolution 4.0 in the 21st century. Students who have an SPS are able to understand scientific concepts including basic and complex basic electric circuits (BEC). The research objective is to develop students SPS by using teaching discovery learning methods (TDLM) and their impact on student learning outcomes of BEC (OLBEC). The research method is quasi-experiment. Participants in this research are 72 students consisting of an experimental group using the TDLM model and the control are 36 students. The research data is analysed by using the Manova statistics. The research finding obtained that students SPS and OLBEC who followed the TDLM approach are higher than students who take CTM. Pages 1 to 18

Pdf (/images/vol5iss6/5602_Sulindawati_2019_E_R.pdf)

The Implementation of a Village Financial Administration Teaching Model through Microsoft Excel Program

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This study aimed at testing the validity and evaluating the implementation of a village financial administration teaching model through a Microsoft program excel that has been developed. The study used Sugiono's development method in its trial and product revision stages. The data were collected through observation, interview, documentation and evaluation of learning achievement of the village apparatus. The data used in this study were analysed using a quantitative analysis. The quantitative analysis was used to evaluate the result of the trial of the model and to evaluate the learning achievement of the village apparatuses. Based on the result of the validity testing by experts it was found that the mean of the content validity is 3.24, falling into a reliable category, R = 93.8% and the mean of the construct validity is 3.22 with R = 92.8%, falling into a reliable category, which means that the teaching model is valid and reliable. The mean of the learning achievements of the village apparatuses = 87.63%, falling into a very good category, which means that the village apparatuses understands the teaching model and this model helped them to do the administration and operate the village financial system. Pages 19 to 34

Pdf (/images/vol5iss6/5603_Robiyansah_2019_E_R.pdf)

The Use of The Android-Based Game to Enhance English Vocabulary of Students with Hearing Impairment in Inclusive Schools

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This study aimed to describe the use of an Educational Vocabulary Game (EVG) application to improve the English vocabulary and designed to test the practicality and effectiveness of an EVG application in improving functional English dictionary among students with hearing impairment in an inclusive school. This study was development research, which involved several steps, including concepts, design, material collection, manufacturing, and field testing. Data were collected through observations and tests. Participants were twenty students with hearing impairment and five teachers in an inclusive school in Indonesia. The results of the study showed that the average score of the pre-test was 6.5, while the average rating of the post-test was 8.9. Moreover, the highest score of the post-test was 9.5. Furthermore, the practicality test reported a score of 98.66%. Based on these results, the use of the EVG application was useful and practical to improve the learning outcomes on English vocabulary among students with hearing impairment in an inclusive school. Pages 35 to 44

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ESL Undergraduates' Perception towards MOOC Embedded in Flipped Classroom

Melor Md Yunus[a], Harwati Hashim[b], Karmila Rafiqah M. Rafiq[c], Mohammad Azreen Ariffin[d], Alwani Izzati Shahudin[e], Wan Anisa Hafiqa Hussain[f], Faculty of Education, Universiti Kebangsaan Malaysia[a,b,c,d,e,f], Email: [a]melor@ukm.edu.my, [b]harwati@ukm.edu.my, [f]karmilarafiqah@gmail.com

The rapid advancement in technology has given rise to the development of the Massive Open Online Course (MOOC). Thus, the usage of MOOC is seen as among the preferred method, which is embedded in a flipped-classroom approach. This study investigated English as a second language (ESL) and undergraduates' perceptions towards the use of MOOC embedded in a flipped classroom in Teaching Writing in an ESL Context course. A quantitative research design was employed in this study where a questionnaire was the instrument used. Data were collected among ESL undergraduates at a faculty in one of the public universities in Malaysia. Data were analysed using percentages. The findings of this study showed that a majority of respondents give positive feedback towards the use of MOOC embedded in a flipped classroom. It implied that the use of MOOC should be highlighted and prioritised in the current teaching pedagogy. Pages 45 to 57

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The Influence of Post-Training Monitoring and Mentoring on Teachers' Competencies of Inclusive Education in Elementary School

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The research was motivated by the problems found in post-training. Teachers rarely applied the knowledge they acquired during the training due to the unavailability of post-training monitoring. This research aims to investigate whether the control and mentoring post-training effectively improve the performance of teachers in implementing inclusive education. The research method used was a survey method with an ex post facto design. Samples selected were teachers who participated in the 2016 inclusive education training. Findings showed that; (1) teachers' competencies of inclusive education have improved after the post-training (2) training and assistance have a significant influence on enhancing teachers' performance in implementing inclusive education in elementary school.Pages 58 to 67

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Scaffolding Approach in Teaching Writing in English as a Second Language (ESL) Context

Melor Md Yunus[a], Harwati Hashim[b*], Fetylana Nor Pazilah[c], Nurdania Nazuwa Rusadzeli[d], Nurul Syasika Tijan Bolkan[e], Dineswari Segakumaran[f], Universiti Kebangsaan Malaysia, Email: [b*]harwati@ukm.edu.my

This paper aims to identify the perceptions of Teaching English as a Second Language (TESL) and students' knowledge of the scaffolding approach in learning to teach writing in a ESL context. A total of 37 students who are doing their Bachelor's degree in Teaching English as a Second Language in a university in Malaysia participated in the research. Data were collected using a survey and were analysed using frequencies and percentages. The data revealed that most of the respondents have an excellent perception of the scaffolding approach, and generally, almost all agreed that it has positive impacts on teaching writing. It has shown that the scaffolding approach is an effective way to enhance students' potential in learning, specifically in learning to teach writing. Pages 68 to 80

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Benefits of Gamification Towards Different Learning Styles in Language Learning

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In the modern age, chalk and talk may not be as relevant as it was a decade ago. With the technology advancing exponentially, it has provided the earth citizens with its practicality and flexibility, particularly in language learning. However, there is still a majority group of people who have not fully utilised learning through technology. Gamification is one of the effective ways to learn a language as it also caters to all different types of learners. This paper aims to study the benefits of gamification towards different learning styles in language learning. This study implies that implementing gamification in education can help students to achieve their targeted goals in language learning and making teaching easier for the teachers. Future studies can investigate the challenges of gamification learning. Pages 81 to 89

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MOOC for Training: A Review of The Variations Of MOOC

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As the Internet of Things (IoT) is paving it's way into various industries, the educational field is changing from formal classroom to online education, where learning is not only restricted to face-to-face interaction but also virtually. This paper aimed to review the different models of MOOC, which can be used as guidelines to carry out online training. The discussion revolves around the various models of MOOC, whereby learning theories are used as a foundation. Ranging from cognitivist to connectivity, the models of MOOC keep emerging to suit the current demands of learning and to cater to the needs of each individual. The considerable variation of MOOCs does not make the earlier models to be ineffective, yet the later models complement the earlier ones. These discussions will be able to guide and provide an overview for educators and researchers in designing and developing MOOC, especially for professional training in the working field. Pages 90 to 98

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Flipped Learning in Malaysia

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The 21st century of education demands for student-centred learning rather than conventional teacher-centred learning. There are several new models and approaches to be adapted to meet the demand. One of the popular models in Malaysia is flipped learning. Flipped learning focuses on meaningful learning, and it also promotes a student-centred learning style. This paper explores flipped learning studies done by researchers regardless of the disciple and level of education. Pages 99 to 111

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Students' Digital Literacy Skill to Solve Learning Problems

Dony Darma Sagitaa[a*], Asni[b], Fatma Nofriza[c], Fitniwilis[d], Feli Cianda Adrin burhendi[e], Rizki Dwi Siswanto[f], Counseling Guidance Study Program [a,b,c], Department of Physics Education[d,e], Mathematics Education Study Program[f], Universitas Muhammadiyah Prof. DR. HAMKA, Email: [a*]donyds@uhamka.ac.id

This study aimed to see the extent of students' digital literacy skills in managing learning problems. The method used was descriptive qualitative with questionnaires and interviews. The results show that the students had the ability of digital literacy at the current stage of scholarship, or it can be said that the students were interested in digital literacy. In some circumstances, the students had not been able to sort and criticise the information contained in the information system in solving learning problems. Therefore, there is a need for guidance for students to improve their digital literacy skills in solving the learning problems.Pages 112 to 122

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Development Combinatorics Realistic Mathematics Education Application based on the Android Mobile

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This development research aims to produce an Android-based combinatoric application as a learning medium for high school students and to find the quality of the combinatoric applications for use in mathematics learning. This research is a research and development (R&D) adapted from the 4D development model. There are four stages: Define, Design, Develop, and Disseminate. Data analysis techniques are used in the feasibility test and the quality test of the media. The results showed the feasibility of an Android-based combinatorics application based on the assessment of media experts was 75.00% with proper criteria, and the evaluation of 2 material experts was 82.32% with suitable principles. The media was tested publicly from 50 students of South Tangerang 6 Public High Schools and MA Kafila. The result of the public trial obtained an application quality result of 83.20% with suitable criteria. Based on the results of data acquisition, it shows that Android-based combinatorics applications are appropriate to be used as a source of mathematics learning at the high school level. Pages 123 to 140

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Kahoot!: Engaging and Active Learning Environment in ESL Writing Classrooms

Melor Md Yunus[a], Harwati Hashim[b], Haida Umiera Hashim[c], Zaidatul Shima Yahya[d], Farah Sabrina Sabri[e], Adriana Nasuha Nazeri[f], Faculty of Education, Universiti Kebangsaan Malaysia[a,b,c,d,e,f]

The aim of this paper is to examine the use of Kahoot! for teaching writing in English as a Second Language (ESL) classroom to create engagement and active learning. The purpose of this study is to measure the effectiveness of Kahoot! for teaching writing in the ESL classroom. This was accomplished through a quantitative design which is a survey regarding the use of Kahoot among third year Teaching ESL undergraduate students in a public university in Malaysia. A total of forty undergraduate TESL students were selected as participants for this study and the questionnaire was designed by using online form via Google form. The survey in this research is focusing on the effectiveness of Kahoot in creating engagement and active learning for teaching writing. The results show that students think the Kahoot! implementation and helps them to enjoy the class compared to the traditional method. The findings also show how the use of Kahoot can create engagement and active learning among students for teaching writing in the ESL classroom. Pages 141 to 152

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Implementation of Blended Learning to Use Discovery Learning Method

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The focus of this research is to find out how to implement blended learning in university and how much influence it has on calculus I learning outcomes with the discovery learning method. The method used in this research is quasi-experimental, with a non-equivalent pre-test/post-test control group design. From the research of students' Implementation of Blended Learning using Discovery Learning Method in Calculus I Courses, it has the result of the extended score between X_{max}(highest score) = 85 until X_{min} (lowest score) = 45 in the total sample of 30 students. The mean () is 66.10 ; variant (s^2) is 92.73 and standard deviation (s) is 9.63. The results of this study indicate that there is a positive influence of blended learning to use discovery learning models in the calculus I course. From the computation of the experiment and control class by using the t-test, it is found that $t_{observed}$ = 1.8. While insignificant level of α = 0.05 and df (30+30-2) = 58, found that $t_{table(1-α;(58))}$ = 1.67. Because $t_{observed}$ = 1.8 > $t_{table(1-α;(58))}$ = 1.67, it means that research hypothesis (H_0) is rejected and (H_i) is accepted. So, it can be stated that there is a significant influence of the Blended Learning to use Discovery Learning Method in the Calculus I Course.Pages 153 to 163

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Video Games: The Game Changer in Teaching Writing for ESL Learning

Haida Umiera Hashim[a], Melor Md Yunus[b], Harwati Hashim[c], Faculty of Education, The National University of Malaysia[a,b,c]

Being able to write excellent academic writing has become a problem among English as Secondary Language learners. Learners tend to be wrong in writing and not show much interest in writing academic writing. One of the reasons for this is because of the conventional approach by educators that are making learners not to feel motivated to write and cause a lack of writing skills. Due to that, to motivate students to be engaged in writing, an intervention of video games is used in teaching writing for ESL learning. The use of video games, specific Players' Underground Battle, or widely known as PUBG, is used in motivating learners to write. A few words or phrases were taken from the video games, and learners needed to write a page of writing out of them. Based on the findings, it can be seen that the intervention of video games has helped learners to be more motivated and creative in writing. Pages 164 to 172

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Learners' Language Learning Strategies in Rural Secondary School

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Language is the medium of communication and instruction among learners around the globe. Successful language learners employ various language learning strategies. This survey aims to explore the suitable language learning strategies and categories applied by Form 2 learners in a rural secondary school in the Cameron Highlands district in enhancing their listening, speaking, reading, writing, and vocabulary skills. Respondents replied to the self-administered questionnaires, which were adapted from the study (Rose & Yunus, 2016). Data were collected, analysed, and administered descriptively using valid percentages. Significant findings revolved that most learners favoured the writing and memory strategies in developing their language competencies. Based on the results, they were highly identified as memory and audiovisual learners in performing language skills. The researcher believes that the results would be a turning point for language practitioners and educators in devising and conducting suggested materials and tasks considering the best language learning strategies preferred by the learners.Pages 173 to 186

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Successful ESL Learners' Strategy Use for Writing Skills

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Every learner has different ways and strategies in building excellent writing skills. Past researchers have suggested that good second language learners have a greater awareness of the strategies used in their learning. However, there are insufficient studies that focused on successful language learners from lower secondary students. Therefore, this study aimed to seek out the ESL learning strategies used for writing skills by lower secondary students. This study employed a quantitative approach where 15 successful language learners from a public school were involved. Based on the findings, the most important strategies used by successful language learners are reading, producing a draft before writing, and also using a dictionary to acquire vocabulary. This study provides knowledge and understanding of the possible strategies that can be promoted to all second language learners in the future. Pages 187 to 196

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Need Assessment of Parents of Children with Cerebral Palsy Observed from Family Counselling

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Caring for a child with cerebral palsy can impact the quality of life of the parent. Raising a child with cerebral palsy is stressful for the parent because it requires intensive physical engagement, such as family counselling. Raising a child who has cerebral palsy creates fresh challenges for the whole family. Family counselling is a disability waiver service that includes counselling for the person and family members who serve as unpaid caregivers as identified in the individual plan of care. This study aimed to determine the needs of parents who have cerebral palsy children. The object of this research is 13 parents who have cerebral palsy children in Padang. A qualitative study was conducted utilising a grounded theory framework, with data collection through literature study, observation, and also using a questionnaire. The analysis tool used is explanatory research. Pages 197 to 207

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Challenging Parenting Issues on Developing a Disciplined Character for Elementary Students

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The purpose of this study was to get a deeper understanding of a suitable parenting training approach to develop a disciplined character for elementary school students. This research is a pilot project. The sample in this study was 79 parents of students in three schools and three teachers of students in the three schools and three students. The instruments used were the Scale of *Pembentukan Karakter Disiplin Siswa Sekolah Dasar (PKDSSD)* and Focus Group Discussions. Data analysis used is a qualitative descriptive approach with thematic analysis and the Wilcoxon test to determine the suitability of the participants. This research portrays the urgency of parenting training to develop disciplined character, and this information can be used by counsellors, teachers, and parents for the formation of elementary school students' disciplined character.Pages 208 to 218

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Has a Fear of Missing Out Contributed to Phubbing Among Students?

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Smartphones have a negative impact on changes in student behaviour; the social interaction that is done directly has turned into communication with the help of smartphones and internet access. The purpose of this study is to describe the contribution of FoMO to Phubbing in school. The sample consisted of 1534 male students (n = 646), female (n = 888) spread in junior high schools (n = 295), high schools (n = 734), and vocational high schools (n = 505), which was selected by using the Purposive Random Sampling technique. Data were collected through two questionnaires administered online, namely: (1) internet FoMO (Fear of Missing Out) instruments, and (2) Phubbing instruments. The instrument used was a Likert scale model, with five answer choices. The results showed that the contribution of internet FoMO (X) was significant towards phubbing behaviour (Y), seen from the contribution given by FoMO internet by 35.2% to students' phubbing behaviour. Pages 219 to 230

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Konselo App: The Future of Distance Counselling and Therapy Applications Based on Android Technology

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The internet is one of the main drivers in the development of technological innovation and the industrial revolution, which tends to play important roles in various sectors of human life. One implication of this technology is the development of a mobile operating systems such as Android and iOS. However, its use in mental health interventions is still limited. This research, therefore, aims to develop an Android-based platform that can be used to connect counsellors with clients in the context of mental health interventions, irrespective of their distances. Data was obtained from 10 counsellors and clients which included 174 respondents in the preliminary study regarding the application content. The data obtained was then analysed by using the Rasch Analysis, Kendall's Concordance Analysis, and Network Psychometrics Analysis. The results of the study showed that the developed application fulfilled the requirements and was widely accepted by respondents. Pages 231 to 244

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Exploration of Active Smartphone User's Mental Health and the Opportunities of an Internet-Based Therapy Approach.

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The internet is the latest technology developed in various sectors of life. This technology provides its users with ease of access, simplicity, huge data storage, connectivity, amongst other conveniences. One implication of this technological development is implemented through the use of a smartphone. This device brings a major change in daily life and human social complexity. Indonesia, as a developing country, has the largest smartphone use potential in Asia. However, excessive use raises new mental health issues for individuals. The intervention of mental health services in Indonesia has not been able to reach all clients. Additionally, the use of internet-based services are unknown and not yet measurable through various researches. This study aims to explore the mental health condition of active users of smartphones in Indonesia and internet-based usage opportunities for its services. This preliminary study consisted of 174 respondents spread throughout Indonesia with diverse demographics. The data findings were analysed by using network psychometrics and Rasch analysis. The results showed that, in general, some mental health disorder was found among users who actively use smartphone related to social conditions. The opportunity to use internet technologies to reach individuals with disturbed mental health conditions are significant. Respondents want internet-based services to be provided before meeting counsellors and psychotherapists personally. Pages 245 to 254

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Cognitive Counselling in Developing Cross-Gender Friendship

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Cross-Gender Friendships (CGFs) are relationships between men and women who are not attached. Through observing high school students in the Buleleng district, it was found that some teenagers show friendly attitudes with male or female friends, while others show distancing behaviour and will not to get too close to male or female friends. Boys will gather with boys and vice versa with girls. Seeing the phenomenon of low CGFs, it is necessary to be counselled. This research is a quasi-experimental study in which the research design uses an experimental group and a control group. The populations in this study were middle school adolescents in Buleleng district. Sampling was conducted by the purposive technique in which the characteristics of adolescents who have low CGFs were used as research subjects. The number of samples included in the criteria was 44 respondents. The data analysis technique used was two-way ANOVA. The results showed that Cognitive Counseling was effectively used in developing CGFs in adolescent boys and girls. The low CGFs in adolescents is developed using Cognitive Counseling. It is recommended that counselors can be used as an alternative to providing counselling services.Pages 255 to 262

Pdf (/images/vol5iss6/5625_Taufik_2019_E_R.pdf)

Phubbing Behaviour in Indonesian Students

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This research is motivated by the increase in phubbing behaviour in Indonesian students . This behaviour does not only affect their learning activities but also disrupts their psychological and social life. The researchers will analyse the objectives of this research which focuses on the phubbing level among a student. The research approach is quantitative descriptive, with a sample of 1124 students. A purposive sampling technique is used. Collected data used includes phubbing inventory, with items reliability 0.96 and respondent reliability 0.92. The data analysed used descriptive and deferential analysis. The results showed that for the students whose phubbing behaviour was in the high category, there was no difference based on gender and ethnicity. It can therefore be concluded that there is a need for collaboration and a comprehensive effort to reduce the problem of phubbing. Pages 263 to 272

Pdf (/images/vol5iss6/5626_Putra_2019_E_R.pdf)

Teacher's Pedagogy Competencies for Managing Classes in Inclusive Schools

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This research aims to describe the pedagogical competence of teachers in inclusive schools. This research was conducted at a Junior High School in the Sidoarjo Region of East Java Province, Indonesia. To achieve the research objectives, semi-structured interviews were conducted with school principals, teachers, and school supervisors in inclusive schools. This research data was analysed through the stages of a case study and phenomenological analysis. The results showed that the importance of teachers in inclusive schools to apply pedagogical competence in managing classrooms. The ability of teachers to use pedagogical competencies varies, including the understand of student characteristics, changing curriculum, teaching methods, teaching strategies, and conducting student assessments. The results become a reference in the development of teachers in inclusive schools.Pages 273 to 282

Pdf (/images/vol5iss6/5627_Sidarta_2019_E_R.pdf)

The Implementation of Quality Culture in Primary and Secondary Education with Internal Quality Assurance System in Indonesia

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This study aims at describing the ability of school staff to implement internal quality assurance systems of education and quality culture. This formative evaluative study involved surveys of 228 principals and members of the school education quality assurance in East Java, Indonesia. Data on the research analysis used is descriptive and was obtained by describing each indicator. The results of the research showed that schools had implemented an internal quality assurance system and implemented a quality culture. Research findings also show that in implementing quality culture, there is still a lack of involvement of the school's internal parties and the school's external parties. Pages 283 to 294

Pdf (/images/vol5iss6/5629_Muryanti_2019_E_R.pdf)

Teacher's Support on Child Directed Play and its Contribution to Children's Development

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This paper discusses teacher's support on children directed play and the benefits of play in children's development. Children's directed play is the context of play engaged by children's initiation. Children's holistic development can be stimulated through children's directed play. The importance of children's directed play is often ignored by adults. Play is a primary approach of learning in Indonesia kindergartens as stated in Indonesia's early childhood education curriculum, 2013. Given the importance of play for children's holistic development, this paper will explore and analyse teacher's support of children's directed play and its contribution to children's development. Pages 295 to 303

Pdf (/images/vol5iss6/5632_Asrobi_2019_E_R.pdf)

Unsustainable English Learning: The Factors Inhibiting Retention of 'English as a Foreign Language' (EFL) in an Indonesian University

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This study aims to analyse the unsustainable experience of English learning for 'English as a Foreign Learner' (EFL) students. To determine the main factors, this descriptive qualitative study selected 120 student-participants using an opportunistic sampling technique. Data was collected using observations, questionnaires, and interviews. An instructive model technique analysed the data via three components: Reduction, presentation, and verification of the data. The study found three main factors contributing to students' experience of English learning as unsustainable: Students had a lack of basic knowledge in the English language; Appropriate materials were not provided in the classroom, and; The classroom environment was lacking support enough to expose and enhance students' basic knowledge and skill level. Pages 304 to 313

Pdf (/images/vol5iss6/5633_Aswasulasikin_2019_E_R.pdf)

The Influence of Adolescent Soap Opera on Elementary Students' Behaviour

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Many elementary school students are imitating the scenes from the shows they watch and practicing martial arts scenes with friends at school. Most students like soap operas with action and drama genres, and often resemble the scenes at school. Everyone of all ages can watch adolescent soap operas and full parental control cannot be fully exercised. This study looked into the influence of adolescent soap operas on elementary school students' behaviour. The research method conducted interviews with competent informants. Data were collected via the observation and discussions made, and both were documented. Data from the research conducted showed that adolescent soap opera does influence student behaviour. A student's behaviour might mimic scenes that are less educational from the shows, such as fighting by using violence to recognise love. This makes children precocious. Pages 314 to 324

Pdf (/images/vol5iss6/5634_Nahdi_2019_E_R.pdf)

Inside-Outside Circle: An Early Childhood Language and Literacy Development Method

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Aspects of language development and literacy, especially the ability to speak in children aged 5-6 years, is one aspect of special concern in child development. One method used to improve aspects of child language development and literacies is the method of 'inside-outside learning'. This quantitative research study used experimental research and paired sample t-test. Language development and literacy, especially the ability to speak using the inside-outside circle method, obtained the results of the test "t" (Paired T-Sample) with score t-count ≥ table (5.147> 1.706). Language development and literacy improved, especially the ability to speak, when using the method 'Inside-Outside Learning Circle' skills developed included the ability to intonate, communication skills, mastery of simple words, and increased ability to compose simple sentences. The application of learning by using the 'Inside-Outside Learning Circle' method is one of the useful innovation efforts in Early Childhood Education.Pages 325 to 335

Pdf (/images/vol5iss6/5635_Haritani_2019_E_R.pdf)

The Correlation of Undergraduate Course Research Experience and Critical Thinking Skills

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This research aimed to analyse the correlation of undergraduate course research experience and critical thinking skills in the context of laboratory research. The undergraduate courses in this research were basic chemistry, plant-determination, photochemistry, drug, food, and cosmetic analysis. The students in a pharmacy department developed critical thinking skills during their time, making and using solvents, determining plant , analysing the fractionating active compound, and analysing active compounds. This research was qualitative descriptive research and used observation and interviews to collate data. Eighteen students made up the sample population. The critical thinking skills were divided into low, middle, and high categories (percentage). The data show the same interval in mean, standard deviation, and category percentage in every category with the same participants. The descriptive analysis used observation and interview in four undergraduate courses during laboratory research experiences. The study shows a positive correlation between critical thinking skills in the pharmacy laboratory and the undergraduate course. Pages 336 to 347

Pdf (/images/vol5iss6/5636_Alizamar_2019_E_R.pdf)

Phubbing Behavior: How it's Related to Happiness

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Millennial society today may experience various problems including addiction in relation to their use of smartphones, the Internet, social media, and games. We also know this student behavior as phubbing behavior. 'Phubbing' is the term used to describe a person using a technological device while in the company of another person to whom they are not noticing or attending. This study analyses 'phubbing behavior' in Indonesia. 1093 students responded to the study in which a multistage random sampling technique determined participants' level of happiness (happy, unhappy.) via a Phubbing Behavior Scale (APBS). The data was collated using a research method that was comparative, quantitative and descriptive. Data was analysed with an analysis of variance. The results found 45.2% of Indonesian students experienced high expressions of phubbing behaviour (495 respondents). Judging from the correlated level of happiness in participants, there was no significant difference found: The people expressing high amounts of phubbing were not less happy. The mean of students who tend towards phubbing behaviour. This shows that phubbing in your daily life does not affect your happiness as an individual, but phubbing may be one factor inhibiting happiness. Phubbing others may lead to negative psychology and do more harm. Special attention from various stakeholders may assist society overcome the problems faced by students phubbing in socially interative spaces. Collaboration between various parties toward a shared goal for healthy socialising can be discussed further in future studies. Pages 448 to 358

Pdf (/images/vol5iss6/5638_Saaduddin_2019_E_R.pdf)

The Effects of Principal Leadership on Effective School Management

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The quality of education in Indonesia needs to improve. In order to achieve quality education the leadership of the school principal and the school management matters. This study was conducted to examine the influence of the principal and the school leadership on effective school management. This research is a quantitative descriptive study with a sample of 113 people. The study used the Likert model, as the principal's leadership instrument and effective school management instrument. Data analysis used descriptive analysis and simple linear regression analysis. The research findings show that the principal's leadership influenced effective school management.Pages 359 to 367

Pdf (/images/vol5iss6/5640_Satrya_2019_E_R.pdf)

The Discourse of Sasak's Art: From Tradition to Modernity

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This article discusses the discourse of art in Sasak, Lombok, in the context of Art Education. This research aims to examine the reality of painting styles in Lombok using Representation Theory in Cultural Studies. From this perspective, the research aim was to explore how the art of Sasak, Lombok is represented. Data was collected using library records and a discourse analysis was applied. There was not a singular art discourse for Lombok. The artistic tradition before the 2000s was dominated by a discussion of Traditional art. This corresponded with a nobility government in West Nusa Tenggara. Later between the year 2000 and 2010, specifically in the leadership period of Tuan Guru, Islam, discussions of Modernity were found to dominate written interpretations of art. The transition of leadership from the aristocracy to governance under the leadership of Tuan Guru correlated with the changing of Sasak's art discourse from Tradition to Modernity. Pages 368 to 377

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Development of an Online System to Reveal Student Learning Problems: Based on AUM SP.1 PTSDL

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Technology and information have evolved in various fields, with one such area being guidance and counselling. As such, school counsellors must be able to keep the balance between the pace of technological development with service processes that require school counsellors to use complementary technology. One such example is in the assessment process AUM SP.1 PTSDL, an online system application that can be used by school counsellors in the assessment process to reveal learning problems. This application can support school counsellors to develop more assessments without requiring as much time and energy compared to usual manual processing. Processing the instrument manual is an inefficient use of the school counsellor's time. As such, counsellors have difficulty using AUM PTSDL for the assessment process. The development of information technology that is present today fosters the need for counsellors to use applications or media that can facilitate their tasks by allowing them to use their energy and time more effectively and efficiently.Pages 378 to 389

Pdf (/images/vol5iss6/5642_Iswari_2019_E_R.pdf)

The Urgency of the Role of Guidance and Counselling Services in Assisting Career Planning for Deaf Students

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Deaf children are exceptional children who experience physical disabilities of hearing, which affects a lack of confidence in career planning. This problem highlights the role of school counsellors in planning students' careers by providing self-understanding and the correct environment through guidance and counselling services. This study aims to describe the differences in career planning for deaf students with and without counsellors in schools. The samples of this study were 96 students from13 high schools. The results showed that there is a significant difference between the career planning of deaf students in high schools with counsellors and those without counsellors at school. The profiles of career planning for deaf students, based on the presence or absence of school counsellors, was discussed further. Pages 390 to 397

Pdf (/images/vol5iss6/5643_Hanim_2019_E_R.pdf)

Development of Digital Character Education Comics to Improve Cognitive Empathy

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This research aimed to develop digital comics that are suitable for use as a medium of intervention in Group Guidance. The research method uses Hannafin and Peck's Model Research and Development method. This method step starts from the Needs Study, Design, Expert Test, Revision and Field Testing. This research reached the expert test stage. Overall media expert test results gave a percentage of 80% in the first comic design . Material experts as a whole gave a percentage of 71.7% in the first comic design. After the results had been improved, this reached 95% of the media aspects and 97% of material aspects. This showed that according to the digital comic expert produced as a viable medium for Group Guidance intervention to increase students' cognitive empathy. Pages 398 to 407

Pdf (/images/vol5iss6/5644_Anuar_2019_E_R.pdf)

Informal Caregiving of Senior Parents in Malaysia: Issues & Counselling Needs

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Caregiving can be challenging as it impacts the quality of the caregiver’s life. This study focuses on two research questions: 1) Issues faced by adult children in caregiving for their senior parents, and 2) Counselling support needed by the caregivers. Qualitative data was collected from in-depth interviews with thirteen (age = 30-59, gender = 9 females and 4 males) middle to high-income adult children residing in various places in Malaysia. Data was managed and analysed using Atlas.ti8 to find emerging themes. Two themes emerged for issues of caregiving including management of the senior parents’ health, emotions, and finances; and personal management of the caregivers and their relationships. Three themes emerged for counselling: the need for counselling services; the content of the counselling session and; the type of counselling. The results of this study support a need for more research and education on the elderly developmental process and caregiving as well as the development of related counselling services. Pages 408 to 420

Pdf (/images/vol5iss6/5647_Bakar_2019_E_R.pdf)

School Guidance and Counselling Services for Special Education Students in Malaysia: A Literature Review

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The Malaysian Education Act 1996 gave the liberty to the Minister to establish special education classrooms at any schools that needed them, provided the students' population in those particular schools is sufficient. This clause has motivated the establishment of Program Pendidikan Khas Integrasi (PPKI) in government schools ever since. This move encouraged parents who have children with issues like learning disabilities and other categories of special needs, to send their children into the mainstream education system, and the numbers are growing every year. The uniqueness of these students and the special learning needed by them makes it essential for the educational system to provide holistic support elements in school settings. One of these vital elements is the counselling provision specifically tailored for this unique population of students. However, the current school counselling services provided are based more on the "one-size-fits-all" philosophy; thus, tends to ignore the needs of special education students. On top of that, the PPKI teachers are not given proper training or knowledge in counselling and guidance, which prevents them from helping the students effectively in school. This paper analytically reviews the literature, internationally and locally, with the main purpose to establish an overview of the provision of school counselling for special education students in Malaysia. Consequently, this literature review will initiate further research works to plan integrated strategies to enhance the existing school counselling services in the Malaysian education system. Pages 421 to 433

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Support and Opportunities: The Public Benefits Hearing at The National University of Malaysia, UKM

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We conducted this study to identify the support received and the obstacles faced by students with disabilities at the Institute Pengajian Tinggi Awam (IPTA) in Malaysia. The study sample was comprised of students with hearing loss. We obtained data from students in writing and through interviews conducted because the sample had hearing loss. Issues raised by students included those of a sign interpreter, library information help, disabled-friendly transportation system facilities, bureaucratic red tape and lack of empathy from some campus residents. The sample reported that they relied on close friends to assist them in attending college. Improving the quality of services and facilities for students with disabilities in Malaysian high schools was among the suggestions submitted as were efforts to increase awareness and overall understanding. Campus citizens about their challenges and needs and established a body that can communicate their needs of university administrators and take action that can create a more positive physical and social environment to reach their full potential. Pages 434 to 444

Pdf (/images/vol5iss6/5649_Tahar_2019_E_R.pdf)

Modifications of Student Behaviour Among Special Needs Students Using Art Therapy

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Art is a field that benefits the development of special needs students. This study was conducted to look at the therapeutic impact of art on students' special education learning behaviour as well as the level of student acceptance of art therapy activities in the learning process. This study is a qualitative descriptive case study using Albert Bandura's Modeling Theory and guided by the Person-Environment-Occupation Model (PEO). The sample of this study was 5 people consisting of students with special education learning in the age group of 7 to 9 years with various categories of disabilities. The study was conducted using a modified observation check instrument from the ABILHAND-Kids Questionnaire and Child Behaviour Checklist as well as structured interview questions by four expert teachers. The findings of the study were analysed using tables and graphs by the researcher. Studies have found positive effects on students' behaviour through art therapy activities as well as being well received in the learning process. It is hoped that this study will provide ideas for others to explore the therapeutic application of art in the education of special education students. Studies that focus on students with specific disabilities categories are recommended for further study. Pages 445 to 457

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Synchronous Approach in Improving Students' Speaking Competency

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Nowadays, the use of technology has changed teaching and learning experiences, and it is seen to be effective in enhancing teaching and learning of the English language. It enables learners to be more motivated and independent. Although it is challenging to have the best approach to improve learners' speaking skills, it is proven by many researchers who have shown the positive outcomes of using technology in teaching and learning of English. Hence, we should admit that teaching and learning of English by using technology enhances teaching and learning of English speaking. Therefore, this article seeks to clarify the effectiveness of Live Speak in improving learners' speaking proficiency. Pages 458 to 467

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The Development of Android-Based Economic Teaching Materials for Student Independence

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Technological developments affect smartphone addiction, therefore smartphones must be utilised with positive goals, for example, increasing student knowledge in economic learning. The purpose of this study is 1) to determine the effectiveness of Android-based economical teaching materials, 2) to recognise students' independence in learning. The development model used is Research and Development (R&D) and Gall. Learning innovation is carried out in class X MA NW Assyafiiyah Tarekat, in East Lombok's Indonesian Congregation. The data obtained from the observation sheet of economic teaching materials based on Android after being tested in the implementation class is very good. The findings also revealed that after studying android-based economical teaching materials, students' independence was highly significant in independent learning. The research revealed that android-based economic teaching materials were highly feasible to use. Pages 468 to 482

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Mathematical literacy of ninth-grade students in solving PISA mathematics problems

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The purpose of this study is to analyse the mathematical literacy of junior high school students. There are three mathematical processes of mathematical literacy: Formulate, employ, and interpret. The participants of this study were four students in the ninth grade at two junior high schools in Lombok, Indonesia. Data was collected using a test and an interview. There were four Programme for International Student Assessment (PISA) mathematics items used in this study. A meeting was conducted to confirm the students' work in solving mathematical literacy tests. A qualitative descriptive analysis was used to analyse the results, most of the students had difficulties in interpreting, applying, and evaluating mathematical results. A small number of the students had problems formulating situations mathematically. Pages 483 to 495

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The Occurrence of Mental Disorders in Adolescents with Social-Emotional-Intellectual Disabilities

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Many parents may not realise that their children are suffering from a "mental disorder". Mental disorders that are identified late for adolescent individuals may cause social-emotional and intellectual obstacles later in life. This research aimed to examine the main factors underlying the experience of ‘Mental disorder’ for men during adolescence. The most visible indicator of the presence of a mental health disorder present in a male adolescent man is the weak interaction between himself, his family and the community. The research method used case studies which were analysed using a purposive sampling technique with the characteristics of a number of 19-year-old adolescent respondents who were male and had been diagnosed with mental disorders. In partnership with The Organization of Applied Psychology Center (APC) UIN Sunan Kalijaga Yogyakarta, we carried out instrumentation assessments. The results showed that: (1) Hypnotherapy doesn't have a significant effect on adolescent males with a mental disorder; (2) Attending to removing trauma must be considered when dealing with teen mental disorders and; (3) The main factors underlying mental disorder are parenting and trauma. Pages 496 to 508

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Effectiveness of Rex-Centra Counselling Model as a Psychological Treatment of PLWHA

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Although people with HIV/AIDS have to routinely have a medical check-up, there are empirical studies that show that they also need psychological treatment. People with HIV/AIDS need social support in their surrounding environment. This study aims to determine the effectiveness of Rex-centra's counselling model as a psychological treatment for people living with HIV/AIDS. The design of this study used a pre-posttest control group design. The respondents used were 12 people consisting of HIV recipients, people living with AIDS (i.e People Living with HIV/AIDS-PLWHA) and people who were at risk of contracting HIV/AIDS. Data was collected using a questionnaire and interview method. Evaluation of the success of the Rex-centra counselling model is known through changes in attitudes of PLWHA patients collected with attitude scale instruments and the data can be in the form of intervals. Data on the results of the research on the effectiveness of the Rex-centra counselling model was analysed using t-test. The findings indicate that the Rex-centra counselling model is effectively used as a psychological treatment for people living with HIV. So psychologically they are also helped to be able to move like other normal people. This research is limited to testing the effectiveness of Rex-centra's counselling model as a psychological treatment that is implemented in with PLWHA and people who were at risk of contracting HIV/AIDS. The results of this study have implications as one of the alternative references for making local policies in promoting life health and community behaviour, as well as a reference for developing the Guidance and Counselling curriculum as a place of service for young people in schools and in tertiary institutions. The Rex-centra counselling model is a research finding based upon the results of research on the developing stigma of people living with HIV. The Rex-centra counselling model has also not been applied by other researchers as a psychological intervention. Pages 509 to 522

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Sharing Experiences among People with Physical Disabilities through Rehabilitation Counselling Sessions

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Rehabilitation Counselling is an approach that is introduced to assist the person with a disability in solving their problems. The problems in question do not only involve rehabilitation from physical aspects but also takes into account their psychological, emotional, and social issues. The group counselling sessions were conducted in this study purposely to explore the participant’s experiences during the rehabilitation counselling session. Six subjects were involved in this study and participated in eight sessions based on eight sub-modules. The results show that several key themes are formed based on the experience gained during the session. The themes formed were 1: Views of the rehabilitation counselling session and 2: Experience of the rehabilitation counselling session. Among the subthemes formed are perception, acceptance, and reliability. The subjects translate experiences involving sharing, hopes, awareness, the need to express feelings and relationship issues. This finding shows that rehabilitation counselling sessions conducted by the peer group help them to work together in addressing issues encountered. In this way, they can feel that they are being heard and they are not alone having through difficult times in life. Thus, this study has shown that the rehabilitation counselling sessions not only assists the person with a disability to address and resolve their problems but also as a guide to counsellors in Malaysia in carrying out and exploring the disabled in depth. Pages 523 to 539

Pdf (/images/vol5iss6/5650_Anggraeni_2019_E_R.pdf)

Blending Humour and Animation in English Learning for Students of English Education Programs in Universities

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Most pedagogical approaches lay particular stress on inculcating knowledge while ignoring the significance of students' learning skills, interests, attitudes and confidence. Therefore, most students consider English learning as examination-oriented. Humour and animation can accommodate learning styles and enhance students' perceptions of the lesson being presented. Unfortunately, the fact is that the use of humour and animation in language teaching classes in our place does not draw enough attention. Thus, the new teaching and learning approach has not been widely applied. This study used both qualitative as well as quantitative methods to collect data. The qualitative methods included class observation, interviews, teaching material selection, analysis and animation video. The quantitative method focused on class project results. Sixty students of the English Education Department of Indraprastha PGRI Jakarta in their third semester 2019 were chosen in this study. The results of the survey clearly show that students' projects, which were taught utilising humour and animation, achieved better results. The results were exposed to contextualised language through the implementation of fun in animation. It indicates that there are potential benefits involved in the application of this new learning and teaching methodology, that is can enrich students' vocabularies, lead to an increase in comprehension of the contexts in animation, create new animation styles, and, therefore, more attention should be paid to this issue in the future. Pages 540 to 553

Pdf (/images/vol5iss6/5621_Daharnis_2019_E_R.pdf)

The Development of an Integrative, Collaborative Model of Counsellor and Parent Based on Android Technology to Reduce Student Learning Problems

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The challenges of rapid technological development require an educational pattern in the form of a curriculum that is adaptive to these changes. Educational success will be indicated through the ability of students to master the subject matter, the ability to face the challenges of the times, have a successful social life, and career preparation by following the stages of development. This success will be generated through counselling services that are also successful in schools. However, the study conducted by the author shows the process of learning activities in schools is not optimal, and the selection of study programs is not appropriate in students' continued education. This study aims to develop an integrative, collaborative model of school personnel with parents to optimize student learning processes based on Android technology. This research is development research using the ADDIE model approach. This study involved 142 counsellors and 150 parents of high school students. The research data was analysed using the Kendall concordance suitability index and Rasch analysis. The results showed that the integrative collaboration model using Android technology was effective in enhancing the counsellor's collaboration with parents to reduce student learning problems, especially concerning the difficulty of understanding material and achievement motivation. Pages 554 to 566

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Cyber Aggression of Students: The Role and Intensity of the Use of Social Media and Cyber Wellness

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Cyberspace aggression is a behaviour that is a relatively new phenomenon which can have significant consequences for young people's wellbeing due to the specific technological affordances of social media. This research is an investigation of the contribution of access intensity to the use of social media and cyber skills in the form of youth cyber wellness on cyber aggression behaviours. The study involved 283 high school students, aged 15-21 years in Kota Padang, Indonesia, using a self-report scale approach. The results of multivariate regression tests with ANCOVA show that the intensity of using gadgets and cyber health was proven to contribute to student cyber aggression even though the intensity of using social media separately had no significant effect on cyber aggression behaviours. The MANOVA test results explain that there were differences between cyber health and cyber aggression on male and female students. Pages 567 to 582

Pdf (/images/vol5iss6/5639_Bariyyah_2019_E_R.pdf)

The Development and Validation of a Multicultural Competence Scale among Indonesian College Students

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A counsellor needs a multicultural view in order to deal with cases relating to the culture of a society. The composition of Indonesian society across various ethnic and cultural groups often causes conflicts in the interaction between communities. Based on that, students, especially guidance and counselling students, do well to have this multicultural focus. An instrument was developed to measure students' multicultural competencies. This research is a quantitative study using Rasch Model analysis. The subjects of this study were 403 college students in Indonesia. The subjects of this study were selected using Cluster Random Sampling. The instrument used in this study is the student multicultural competency instrument developed from the theory of Constantine & Sue. Research data were analysed using the Rasch Model. The results showed that this instrument was suitable for the study because it had fulfilled the instrument's validity and reliability requirements. Pages 583 to 597

Pdf (/images/vol5iss6/Part_2/5651_Widodo_2019_E_R.pdf)

The Role of Leader-Member Exchange and Job Satisfaction on The Public Sector Employee Performance

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Social exchange theory examines the relationship of organizational leaders and subordinates and organizational performance, specifically the effectiveness of assignment and organizational performance. The objective of this research is to empirically examine the relationship between job satisfaction, leader-member exchange, and employee performance, with an emphasis on testing the effect of the leader on their subordinates. We utilize a survey method to collect the primary data and the sample utilised was employees of state-owned banks in the Bengkulu province. The estimation results of structural tests indicate that LMX has a positive and significant effect on employee performance as well as job satisfaction being found to be a determining factor for employees in increasing employee performance. The role of gender differences was estimated structurally in this research so as to test whether any different perceptions on two separate respondents. Based on the estimation results and the structural relations test between variables, it is shown that the relationship of job satisfaction on leader-member exchange in both groups of respondents is not significant. This indicates that there is no difference in perception between male respondents and female respondents in perceiving job satisfaction, LMX, and employee performance. Pages 598 to 615

Pdf (/images/vol5iss6/Part_2/5652_Utami_2019_E_R.pdf)

The Performance of Spending Budget: Governance and Human Resource Competence Perspectives (A Study on Ministries and State Institutions in Indonesia)

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The realization of a spending budget was often late in Indonesia. Delays occurred in both regional government and state institutions. The purpose of this study is to compare factors affecting the realization of budgets between ministries/institutions that have a high and low budget realization. Factors that were considered to influence the realization of the spending budget were (1) understanding of budget governance, (2) systems and procedures, and (3) human resource competencies. The populations are ministries and state institutions, and samples are chosen based on random and willingness to participate. The results of the study show that budget governance and human competencies have a significant positive effect on the realization of the spending budget. Pages 616 to 633

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Tourist Preference Mapping; Does Online Information Matter? - A Conjoint Analysis Approach

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Evaluation is the most crucial phase in tourism marketing, and tourists decide their preference based on information searches. Previous research has not established whether online information is a prominent consideration whereby it is essential in influencing a tourist's decisions. Research in tourism marketing is generally concerned with examining research using regression; however, an analysis of the essential factor that determines a tourist's desire is not less substantial. Conjoint analysis is a method to analyze factors that determine a tourist's preference. Research results reveal that cost is the primary factor to a tourist when arranging a vacation. The blog is an essential source for tourists to attain online information. Another insight is that tourist tend to be loyal and enjoy heritage and cultural tourism. Research implications are discussed for marketers and tourism stakeholders. Pages 634 to 644

Pdf (/images/vol5iss6/Part_2/5654_Suardi_2019_E_R.pdf)

The Effect of Environmental, Social and Governance Performance with Legal Institution on Earnings Management

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ESG scores can measure sustainability reports consisting of environmental, social, and governance (ESG) activities. This paper examines the role of the legal institution, including law, rules, and disclosures. The performance of the sustainability report is related to earnings management practice. The results show that the increase of a sustainability report or ESG score will reduce earnings management using discretionary accrual calculation. However, the role of the legal institution does not affect the relationship between the sustainability of companies and earnings management. This paper uses data from 12 countries in Asia and Europe. Pages 645 to 656

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Predicting Antecedents of Intention to Use Location-Based Advertising: Empirical Study of Telkomsel MyAds

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The technological capabiltlies of mobile phones is always developing. The Global Positioning System (GPS) facility that is in integrated with the mobile phone supports opportunities for practitioners to create innovative advertising channels such as Location-Based Advertising (LBA). This research was conducted to cover the absence of reserach as to how to increase the intention to for advertisers to use LBA in Indonesia. The purpose of this study is to examine relationships between variables that can affect the use of LBA. The variables in this study are the value of advertising, intention to use LBA, trust in the brand, concern for privacy, and confidence in privacy. The data collection was conducted using a questionnaire and with a purposive sampling method. The number of respondents was 200. The data is analyzed using Structural Equation Modeling (SEM). The results show that four of the formulated hypotheses are accepted. The four hypotheses are: 1.) a significant positive relationship between the value of advertising and the intention to use. 2.) The plan to use has a meaningful negative relationship with concern for privacy. 3.) Trust in the brand has a significant negative relationship with interest for privacy. 4.) There is a significant negative relationship between self-confidence in privacy and concern for privacy. This study also covers the limitations of such and provides suggestions for further research. Pages 657 to 668

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The Effect of Entrepreneurial Values and Entrepreneurial Orientation on Micro, Small, and Medium Businesses' Financial Performance

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This study tries to explain a conceptual model with main the variables of Entrepreneurial Values, Entrepreneurial Orientation and Financial Performance of Micro, Small, and Medium Businesses. The purpose is to investigate the relationship between (1) entrepreneurial orientation and financial performance, (2) entrepreneurial values and financial performance, (3) entrepreneurial values and entrepreneurial orientation. The target population is 32 selected micro-small-medium businesses in Indonesia. A census approach is used in this study and utilizes questionnaires as instruments to collect data from the founders of those businesses. The statistical method of PLS-SEM is used to process the data collected. The findings provide that there is a positive relationship between (1) entrepreneurial value and financial performance, (2) entrepreneurial value and entrepreneurial orientation, and (3) entrepreneurial orientation and financial performance. Although the model has not incorporated some moderating variables such as external and internal variables, it will be an interesting topic for further research testing. Pages 669 to 681

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Retaining Customer Loyalty through Implementation of Recovery Strategies in the Food and Beverage Industry – A Case Study of a Fine Dining Restaurant in Jakarta

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Excellence is the absolute prerequisite in fine dining because the prices charged are necessarily high. Therefore, service error/service failure occurrence in dining operations tend to be avoided. However, a report states that 60% of restaurants fail within the first three years of their operation, and it was identified that service failure within the process was among the root causes. Therefore, to avoid customer dissatisfaction within an establishment, the implementation of a service recovery action is crucial to move customer dissatisfaction to satisfaction. The purpose of this research is to explore the correlation between service and customer loyalty as well as to explore ways or strategies in service recovery implementation that would effectively influence customer loyalty. The research findings reveal that slow/unavailable service, placement of incorrect orders, and product quality were identified as the most commonly occuring issue in service failure. At the same time, apologies, item replacement, and management intercession were the most popular recovery strategies leading to customer loyalty intention. The results of this study indicate that the recovery strategy has an impact of 42% on customer loyalty intention. Pages 682 to 692

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The Impact of Perceived Value on Customer Loyalty: A Case Study of GrabFood Consumers

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This research aims to identify the impact of perceived value on customer loyalty in the case study of GrabFood consumers in Jakarta. Perceived value is measured through customer-perceived benefits and sacrifices. The data was collected from 190 customers who have downloaded and used GrabFood. Multiple linear regressions were used to examine the collected data. The finding indicates that perceived value significantly impacts the loyalty of GrabFood customers. All indicators of perceived benefits impact customer loyalty, and the strongest influence on customer loyalty is perceived enjoyment, while the least is perceived money saving. Meanwhile, the quality risk becomes the only indicator of customer perceived sacrifices that impact customer loyalty. Perceived fee, delivery risk, and privacy risk are found to have no significant impact on customer loyalty. This study provides several suggestions for Grab Indonesia to enhance customer loyalty towards GrabFood by considering perceived benefits and sacrifices as determinants of perceived value. Pages 693 to 706

Pdf (/images/vol5iss6/Part_2/5662_Nagoya_2019_E_R.pdf)

Determinant Factors of University Choice for UPH Students

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The objective of this research is to answer the following questions. Firstly, is there a positive correlation between the Quality of Academic Resources and University Choice? Secondly, is there a positive correlation between University Spirituality Value and University Choice? Lastly, is there a positive correlation between Applied Oriented Service and University Choice? This study is based on Questionnaires distributed among 153 students at Pelita Harapan University (UPH), Tangerang. The data was analysed using Partial Least Square – Structural Equations Modelling (PLS-SEM). The results of this research showed that the Quality of Academic Resources, University Spirituality Value, and Applied Oriented Service has a positive correlation with University Choice. This research can be used by Pelita Harapan University or other Higher Education Bodies to examine their curriculum relating to those three Variables. Pages 707 to 719

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The Effect of Technology Readiness, Service Quality and Perceived Risk on Relationship Quality, and the Implications for Continuance of Intention - Study on Users of BCA Mobile Banking Applications

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Many banks in Indonesia compete to provide a digital platform that is useful for conducting banking transactions by presenting mobile banking. To be able to compete, the presence of mobile banking must be able to build a good quality relationship with customers. BCA mobile banking (m-BCA) is a mobile banking service that comes from one of the largest banks in Indonesia. But field observation shows there are many complaints from m-BCA customers that can lead to discontinuation of using m-BCA. The study aims to determine the effect of Technology Readiness, Service Quality, and Perceived Risk that can affect Relationship Quality and provide implications for Continuance of Intention on m-BCA. The quantitative method is used in analysing this study, as well as collecting data by distributing questionnaires to 105 respondents. The data gathered is being examined by using the Structural Equation Model (SEM). The results in this study indicate that five proposed hypotheses have proven that there is a positive effect on continuance intention. Still, technology readiness isn't proven as a significant effect on perceived risk. Pages 720 to 734

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Business Analysis and Design of Open Trip Planner for Online Marketplace

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In the travel industry, the existence of the open trip planner (OTP) is rapidly increasing. The amateur open trip planner needs a platform that is able to increase its sales and manage its participants. This thesis research objective is to develop a business analysis and design for an open trip planner online marketplace startup company. An in-depth interview was conducted with several business actors who are active in the travel industry to gain insights into the open trip planner industry to obtain business analysis and design. Based on the result of discussions, the smart business map that was already made earlier before the in-depth interview can be verified and revised, thus the business model canvas was also able to be concluded. Afterward, the development of a mock-up and prototype is needed to do an in-depth interview to gauge the usability of the prototype. Available features in this platform will include search, comparison, payment options for full payment and down payment, trip creation, and participant management. The result concludes that there are mixed responses regarding the needs of the marketplace for OTP. For more professional OTPs, a marketplace is only a ‘nice’ feature to have for their administrative works, while for amateur OTP a travel marketplace is needed to boost their sales, open new markets, and create a more natural way for them to manage the participants of their trips. Pages 735 to 748

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Higher Education 4.0: The Effects of Blended Learning on Students' Motivation and Self-Learning Readiness

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Blended learning is expected to provide a better outcome than traditional face-to-face learning. This article aimed to assess the implementation of blended learning in a research and statistics course and its significant effect on students' motivation and self-learning readiness after the intervention. The participants involved in this research were nursing students in the research and statistics course at the Faculty of Nursing, Universitas Pelita Harapan. Pre-experimental research was conducted by comparing the scores of the students' academic motivation and self-directed learning readiness (SDLR) in pre-test and post-test. A total of 181 students were involved in the pre-test and 68 students in the post-test. The analysis result revealed that there was a significant change in the SDLR score, proven by the Wilcoxon signed-rank test analysis (Z -2.442, p-value 0.015, r -0.15). This research concluded that students' SDLR scores were significantly lower in the post-test than in the pre-test. On the other hand, students' academic motivation did not change statistically. It seems that blended learning affects students' SDLR but not their motivation. There is a further need to explore the benefits of blended learning, especially in nursing education. Pages 749 to 759

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Data Analytics for Higher Education – Promises & Limitations: A Case Study in Pelita Harapan University

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Universities sit on a huge databank, from admission data, student academic data, to the alumni data. However, unlike the financial or telecommunication industries, universities often do not see it as critical to harness these data for strategic decisions. In this paper, we explore data analytics by visualisation to enable a data dashboard for strategic decision in the case of Universitas Pelita Harapan (UPH). We perform initial interviews with selected deans and university leaders, then develop and present various academic data visualisations. Focus group discussions were then performed with deans and leaders to identify various ways they envision use of the data. The identified important indicators for the data dashboard include number of students, GPA, lecturer/student ratio, graduation time, class sizes, number of failing students, number of full time/part-time lecturers, and students' feedback on lecturers. Some examples of GPA and admission data are presented in this paper to illustrate the potential usefulness of data analytics. In discussion with deans and university leadership, we found potential uses of data analytics to include: increasing admission numbers/quality, providing early warnings for failing students, optimising teaching process and utilisation of resources, and optimising the faculty workload. The success of learning analytics seems to involve the careful design of observation data into the learning settings. The usefulness of data analytics must be balanced with the awareness of its limitations, as was shown, e.g., by the case of Google Flu Trends (GFT). Availability of skilled data scientists, wisdom in institutional strategic decisions, and awareness of ethical issues involved with data analytics is becoming more important with the implementation of data analytics. Pages 760 to 775

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Firm Competitiveness and Firm Performance - The Impact of Alliance Formation in Early Stage Digital Start-ups

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The quality of digital start-ups' entrepreneurial activities is essential for the wealth of the nation. The digital start-up, as with other small and medium enterprises, is known to have limitations in assets, processes, and knowledge for them to compete and have a sustainable business. This study provides an initial view of how these start-ups deal with this limitation through alliances by understanding the diversity and characteristics of alliance formation, and how it is impacting their competitiveness and performance. The analysis of responses from 103 start-ups using the structural equation model (SEM) shows that alliance formation in the early stage of digital start-ups has a positive and significant impact on both firm competitiveness and performance through the view of the alliance's functionality, structure, and attribute. Pages 776 to 788

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The Impact of Diversification on Efficiency: Analysis of The Indonesian Banking Industry

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The objective of this research is to examine the Indonesian banking industry diversification strategy towards efficiency from 2014 – 2018. The present study aims to measure banks' effectiveness as financial intermediaries with income diversification, loan diversification, and technology diversification as dependent variables, with return on assets, non-performing loan ratio, loan to deposit ratio, and bank size as control variables. To measure the firms' efficiency, this research uses a non-parametric measurement called data envelopment analysis input-oriented method. Two models are being used: constant return to scale (CRS) and variable return to scale (VRS). For measuring diversification, this research will use the Hirschman-Herfindahl Index to find the relationship between firms' efficiency, firm diversification strategy, and the control variables. This research will use panel data regression. Finally, the result of this research is Indonesian banking efficiency has not increased every year, and only loan diversification seems to affect efficiency significantly. This research suggests that firms should consider diversifying their loan distribution to get a maximum performance efficiency result. Pages 789 to 802

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The Co-working Space as a Business with Higher Purposes (Case Study of Co-working Spaces in Jakarta)

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Co-working space not only offers work flexibility but also plays a role in creating a collaborative ecosystem that helps members of the community to collaborate and share knowledge, ideas, and potential business networks. Previous researches on co-working space have discussions more on the added value it brings from the users' perspective. This study aims to cross-reference the creation of the value of the benefits of co-working spaces from the perspective of the host by exploring the process of creating co-working value as a conscious form of business. The study used a qualitative research design with a multiple case study approach to three co-working space hosts in the Jakarta area. Research results in all cases show that the host co-working space manages its business consciously to ensure community members, as stakeholders, get the needed resources to maintain the sustainability of their business. Pages 803 to 812

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The Impact of Brand Activation on Customer Trust: an Investigation of Brand XYZ's Brand Activation

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Customer trust is one of the aspects that lead customers to keep buying a brand's product. A decrease in customer trust would cause people to leave the brand. Brand XYZ is experiencing a decrease in customer trust, and with today's fierce competition between fast-moving consumer goods (FMCG) brands, brands are forced to figure out new marketing campaigns, usually ones with direct customer engagement such as brand activation. Brand XYZ used a brand activation strategy in the form of an event to increase customer trust towards their brand. To see the results and significance of this strategy implemented by the company, this research created a model to measure the impact of brand activation on customer trust for Brand XYZ's brand activation event. The result of this study suggests that brand activation has a significant impact towards increasing customer trust. Theoretical implications and further recommendations made are based on the findings of this study. Pages 813 to 824

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Firm Information Quality and The Cost of Equity Capital in Indonesia

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The purpose of this research is to analyse the effect of firm information quality, which is known by calculating the ratio of firm stock return and firm earnings growth on the cost of equity capital in Indonesia. The sample consists of Indonesian firms through the years 2003 until 2015. The measure used for the proxy of firm-specific information is by seeing the firm information quality from the stock return and stock earnings. We are using an unbalanced panel data regression after including some control variables (capital asset pricing model beta and the firm age). The findings of this research conclude that the firm-specific information (ratio of firm stock return and firm earnings growth) has no significant effect on the cost of equity capital in Indonesia from 2003-2015. This is different from the hypothesis that firm specific information has a significant negative impact on the cost of equity capital. Pages 825 to 838

Pdf (/images/vol5iss6/Part_2/5676_Alrefi_2019_E_R.pdf)

General Overview of Psychological Flexibility of Students in Indonesia

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This study aimed to get an overview of the psychological flexibility profile of students in Indonesia. There are many studies on psychological flexibility carried out in various countries, but for Indonesia it is still very limited. The instrument used was a multidimensional psychological flexibility inventory (MPFI) consisting of 60 items. The method used in this research was descriptive quantitative. The results showed that 159 students got a general description of psychological flexibility: 24 (15%) of students had psychological flexibility at a high level, 102 (62%) were at a moderate level, and 33 (21%) were at a low level. These results illustrate the importance of developing psychological flexibility in students through various efforts and interventions, especially in Indonesia. Pages 839 to 849

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Analysis of e-Learning Creativity in Digital Content Presentation

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This study aims to explain the creativity of students in presenting material with digital content in web-based e-learning. This study uses a qualitative descriptive approach with subjects being students who take lessons using e-learning, while the object of research is digital content. Sources of research data are obtained through observation, interviews, and documentation. Data were analysed using Milles Hubberman's analysis, including reduction, display, and verification. The validity of the data is verified by triangulating sources, techniques, and time. The results showed that the creativity of students was seen through the level of smooth thinking obtained by 75%, flexible thinking by 85%, original thinking and detailed thinking by 70%. This shows that students are still lacking in developing ideas or ideas and are still lacking in detail in doing their work. Creativity can be developed through four aspects, namely person, process, product, and press. The e-learning stages include preparation, incubation, illumination, and verification. Pages 850 to 861

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Benefits Realisation and Success Factors for Information Systems Strategic Planning using Systematic Literature Review

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Information System Strategic Planning (ISSP) is an information system planning concept that is related to information system planning in a certain period to provide benefits. ISSP benefits are felt in the form of realisation of interests in the form of increased competitive advantage, effectiveness, efficiency, capability, performance, alignment, and flexibility. The understanding of the benefits of ISSP is also influenced by ISSP's success factors, namely product quality, planning system quality, service delivery quality, facilitators, culture, use, and satisfaction. The question that arises is how the mapping of the realisation of the benefits of ISSP, mapping success factors ISSP, and mapping of the realisation benefits ISSP success factors of ISSP mentioned above. Of course, this question is still not largely answered. The purpose of this study is to investigate and evaluate the phenomenon of the realisation of ISSP benefits and ISSP success factors that influence it using the Systematic Literature Review (SLR) instrument during the period 2009 to 2019. Results of the investigation obtained synthesis and mapping realisation benefits of ISSP and the factors that influence it. Pages 862 to 873

Pdf (/images/vol5iss6/Part_2/5679_Rohayati_2019_E_R.pdf)

The Impact of Empowerment and Career Development on Work-life Quality in PT Reasuransi Indonesia Utama (Persero)

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The goal of the research is to (1) analyse the effect of empowerment and career development on the employees' work-life quality, (2) analyse the influence of empowerment on career development, and (3) analyse career development in mediating the effect of empowerment on the employees' work-life quality. The analytical method for this research is by using SEMPLS with the SmartPLS program. The research population is the employees of PT Reasuransi Indonesia Utama (Persero). There are 93 respondents taken as research samples. The results show that the empowerment provides a direct and positive influence on career development; the empowerment and career development provide a direct and positive influence on the quality of employees' work-life, and empowerment indirectly affects the work quality through career development. The direct effect of career development on work-life quality is higher than the indirect effect of empowerment on work-life quality through career development. Pages 874 to 889

Pdf (/images/vol5iss6/Part_2/5680_Muharam_2019_E_R.pdf)

The Relationship Between Promotion Mix and Price Perception With Student Purchasing Decisions: A Continuing Study

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This study aims to analyse the correlation between promotion mix and price perception with student purchasing decisions in continuing studies. Research by the author uses quantitative methods. The population of this study was all One-Year Professional Program students at the El Rahma Educational Institute Bogor in 2017/2018, amounting to 191 people. The sampling method used was stratified random sampling with the number of samples taken determined using the Slovin formula totalling 130 respondents. Data analysis uses simple linear and multiple regression tests, simple correlation test, multiple correlation test, partial correlation test, and the coefficient of determination test. The results showed there was a positive and significant relationship between the promotion mix variable and the purchase decision with a correlation coefficient (r) of 0.770, which means strong. And the contribution of the promotion mix variable (X1) to the purchase decision (Y) obtained the value of R Square (R^2) of 0.593, and this means that the promotion mix (X1) made a contribution of 59.3% to the purchase decision (Y). There is a positive and significant relationship between the variable price perception with purchase decisions with a correlation coefficient (r) of 0.711, which means strong. And the contribution of the price perception variable (X2) to the purchase decision (Y) obtained R Square value of 0.505, and this means that the price perception variable (X2) formed a contribution of 50.5% to the purchase decision (Y). There is a positive and significant relationship between the promotion mix variable and price perception, together with the purchase decision with a correlation coefficient (r) of 0.799, which means strong. And the contribution of the promotion mix (X1) and price perception (X2) together with the buying decision (Y) obtained an Adjusted R Square (R^2) value of 0.632. This shows that 63.2% of student purchasing decisions in continuing their studies at the El Rahma Educational Institution in Bogor are influenced by the promotion mix and price perception while the remaining 36.8%, purchasing decisions are influenced by other factors, which in this study were not discussed. Pages 890 to 904

Pdf (/images/vol5iss6/Part_2/5681_Hastiani_2019_E_R.pdf)

Reconstruction of Bibliocounselling Containing Melayu Local Wisdom, West Borneo, Indonesia

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This study aims to reconstruct bibliocounselling (biblical counselling) with local wisdom so that bibliocounselling is arranged according to the ideal personal needs of youth. Local wisdom in this study of the ethnic Robo-Robo tradition of Melayu (Malay) is commemorated every third week of the Safar month (second month in the Islamic calendar). This study used a qualitative approach, the triple hermeneutic type, which is the validity of the data using triangulation, intersubjectivity and peer review. Data sources in this study were the Robo-Robo book and author, humanist additional data sources and Princes as indigenous stakeholders. The research findings show that there are three categories of traditional and customary messages that are instilled in students through a bibliocounselling story. Firstly, character including: harmony, generosity, the soul of heir, self-authenticity, honesty, leadership, neatness, firmness, creativity and accuracy. Secondly, identity including: religious, ethnic and work identity. Thirdly, developed social skills including: friendship, kinship, cooperation, simplicity, social care and togetherness. Pages 905 to 918

Pdf (/images/vol5iss6/Part_2/5682_Suharyati_2019_E_R.pdf)

Development of Teacher Creativity Models to Improve Teacher's Pedagogic Competency in the Educational Era 4.0

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A model of teacher creativity of the Early Childhood Education Program might be improved by developing models of innovativeness and teacher pedagogical and digital literacy competencies in the Educational Era 4.0. An effort is needed so that the pedagogical competence of teachers increases significantly by developing the creativity of teachers adapted to current needs. Based on observations, one of the reasons for the low competitiveness of teachers is their low pedagogical competencies and lack of Principal leadership support. Data analysis was performed using descriptive statistics, normality tests, homogeneity tests, linearity tests and simple and multiple regression. It was expected to be found that identification of appropriate creativity can improve the pedagogical competence of teachers in developing innovative learning models. The results showed that there is a positive relationship between teacher creativity and teachers' pedagogical competency with the strength of the relationship. Pages 919 to 929

Pdf (/images/vol5iss6/Part_2/5683_Nellitawati_2019_E_R.pdf)

Effect of Work Motivation on Teacher Work Discipline

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This study aims to analyse the contribution of work motivation to teacher work discipline. This research design is ex post facto correlation. The number of research samples was 318 teachers. The instrument used was the Work Motivation and Discipline questionnaire. Then the data was analysed using correlation analysis techniques and regression analysis. The results of the data analysis showed that there was a significant motivational contribution to the teacher's work discipline. This research implies that to improve teacher work discipline, an increase in teacher work motivation must be done. Pages 930 to 937

Pdf (/images/vol5iss6/Part_2/5684_Ismadi_2019_E_R.pdf)

The Impact of Identity on Loyalty with Reputation as Mediating Variable

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The identity of an organisation is an interrelated system that triggers the processes of identification and differentiation of an organisation. Identity and reputation are related. The reputation of the organisation is the interpretation and evaluation of its identity. Because of a positive reputation, people are proud to be part of that organisation, returning to the organisation's actions, speaking favourably of the organisation, and urging people to be close to the organisation. This research, conducted at St. Anthony School operated by the SCJ Congregation, will uncover the impact of identity on reputation and the impact of reputation on loyalty. The hypotheses were examined by using Structural Equation Modeling. The analysis shows that there is a positive impact of organisational identity on the reputation of an organisation and a positive impact of the reputation of the organisation on customer loyalty. The contribution of this study is to suggest that the organisation pays attention to develop its identity. Pages 938 to 951

Pdf (/images/vol5iss6/Part_2/5685_Megawati_2019_E_R.pdf)

The Effect of Brand Resonance Towards Brand Loyalty of Smartphone Users in Indonesia: The Mediating Roles of Brand Satisfaction and Brand

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This research aims to analyse the effect of brand resonance on brand loyalty on Indonesian smartphone customers in the City of Padang. The main purpose of brand resonance is to see the depth or strength of the psychological ties of the customer with the brand and the level of activity of the Indonesian smartphone customers in Padang that make them loyal to the brand. The analytical tool used is SmartPLS 3 to see the relationship of: brand resonance to brand satisfaction; brand resonance to brand trust; brand satisfaction to brand loyalty; and brand trust to brand loyalty. The research instrument consisted of a questionnaire distributed by the purposive sampling technique with a total sample of 179. The results showed that: brand resonance had a positive and significant effect on brand satisfaction; brand resonance had a positive and significant effect on brand trust; brand satisfaction had a positive but not significant effect on brand loyalty; and brand trust had a positive significant effect on brand loyalty. Furthermore, brand resonance mediated by brand satisfaction had a positive but not significant effect on brand loyalty and brand resonance mediated by brand trust had a positive and significant effect on brand loyalty. Pages 952 to 967

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Public Service Values and Organisational Commitment in Implementing a Community Empowerment Program

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This study aims to examine the influence of public service values, especially ethical values, professional values, democratic values and humanity values, partially and simultaneously on organisational commitment to implement the program of community economic empowerment in Kupang City. Study subjects consist of public officials working as public service providers of the municipal government of Kupang as well as the implementers of the program. They amount to 88 who were chosen purposively. This study used descriptive statistics and regression models to analyse data collected from questionnaires. The findings imply that the study subjects perform very high ethical values in terms of loyalty and respect, humanity values in terms of benevolence, and organisational commitment in terms of affective, continuance and normative commitment in implementing the program. It also reveals that ethical values, professional values, democratic values, and humanity values partially and simultaneously have a positive influence but not so significant on organisational commitment to implement the program. Although the simultaneous impact of these values on organisational commitment to implement the program is still not substantial, it is better than the partial influence. Therefore, an increased use of these values simultaneously is required because it can better generate organisational commitment to implement the program in Kupang City. Pages 968 to 981

Pdf (/images/vol5iss6/Part_2/5687_Butarbutar_2019_E_R.pdf)

Notional Interest Deduction Regime in Belgium: What Indonesia Should Learn to Design the CFC Regulation?

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This study used qualitative research and comparative study of NID regimes. It was found that the application of NID regimes has reduced the effective tax rate and allowed companies to strengthen their capital structure with the added benefit of tax-deductible interest costs. However, the existing CFC rules are not enough to ward off the NID Regimes abuses of the MNEs group. Therefore, Indonesia in the formulation of CFC Rules must consider aspects that can limit excessive claims related to the reduction of notional interest on equity. This includes limiting regulable deduction, acquisition of business operations, contributions or transfers of participation between related parties executed for resulting in a higher notional interest deduction in equity, an internationally coordinated interest rate reduction and royalty reduction, a reverse tax credit, withholding tax on all interest and royalty payments, withholding tax as an anti-tax-avoidance regulation. Pages 982 to 995

Pdf (/images/vol5iss6/Part_2/5689_Suranta_2019_E_R.pdf)

Human Development Index: A Comparative Study of The Central Java And South Kalimantan Provinces

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This study aims to find out: (1) whether there are differences in the Human Development Index (HDI) between the Central Java Province and the South Kalimantan Province, and (2) whether there are differences in HDI before and after 2015 in both provinces. The samples of this study were the regencies/cities of Central Java and South Kalimantan during the period of 2013 to 2017, as many as 240 samples. Data analysis to test the data normality used the Kolmogorov-Smirnov Test. Because the data was not normal, hypotheses testing using the Mann-Whitney test was performed. This study found that: (1) there were significant differences in HDI between Central Java and South Kalimantan, and the average HDI of Central Java was higher than South Kalimantan, and (2) there were significant differences before and after 2015 in HDI of both provinces in which the HDI after 2015 was higher than before. The results of this study are expected to contribute to the government as a consideration for making policies related to equitable development. Pages 996 to 1010

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Learning Force Topics with Science Process Skills Approach and Using Guided Experiment Methods to Improve Students' Understanding of the Concepts

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This research aims to determine the effect of the science process skills (SPS) approach using guided experimental methods on the learning of force topics to increase students' understanding of concepts. The research was conducted in SMP Negeri 2 and SMP Negeri 11 Jayapura in the 2018/2019 academic year. This research is a quasi-experimental research design with Nonequivalent-group Pretest-Posttest Design. The experimental group was taught by using the SPS approach with the guided experimental method, and the control group was taught with conventional learning. Samples were taken by using cluster random sampling technique. Data analysis used normalised gain (N-gain) and independent t-test. The results of the research are as follows: (1) In the subtopic, the force and the change in N-gain of the experimental group is 0.39 and is classified as moderate and the control group is 0.16 and classified as low; (2) in the subtopics the various types of N-gain force, the experimental group is 0.56 is classified as moderate, and the control group is 0.43 and is classified as moderate; (3) There is a difference in understanding of concepts between the experimental group and the control group for the two subtopics being taught. Pages 1011 to 1020

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Madani Community Movement (GNM) and Civics Engagement: Prospect and Reality

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This study aimed to analyse the implementation of the Madani Community Movement (GNM) as a model for civil societies based on local wisdom. It has been implemented in Kabupaten Agam, a district west of Sumatera, Indonesia, over three years. A qualitative approach was used, and data were collected through in-depth interviews, document analysis, and observation, and analysed using QDA Miner 2.05. The result showed that top leadership in the district initiated GNM based on indications of declining morality among the younger generation, in order to prevent it. Providentially, the programs were in line with several religious activities, such as informal education for Al Quranic study, especially for younger kids, with activities such as praying together in the mosque and reading Al Quran after *maghrib* prayers. Even though some obstacles were found during implementation, it has become an alternative civil society movement, needed to solve societal problems. Pages 1021 to 1029

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Tyler's Model Evaluation in Examining Employee Participation and Top Management Fairness in Employee Performance Appraisal

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An effective performance appraisal process reflects employees' satisfaction. For this reason, Top Neutrality and employee's participation have an essential role to play in the process. This study was aimed at assessing both employee participation and Top Neutrality's effectiveness in monitoring employees' performance appraisals, through the use of Tyler's quantitative approach. Respondents of this study were Bank Syariah's employees of D.I. Yogyakarta and Central Java. One hundred and seventy-five people were included in the sample, using quota and purposive sampling methods, while data were collected through interviews, observation and focus group discussion. The results revealed that only mid-level managers are involved in the appraisal and that the bonus value received is not based on the severity of responsibility. Pages 1030 to 1040

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Effect of Ego Identity Status on Subjective Wellbeing in Students

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Subjective wellbeing (SWB) of new students is essential, as they end up in very different settings compared to high school. The learning system in universities strongly demand the independence of students. However, new students may still be in adolescence, and are still looking for their own identity. They must make important decisions regarding their future in an increasingly complex society. The purpose of this study was to find out the status of ego identity towards SWB from students. The research population comprised of 185 students, 94 female and 91 male. Methods of data collection involved using Positive Affect Negative Affect Scale (PANAS) and Satisfaction with Life Scale (SWLS), developed by Diener (1984), and the scale of Objective Measure of Ego Identity Status (OM-EIS), developed by J.E Marcia, Waterman, Matterson, Archer & Orlofsky (1993). The statistical analysis technique used in this research was the variance analysis (ANOVA) technique. The results showed that there were differences in SWB for students with different ego identity statuses. The findings of this research will help guide students. Pages 1041 to 1052

Pdf (/images/vol5iss6/Part_2/5696_Ristianti_2019_E_R.pdf)

Assessment Aspects of Group Counselling Activities

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This study was designed to find out the aspects of assessing group counselling activities by reviewing literature related to the assessment of group counselling. The results show that two dimensions can be assessing group counselling, being content and process dimensions. Content dimensions involve evaluating the client's responses to the topic discussed in the group c; the relevance, the usefulness, the development of the skills, and the improvement that happens to the client. Meanwhile, the process dimensions have aspects such as; organisational structure and purpose of the group, the interaction and communication between the group members, the cohesiveness and the togetherness, and the steps taken by the group to reach the goals and leadership. The results of this study provide a basis for assessing the process of group counselling activities that have been carried out in more detail so that can improve the implementation of group counselling. Pages 1053 to 1063

Pdf (/images/vol5iss6/Part_2/5697_Hidayati_2019_E_R.pdf)

Action Research Counselling: Group Counselling with Animation Media for Increasing Students' Self-Adjustment in Elementary School

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The purpose of this study was to find out how the implementation of group counselling with animation media can improve the adjustment of elementary school students. Based on the collection of data by researchers from interviews and observation, it's known that the fourth-grade students of MI NU Banat Kudus still have difficulty adjusting and being social, especially with fellow students. This study uses action research counselling with two cycles. In the first cycle, it was found that students' adjustment had not increased because the group guidance used was still conventional. Although the adjustment material has been given, students even do not understand it in its entirety. However, in the second cycle, there was a significant increase with five students (41.7%) in the very high category and 7 students (58.3%) in the high category. Animated media has a huge impact because the students better understand the importance of self-adjustment, especially in school. Pages 1064 to 1080

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Applying Contextual Teaching and Learning (CTL) with the Triangle Method in Mathematics Classes to Improve Students' Ability in Problem-Solving

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This study aims to find out the combination practice of Contextual Teaching and Learning (CTL) and the Triangle Method in improving the students' ability in problem-solving. The study used quasi-experiment with a quantitative approach. The population consisted of students in grade XII in Senior High School. The sampling technique used was simple random sampling. The samples were divided into two classes. The data were analysed by using t-test and two ways ANOVA. The result shows that the mean of the final test in the experiment class is higher than in the control class. Furthermore, CTL approach can be used in mathematics classes with another content. Besides that, it is not only for students grade XII but also for students grade XI and X. For the novelty of this study is the CTL approach can be adopted by the teacher to improve the students' ability in problem-solving for the real world problem. Pages 1081 to 1092

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Underlying Factors of The Young Men's Intention to Take Diet and Physical Exercise: An Exploratory Study in Jakarta

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It is the truth that most men are the breadwinner in nearly all family systems across the world. Breadwinner husband becomes an essential factor in marriage. However, the fact is men's health outcomes continue to be substantially worse than women's. Overweight and obesity constitute a major risk factor for most major Non-Communicable Diseases (cardiovascular diseases, diabetes, and cancer). Considering an early onset of obesity is potentially facing the high cumulative incidence of several diseases, also preventing the initial stage is much better, it would be very best to call out all the healthy stakeholders to figure out what factors influencing young men to intent to take food and physical exercise to change the young men's behavioral risk factors (unhealthy diet and lack of physical activity). A qualitative methodology was undertaken in a sample of the male who domiciled in *Jabodetabek* (Jakarta, Bogor, Depok, Tangerang, and Bekasi) Indonesia yet had a job or went to school in Jakarta, who had the Body Mass Index (BMI) overweight, obese, also normal, and aged between 18 years old and 29 years old. This research used quota sampling with in-depth interviews due to the sensitivity of the case. Interviewees were approached in some Jakarta malls using means of purposeful sampling strategy. The total of the respondents was 40 interviewees. Thematic analysis was used to gain insights. The empirical results indicate that the underlying factors of the intention to participate in a diet and physical exercise are composed of seven elements, and they are labeled as health perception, body image, perceived severity, perceived health benefit, self-esteem, social media usefulness, and perceived barrier. This exploratory study contributes a fundamental insight that needs to be studied further in quantitative research regarding the effort to move young men in Jakarta to take diet and physical exercise so that they will be healthier now and in the future. Pages 1093 to 1106

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Influence Between Organizational Resources, Organizational Engagement Climate, Job Resources, and Employee Engagement in Greater Jakarta Areas

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Employee engagement can be a strategy to achieve, develop, and maintain a competitive advantage. This study aims to analyze the influence between organizational resources, organizational engagement climate, job resources, and employee engagement. The research method used is the survey method, which is asking for responses from respondents using a questionnaire distributed to employees who work in Greater Jakarta area. Responses from 200 respondents were analyzed using the Structural Equation Modeling method. The results of the study show that organizational engagement climate and job resources directly influence employee engagement. And organizational resources indirectly influence employee engagement through organizational engagement climate and job resources. These results indicate that organizational resources as a source of supply and support from organizations will directly influence employees' collective perceptions of engagement climate in the organization, and also directly influence the physical, psychological, social, or organizational aspects of work, which in turn will influence employee engagement. Pages 1107 to 1116

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Analysis of the Effect of Innovation Strategies on Product Innovation Performance and Organizational Learning in SMEs in South Tangerang City

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The objective of this paper is to analyze the impact of innovation strategy on organizational learning and product innovation performance in food and beverage SMEs in Indonesia. Similar investigations of the impact of innovation strategy on organizational learning and product innovation performance have been done in manufacture industry abroad. The prior research carried out has not been able to be generalized, and has been able to determine whether it can be applied in other industries and other countries. Some adaptation of indicators, both number and data construct, is needed. A structural equation modelling analysis was conducted on the survey data collected from medium-scale food and beverage SMEs in South Tangerang, Indonesia. The results reveal that innovation strategy is positively related to product innovation performance and organizational learning in SMEs in South Tangerang. Pages 1117 to 1128

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Purchase Intention, Satisfaction, Interest, and Previous Purchase Behaviour

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This research was intended to develop and test the consumer intention model of batik purchase using three predictors, namely the satisfaction of batik purchase, the interest in buying batik, and previous batik purchase. The research subjects were batik consumers in Solo and Yogyakarta. An adjusted Likert scale measured variables with its reliability and validity tested. The results showed that the three predictors used were consistent with the theory and empirically tested. There are some suggestions for the next research. Pages 1129 to 1140

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Sustainable Tourism in Pontianak, West Borneo: The Voice of The Stakeholders

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Sustainable tourism has become an essential topic in the world today, and Indonesia is one of the countries that are focussing on that. The government shows its seriousness by the signing of a memorandum of understanding (MoU) between the Ministry of Tourism of The Republic of Indonesia with 20 regencies/cities – one of them is Pontianak, the capital city of West Borneo (West Kalimantan). Even though the city leaders have signed the MoU, the implementation is not clear yet. Despite the tourism potential, the stakeholders think that tourism development still needs to be accelerated. The purpose of this paper is to identify the key factors that concern stakeholders regarding sustainable tourism and what should be done to accelerate tourism development in Pontianak. The results from interviews and Focus Group Discussion clearly showed the dedication commitment from the tourism stakeholder in Pontianak and support of the government is greatly needed. Pages 1141 to 1152

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Sustainable Gastronomy & Shopping Destination Development in Bandung City – West Java Indonesia

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Culinary and shopping experiences are anticipated as attractions for tourists in visiting a destination in Indonesia. Culinary arts not only can increase the value of a destination but also increases the value of the food itself because generally, the local identity of a region is defined by the place and what special food it has. The purpose of this study is to discover the potentials and formulate suitable strategies for Bandung as a heritage and creative city to be developed as a sustainable gastronomical and shopping tourism destination. The study uses a qualitative approach. The data collection method is gathered through an FGD consisting of 23 participants from various stakeholders in the Bandung tourism sector. The findings stated that Bandung city is ready to implement the development of culinary activities directed at developing sustainable tourism destinations, seen from the aspect of potential diversification and value of culinary shopping products. However, there are specific issues that need to be improved to develop its potential, especially in the area of sustainability. Pages 1153 to 1163

Pdf (/images/vol5iss6/Part_2/5671_Kurniasari_2019_E_R.pdf)

The Effects of Perceived Usefulness, Perceived Ease of Use, Perceived Security and Risk-Free on the Customer Decision to Borrow Using P2P Lending

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The advance of technology development today brings innovation in the financial industries. Financial technology continues to emerge in the sectors of payment, investment, and loans online and as we are familiar with the term, P2P Lending. The purpose of this research is to analyse the effect of perceived usefulness, perceived ease of use, and perceived risk-free and security in customer borrowing decisions on the P2P lending platform, using the Technology Acceptance Model approach. As quantitative research, the study distributed questionnaires to 166 respondents of ultra-micro segments, domiciled in East Java province. The data collection was further processed statistically using the Structural Equation Method (SEM). The study showed that the customer decision to borrow is significantly influenced by the trust variable, in which perceived ease of use had the most significant influence in creating the borrower's trust. Pages 1164 to 1175

Pdf (/images/vol5iss6/Part_2/5688_Murwani_2019_E_R.pdf)

The Role of Monetary Policy for Supporting Foreign Direct Investment Inflows in Indonesia (Evidence from 2000.1-2019.1)

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This research explored the condition of foreign direct investment in Indonesia. The contribution is still relatively low to the growth rate of the Indonesian economy. With the Taylor Rule model, the analysis of monetary policy was done to decide the choice of policy which one was the right one relating to increasing the role of foreign investment. Based on impulse response and variance decomposition analysis, we found that the fluctuation of interest rate has the most influence on foreign investment besides inflation rate, exchange rate, and FDI itself. Such that, the interest rule which decides the targeted interest rate as the final target policy, is the most favourable policy that supports the role of Foreign Direct Investment in Indonesia. Pages 1176 to 1199

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Empowering Organisational Culture to Increase Performance of Senior High School Principals

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This study aims to explore the empowerment of organisational culture in increasing the performance of senior high school principals. The population in this study was 146 heads of public and private high schools in East Jakarta. The sampling technique used is a simple random sampling. The result shows that the performance of senior high school principals can be increased by empowering organisational culture. It also shows that the performance of senior high school principals strengthens the notion that the higher score of the independent variables of organisational culture, the higher the score of the performance of senior high school principals serving as the dependent variable. Strengthening organisational culture will improve the performance of senior high school principals. Finally, the performance of senior high school principals was examined at one point in time. The quality of the principal's performance will increase if organisational culture also increases. Pages 1200 to 1210

Pdf (/images/vol5iss6/Part_2/5695_Wutun_2019_E_R.pdf)

Understanding Conflict between Ethnic Groups on the Border of Timor Leste and Indonesia from a Subjective Culture Innovation Viewpoint

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Timor Island has several sub-ethnic groups, each with its territory, history of origin and mother tongue. The subjective culture of each ethnic group is the root of stereotype-filled ethnic expression, prejudice, ethnocentrism, and discrimination. Qualitative research with an ethnographic approach involves 60 informants on Timor. Data is obtained via observation, in-depth interviews, and documentation with content analysis techniques. The result found subjective cultural attribution tends to encourage close-minded thinking, suspicion, and jealousy, and mythical and egocentric beliefs. The association of ethnic groups' subjective cultural relations is influenced by in-group and out-group self-esteem. The satisfaction of in-group-out-group self-esteem needs is not immediately expressed because of fear of the mythic-magical threat and *Kakaluk.* It is reduced to a secure physical self that is towards the Lower Order of Needs Level. Therefore, the intervention model of subjective culture innovation must be physiological and focus on efforts to fulfil secure in-group and out-group self. Pages 1211 to 1225

Pdf (/images/vol5iss6/Part_2/5698_Wahyuni_2019_E_R.pdf)

Middle School Students' Different Conceptions of the Equal Sign: Case study of Indonesian Students

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This paper reveals results from a written assessment given to 168 students in grade seven at middle schools in Pekanbaru, Indonesia. The authors discuss the students' response when given equation problems addressing their interpretation of the equal sign. The authors find that there are four kinds of misinterpretation in solving equation problems. The evidence of this study led to students' views in the operational rather than the relational aspect. Although students have begun to learn introductory algebra, they are usually doing calculations from left to right side, as operational, rather than doing structural relations. This also indicates that the students havea lack of understanding of the meaning of the equal sign. Furthermore, it is a base for the students to learn algebra and a vital contribution to early algebra experiences in middle school. Pages 1226 to 1238

Pdf (/images/vol5iss6/Part_2/56100_Sidik_2020_E_R.pdf)

Feedback on The Application of The Elements of *Maqasid Syariah* in Family and Marriage Counselling

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The application of religious elements in counseling has aroused different forms of feedback from various parties. This article presents the findings of a study conducted by the researchers on the feedback of the implementation of a religious approach, which is the elements of *maqasid syariah* comprising the concepts of *dharuriyyat, hajiyyat,* and *tahsiniyyat* in family or marriage counseling. The study was conducted qualitatively using a case study design. The data were collected through interviews involving 6 participants and observations during three counseling sessions. The data were analyzed using the 3C Lichtman Model. Based on the analysis data, it was shown that the application of the *maqasid syariah* is a clear and comprehensive approach which also possesses a Benchmark aspect that is proactive. Pages 1239 to 1248

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Development Combinatorics Realistic Mathematics Education Application based on the Android Mobile

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This development research aims to produce an Android-based combinatoric application as a learning medium for high school students and to find the quality of the combinatoric applications for use in mathematics learning. This research is a research and development (R&D) adapted from the 4D development model. There are four stages: Define, Design, Develop, and Disseminate. Data analysis techniques are used in the feasibility test and the quality test of the media. The results showed the feasibility of an Android-based combinatorics application based on the assessment of media experts was 75.00% with proper criteria, and the evaluation of 2 material experts was 82.32% with suitable principles. The media was tested publicly from 50 students of South Tangerang 6 Public High Schools and MA Kafila. The result of the public trial obtained an application quality result of 83.20% with suitable criteria. Based on the results of data acquisition, it shows that Android-based combinatorics applications are appropriate to be used as a source of mathematics learning at the high school level.

Keywords: *Combinatorics, Android, Android-Based Combinatorics Applications, M-Learning*.

Introduction

The 21st-century skills refer to a wide range of skills such as learning and innovation skills (critical thinking, creativity, collaboration, and communication) and information, media and technology skills (Binkley et al., 2012), and have been gaining more and more attention from researchers and practitioners (Chan & Yuen, 2014; J P Gee, 2005; James Paul Gee, 2003, 2008; Qian & Clark, 2016). For instance, the current school curriculum clearly emphasises the importance of students' creativity development, and as a result, teachers are encouraged to develop or adopt innovative teaching methods to foster students' creativity in the classroom (Chan & Yuen, 2014; Qian & Clark, 2016).

The 2013 curriculum emphasises ICT literacy in learning, where all subjects are integrated with the use of information and communication technology (ICT). Teachers and students are required to be able to utilise technology in the learning process. Teachers should realise the potential of mobile technology as a source of learning for students (Chao, Parker, & Fontana, 2011). With the rapid development of mobile devices and technological advancement, there is an opportunity to use mobile devices for learning because of the mobile nature of hand telephony and the ease of communicating (Churchill, 2008). The potential of mobile learning that is used to support activities in the world of education (Chao et al., 2011) opens opportunities for application development using smartphones (Demidowich, Lu, Tamler, & Bloomgarden, 2012).

The development of learning through mobile devices can improve the effectiveness and efficiency of student learning. Mobile learning technology can facilitate students in education (Portelli & Eldred, 2016). Mobile learning has practical characteristics and can be carried anywhere (Kennewell & Beauchamp, 2007). Students can study wherever and whenever while doing social media activities or entertainment through smartphones (García, Welford, & Smith, 2016). The mobile technology will continue to have a significant impact on students learning process (Churchill, Lu, Chiu, & Fox, 2015). The empowered with multimedia presentation capabilities, mobile technology has supported to deliver a range of multimedia such as video recording, graphic, and integrated media (Zhang & Wu, 2016). M-learning offered a new option for students-technology partnerships in the learning process. Students do not depend on teachers' material; however, students can explore other learning resources based on the internet. This learning model supports students in learning independently.

One of the considerations in developing smartphones into learning media for mobile learning is the basis of the system used. Data reported from the results of the Statcounter Global stats survey from November 2018 to November 2019, show that the android is the operating system that dominates the circulation of smartphones in Indonesia, as much as 93.75%, then followed by the iOS operating system 5.82%, Tizen 0.07%, Nokia 0,08%, series 40 0.07%, Windows 0.05% and below 1% (Statcounter Global Stats, 2019). This means that most smartphone users in Indonesia use the Android mobile operating system.

Android, Inc. is the name of the company that was built in October 2003 by Andy Rubin and his friends in Palo Alto, California (Wisudawan, Hendriana, Nuriadin, & Ramza, 2017). In 2005, Google bought Android, Inc., and took over its development as part of a strategy to include it in mobile space (W.-M. Lee, 2012). Android is a portable device platform that openly provides and makes it easy for developers to create applications as expected (Ichwan, Husada, & Rasyid, 2013; G.-Y. Lee, Yun, Lee, & Park, 2013). The android system that supports the development of its application is expected to produce representative learning media based on mobile learning (W.-M. Lee, 2012).

Wood (Sriyanti, 2009) argues that mobile learning (m-learning) refers to the use of mobile and portable IT devices, such as PDAs, cell phones, laptops, and tablet PCs, in teaching and learning. M-learning is unique because learners can access material, direction, and applications related to learning anytime, anywhere. It will increase attention on learning material, make learning pervasive, and can encourage learner motivation for lifelong learning. M-learning allows more opportunities for ad hoc collaboration and informal interaction between learners (Holzinger, Nischelwitzer, & Meisenberger, 2005).

M-learning can be classified based on the leading indicators, namely the type of device supported and the type of wireless communication used to access learning material and administrative information. From teaching technology, m-learning can be classified based on indicators, asynchronous and synchronous learning support, standard e-learning support, the availability of a permanent internet connection between the system and the user, the user's location, and access services to learning and administration material. According to the time the instructor and students share information, m-learning can be classified into: systems that support synchronous learning, systems that support asynchronous learning, and systems that support synchronous and asynchronous learning as well, as shown in Figure 1.

Figure 1. Classification of M-Learning

Learning mathematics using mobile phone technology is not a new concept of instruction (Hwang, Lai, & Wang, 2015). Recently, the mobile device has tremendously evolved in many kinds of features, and its impact is evident in the learning environment. The presence of technology has gradually enhanced the quality of teaching practice because the use of the mobile phone in the learning process has been extended for various purposes (Churchill et al., 2015). Trends in educational research indicate an increasing interest in how learning application may influence learning (Ke, 2011; Kebritchi, Hirumi, & Bai, 2008; Qian & Clark, 2016; Wu, Chiou, Kao, Hu, & Huang, 2012). For example, some studies (Boyle et al., 2014;

Dempsey, 1994; Qian & Clark, 2016; Randel, Morris, Wetzel, & Whitehill, 1992; Vogel et al., 2006) pointed out that learning application might be superior to traditional classroom instruction as it could increase students' motivation for learning and provide them with opportunities to explore and acquire new knowledge and skills.

Several studies that have been published in reputable international journals show that the use of ICT can improve self efficacy and student learning outcomes. The results showed that multimedia teaching materials could effectively increase attention to increase the potential and effectively develop reciprocal teaching functions (Chen & Kong, 2017). Calik (2013) research results show that the use of technology can improve self efficacy. Other research findings reveal that mobile-based learning applications can improve learning outcomes of ideal gas properties, such as Boyle's law, Charles's law, and Gay Lussac's law in high schools (Astra, Nasbey, & Nugraha, 2015).

Also, the results of Azhar, Kusumah, & Sabandar (2013) show that learning with the RME approach provides improved mathematical communication skills that are better and significantly different from conventional education at the Islamic Senior High School (Madrasah Aliyah) in Jakarta. The same thing was also found in Azhar's (2015) study, which showed that teachers and students were interested in using RME-based opportunity theory learning tools recorded in videos of learning activities.

Based on some of the research mentioned above, the writer wants to innovate mobile technology-based learning, that is "Development Combinatorics Realistic Mathematics Education Application based on the Android Mobile" at the high school level, which refers to the book "Learning Tools Opportunity Theory Based on Realistic Mathematics Education." That has been done by the author of previous research and has obtained IPR. The learning application developed in this research is a mobile android-based realistic mathematics education application for high school students which contains multiplication rules with examples of rules on how to dress, factorial concept material with examples of playing numbers, and permutation material with examples of class management arrangements, and learning evaluations for each material. This realistic mobile learning application based on android mobile is packaged and satisfying, so it is expected to be a practical and fun learning media that can be accessed anytime and anywhere, can increase students' interest in learning mathematics and can be used as a means for independent learning and as a student reference source.

Methods

The method used in this research is the research and development method. According to Sugiyono (2010), research and development methods are research methods used to produce specific products and test the effectiveness of these products. In the research and development

method (Research and Development), there are several types of models. The model used in this is the 4D model. The procedure consists of 4 steps: Define, Design, Develop, and Disseminate.

The data analysis technique used is qualitative and quantitative. Qualitative data were obtained using a feasibility test and a test of the quality of the media using a questionnaire instrument. To determine the appropriateness of applications that have been developed, this application will be tested for validation by material experts and media experts. To find out the quality of applications that have been developed will be publicly tested on students in partner schools before being disseminated.

The instrument used was a media validation questionnaire. The media validation sheet consists of a feasibility assessment sheet and a media quality assessment sheet prepared using a Likert scale. Feasibility assessment sheets for material experts, media experts and quality assessment sheets for public testing of students was used (Widoyoko, 2012).

Results and Discussion

Define. The initial step of this application is the book "Learning Tools Opportunity Theory Based on Realistic Mathematics Education " that has been written by the author of previous research and has been awarded IPR. The advantage of this book is that it is the only RME book that touches high school mathematics; so far, the new RME approach is in elementary and junior high school mathematics learning, considering that in its native Netherlands, RME was developed at the elementary school level. In addition to being guided by the book Theory of Opportunity Learning Theory Based on Realistic Mathematics Education, a preliminary study was also carried out covering literature studies and field studies.

Literature studies conducted are mobile-based learning and realistic mathematical education (RME), relevant research such as Sulistyorini, Argarini, & Yazidah (2018), who analyse errors in solving combinatorics problems and Cholila & Hidayanto (2019) who develop mathematical learning media for windows-based combinatorics material for vocational students. The weakness that can be seen from previous research is that the application developed still uses Windows as the basis of the system. In contrast, this research is a practical mobile-based learning application for Android mobile high school students in which there is a material and evaluation of learning, whereas the field study conducted was about the use of RME in mathematics learning in high school, supervision of lesson plans, and teacher learning, as well as limited interviews with teachers and experts.

Design. This design phase aims to design media that can be used in learning. In this stage, a draft RME application was made with the steps of making storyboard designs (manual) and illustration designs (graphic design). The use of RME is divided into three things, namely Multiplication, Factorial, and Permutation Rules. Issues for Multiplication Rules are carried

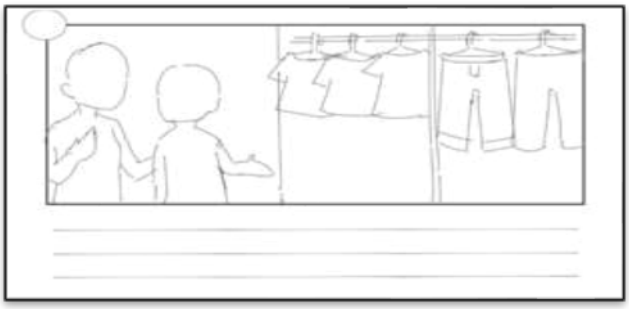
out for how to dress, Factorial for Playing Original Number Cards, and Permutations for Arranging Class Managers. Based on the design stages carried out in each problem as follows:

1. Problems with how to dress, the process carried out consists of:
   a. StoryBoard Preparation Manual.
   The Story Board Manual describes the narrative or manual storyline of the multiplication rules for how to dress to be applied. Table 1 shows a snapshot of the Story Board manual for the multiplication rules for how to dress.
   b. *Graphic Story Board*
   Visual storyboards provide sketch depictions of the narrative storyline on how to wear clothes that show different ways they can be worn. Figure 2 shows an illustration of the Graphic Design Rules for Multiplication of Dressing

Table 1. Draft Story Board Manual for Dressing

Pictures / Videos	Sound / Dubbing
The Concept of Multiplication Rules	Opening Music or Introduction
When Zainal wants to go to an event. Zainal opened the door and then approached the cupboard. The cupboard has two doors on the left, hanging three different clothes. Each shirt is red, yellow clothes, and blue shirts. On his right hung two long pants with different models. Each one is made of cotton and levis.	"Can anyone help me to buy clothes that are suitable for the event that I want to go to," said Zainal (expression confused).

Figure 2. Illustration Design (Graphic Design) Multiplication Rules How to Dress



2. Problems are playing with number cards
   a. *StoryBoard Preparation Manual*
   The Story Board Manual describes the narration or storyline of the Manually Playing Number Numbers Card that will be applied. The description tells the concept of multiplication rules obtained by many possible numbers formed. Many names are formed consisting of 3 number cards. Table 2 shows a snapshot of the Story Board stages of Playing Number Numbers Cards.

b. *Graphic Story Board.*

Visual storyboards provide a sketch picture of a factorial storyline/narrative for Playing Number Numbers Cards, which shows different ways to Play Number Numbers Cards. Figure 3 shows a factorial Graphic Design illustration for Playing Number Numbers.

Table 2. Draft Story Board Manually Playing Numbers Numbers Card

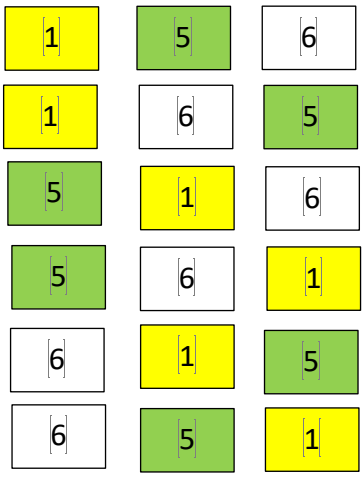
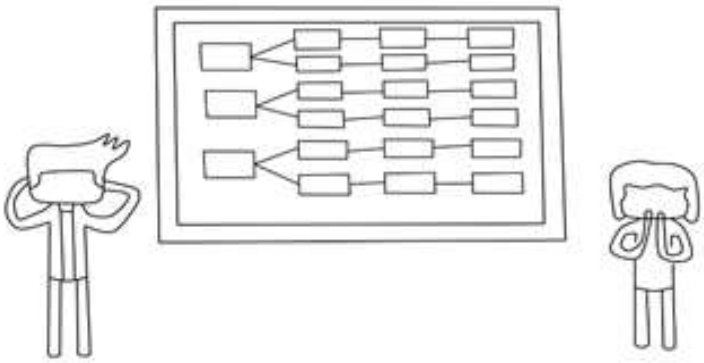
Pictures / Videos	Sound / Dubbing
The text "2. Factorial Rules "	We will learn factorial rules with realistic mathematics
The text "2.1. Appears Playing card."	Let's play cards
3 number cards appear with swapping arrangements such as: 	"Can anyone help me to arrange 3-digit numbers that can be formed from 3 number cards 1, 5, and 6."

Figure 3. Factorial Design Illustration (Graphic Design) Playing Numbers Numbers



3. Problems Arranging Class Managers

a. *StoryBoard Preparation Manual*

The Story Board Manual describes the narration or storyline of the Permutation manual for Arranging Class Administrators. The description tells the concept of Permutation for

Arranging Class Administrators. Table 3 shows an excerpt of the Story Board stages of Organising the Classroom.

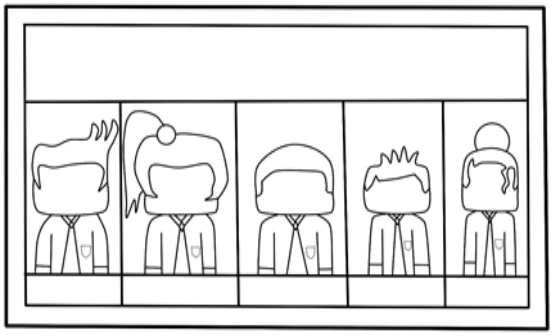
b. *Graphic Story Board*.

The graphic storyboard provides a sketch overview of the Permutation storyline/narrative for Arranging Class Managers that shows the many ways to Arrange Class Managers. Figure 4 shows a factorial Design Graphic Illustration for Arranging Classroom Managers.

Table 3. Draft Story Board Manual Arranging Class Managers

Pictures / Videos	Sound / Dubbing
The text "3. Learning Permutation "	We will learn permutation with realistic mathematics
Text appears "Arranging Class Managers"	Let's arrange the class administrator
Image appears: Class XI A will elect the Class Chair and Class Secretary from 5 candidates. See the following picture Class Management Candidates The message appears: "chosen by the Chair and Secretary of the 5 candidates. First the chairman is chosen and then the secretary "	Class XI A will hold a class management election consisting of 5 prospective administrators, namely A, B, C, D, and E. Of the 5 people as shown in the Figure, one of the 5 candidates will be chosen as Class Chair. One of the remaining 4 candidates will be chosen as a secretary. How many possible class arrangements are composed of class leaders and secretaries?

Figure 4. Illustration Design (Graphic Design Permutation Arranging Class Management)



Development. This development phase aims to apply the design into a medium that can be used in learning. In this stage, a draft of the RME application was made with the steps of the process of animation (visual effect), narrative dubbing, and motion graphic animation video (merging illustrations and dubbing).

1. The Process of Animation (Visual Effect), Dubbing Narrative, and Motion Graphic Animation Video (Combining Illustration and Dubbing) of the Problem of Dressing.
   In this process combining multiplicative frames for how to dress that has been poured in the visual effect and then given a voice-based on the narrative dubbing; the next manual is editing the finished video. The next step is the resulting video must pay attention to the duration, dubbing, and transitions between frames. Figure 5 shows the animation process (Visual Effect), Dubbing Narration, and Motion Graphic Animation video.

Figure 5. Visual Effect, Dubbing Narration, and Motion Graphic Animation Video (Combining Illustration and Dubbing) for Multiplication Rules for Dressing

2. The Process of Animation (Visual Effect), Dubbing Narrative, and Motion Graphic Animation Video (Combining Illustration and Dubbing) of Problems Playing Number Numbers Cards. In this process, combining factorial frames for playing numeric cards that have been poured in visual effects and then given a voice-based on narration dubbing; the next manual is editing the finished video. The next step is the resulting video must pay attention to the duration, dubbing, and transitions between frames. Figure 6 shows the animation process (Visual Effect), Dubbing Narration, and Motion Graphic Animation video for Playing Numbers Number Cards.

Figure 6. Animation Process (Visual Effect), Dubbing Narrative, and Motion Graphic Animation Video (Combining Illustration and Dubbing) Factorial Playing Number Numbers Cards

3. Animation Process (Visual Effect), Dubbing Narrative, and Motion Graphic Animation Video (Combining Illustration and Dubbing) of Problems Arranging Classroom Managers
   In this process, combining Permutation frames for Arranging Class Managers have been outlined in the visual effect and then voting based on narration dubbing; the next manual is editing the finished video. The next step is the resulting video must pay attention to the duration, dubbing, and transitions between frames. Figure 7 shows the animation process (Visual Effect), Dubbing Narration, and Motion Graphic Animation video for Arranging Classroom Managers.

Figure 7. Animation Process (Visual Effect), Dubbing Narration, and Motion Graphic Animation Video (Combining Illustration and Dubbing) Arranging Class Managers

Dissemination. After the application is complete, the next is product validation by material experts and media experts. This stage includes testing and authorisation from experts. The results will be in the form of criticism and suggestions that can be used as a basis for revising the developed media so that the media can become even better.

Material validation aims to assess the appropriateness of the material presented on a mobile android based realistic mathematics learning application for high school students. Material experts provide an assessment and advise on the material presented in the form using a Likert scale of 1 to 4. Validation was carried out by two people, namely, Nurlaela Rahmawati, S.Pd as a mathematics subject teacher at South Tangerang 6 Public High Schools, which became a partner school in this study, and Rudi Dwi Pramono, S.Pd, as a mathematics subject teacher and school principal at MA Kafila International Islamic School, who is also a partner school in this study.

The results of Nurlaela Rahmawati, S.Pd's assessment as the first material expert in the material aspect, were 85.71% with the right criteria; the learning aspect was 80.00% with reasonable measures, the evaluation aspect was 81.25% with suitable rules. The results of the assessment of Rudi Dwi Pramono, S.Pd as the second material expert in the material element amounted to 85.71% with the right criteria; the learning aspect was 80.00% with reasonable measures, the evaluation aspect was 87.50% with suitable rules. Overall the quality of the material in the learning media assessed by two material experts was 82.32% with appropriate criteria.

Media validation of realistic android based mobile mathematics learning applications for high school students are tested before being tested on partner school students or the general public. The aspects that are tested are the aspects of appearance, elements of writing, aspects of software engineering, and dubbing. Validation was carried out by one person, namely, Prof. Dr. Zulkardi, M.I.Komp., M.Sc. Sriwijaya University Professor, who is an expert in mathematics education in RME and Computer Science.

The results of the assessment of media experts in the aspect of display quality are 75.00% with the right criteria; the writing aspect is 75.00% with reasonable measures, the software engineering aspect is 75.00% with consistent standards, and the sound dubbing aspect is 75.00% with the criteria good. Overall the quality of instructional media assessed by a media expert was 75.00% with suitable measures.

The product trial phase is carried out by testing and distributing applications to students in partner schools, namely South Tangerang 6 Public High Schools and the MA Kafila International Islamic School. It is done to verify the functioning of the application on various types of Android-based smartphones and measure the level of product eligibility through the Google form http://bit.ly/ujicoba_product. Before the app is used, respondents are asked to install the application on their Android smartphone device. Request spreading is made via

Bluetooth, SHAREit, and the http://bit.ly/aplikasikombinatorik download link from Google Drive prepared by researchers.

The results of a public trial of 27 students of South Tangerang 6 Public High Schools, obtained the results of application quality in the aspect of display quality by 80.56% with reasonable criteria, writing characters by 86.34% with perfect measures, software engineering aspects by 84.26% with consistent standards, and sound dubbing aspects of 82.10% with suitable criteria. The results of a public trial of 23 students at the MA Kafila Internationa Islamic School, obtained the results of the quality of the application in the aspect of display quality by 84.24% with reasonable criteria, and writing characters by 85.60% with suitable measures. The results of aspects of software engineering was 85.73% with consistent standards, and sound dubbing aspects at 76.81% with appropriate criteria. The overall quality of learning applications assessed by 50 students from partner schools is 83.20% with suitable measures. The results of data acquisition show that practical mobile learning applications based on Android mobile are appropriate to be used as a source of learning mathematics at the high school level.

After the trial was limited to students in partner schools through the Google Form and the application was revised, the next step was the dissemination stage. The purpose of this stage is to disseminate the use. In this research, the form that has been made is planned to be distributed through the Google Play Store, but the research team has not yet uploaded the application to the Google Play Store.

Figure 8. Expert Material Assessment

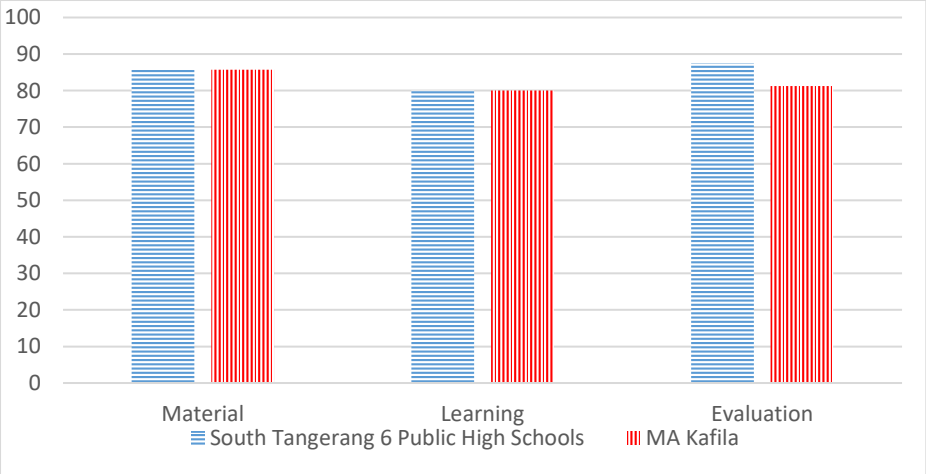


Figure 9. Media Expert Rating

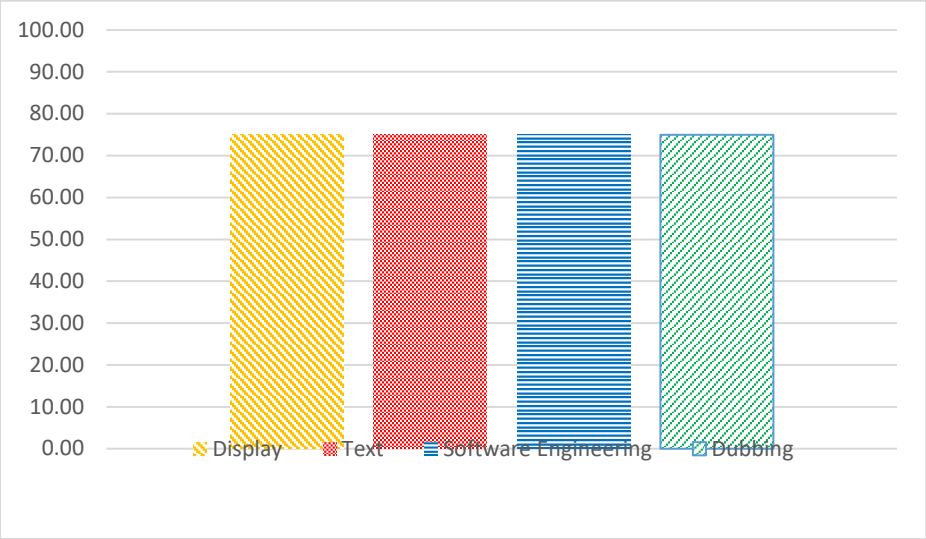
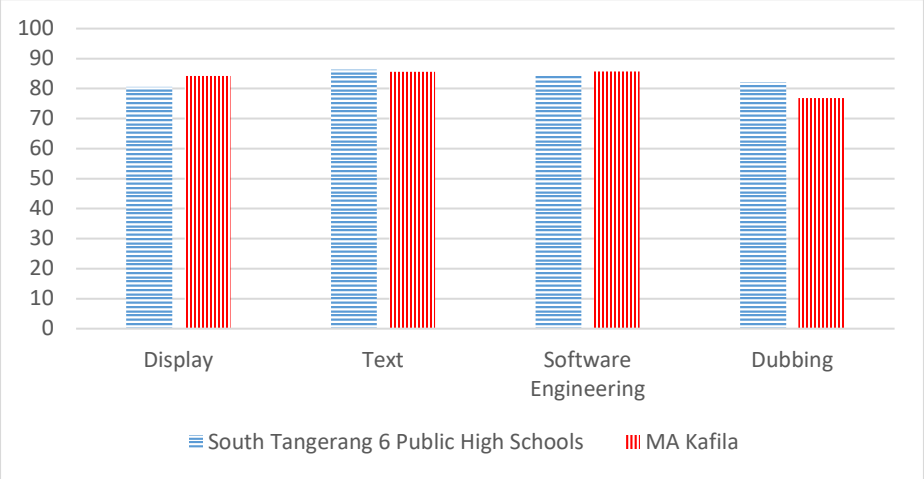


Figure 10. Application Trial Results



Conclusion

Based on the research development that has been done, the following findings can be obtained: Development of learning media for mobile android based practical mathematics learning applications for high school students was named "Combinatorics Application" using the 4D model. Define was in the form of preliminary studies, including library studies and field studies.

Design was in the way of making RME application drafts with the stages of storyboard design (manual), graphic design, animation (visual effect), dubbing narrative, and motion graphic animation video (merging illustrations and dubbing). Develop (development) was in the form of an expert validation stage and product trials, and Disseminate (dissemination). The final

product is a Combinatorics Realistic Mathematics Education Application based on the Android Mobile for high school students named "Combinatorics Application" with the extension .apk (dot apk). This application was developed as a learning medium for high school level students. This application contains multiplication rules with examples of rules on how to dress, factorial concept material with examples of playing numbers, permutation material with examples of class management arrangements, and learning evaluations for each material that can be accessed with an Android-based smartphone. This application is packaged as interesting, so it is expected to be a practical and fun learning media that can be accessed anytime and anywhere. It can increase students' interest in learning mathematics and can be used as a means for independent learning and as a student reference source.

The results of the overall material validation assessed by two material experts were 82.32% with suitable criteria. The results of the media validation were validated by the media expert obtained a percentage score of 75.00% with appropriate measures. The results of product trial on 50 students in partner schools got quality results of 83.20% with functional categories. Based on the results of data acquisition, it shows that practical mobile learning applications based on the Android mobile should be used as a source of mathematics learning at the high school level.

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Atiqah Meutia Hilda - Development Combinatorics Realistic Mathematics Education Application based on the Android Mobile

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Development Combinatorics Realistic Mathematics Education Application based on the Android Mobile

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This development research aims to produce an Android-based combinatoric application as a learning medium for high school students and to find the quality of the combinatoric applications for use in mathematics learning. This research is a research and development (R&D) adapted from the 4D development model. There are four stages: Define, Design, Develop, and Disseminate. Data analysis techniques are used in the feasibility test and the quality test of the media. The results showed the feasibility of an Android-based combinatorics application based on the assessment of media experts was 75.00% with proper criteria, and the evaluation of 2 material experts was 82.32% with suitable principles. The media was tested publicly from 50 students of South Tangerang 6 Public High Schools and MA Kafila. The result of the public trial obtained an application quality result of 83.20% with suitable criteria. Based on the results of data acquisition, it shows that Android-based combinatorics applications are appropriate to be used as a source of mathematics learning at the high school level.

Keywords: *Combinatorics, Android, Android-Based Combinatorics Applications, M-Learning.*

Introduction

The 21st-century skills refer to a wide range of skills such as learning and innovation skills (critical thinking, creativity, collaboration, and communication) and information, media and technology skills (Binkley et al., 2012), and have been gaining more and more attention from researchers and practitioners (Chan & Yuen, 2014; J P Gee, 2005; James Paul Gee, 2003, 2008; Qian & Clark, 2016). For instance, the current school curriculum clearly emphasises the importance of students' creativity development, and as a result, teachers are encouraged to develop or adopt innovative teaching methods to foster students' creativity in the classroom (Chan & Yuen, 2014; Qian & Clark, 2016).

The 2013 curriculum emphasises ICT literacy in learning, where all subjects are integrated with the use of information and communication technology (ICT). Teachers and students are required to be able to utilise technology in the learning process. Teachers should realise the potential of mobile technology as a source of learning for students (Chao, Parker, & Fontana, 2011). With the rapid development of mobile devices and technological advancement, there is an opportunity to use mobile devices for learning because of the mobile nature of hand telephony and the ease of communicating (Churchill, 2008). The potential of mobile learning that is used to support activities in the world of education (Chao et al., 2011) opens opportunities for application development using smartphones (Demidowich, Lu, Tamler, & Bloomgarden, 2012).

The development of learning through mobile devices can improve the effectiveness and efficiency of student learning. Mobile learning technology can facilitate students in education (Portelli & Eldred, 2016). Mobile learning has practical characteristics and can be carried anywhere (Kennewell & Beauchamp, 2007). Students can study wherever and whenever while doing social media activities or entertainment through smartphones (García, Welford, & Smith, 2016). The mobile technology will continue to have significant impact on students learning process (Churchill, Lu, Chiu, & Fox, 2015). The empowered with multimedia presentation capabilities, mobile technology has supported to deliver a range of multimedia such as video recording, graphic, and integrated media (Zhang & Wu, 2016). M-learning offered a new option for students-technology partnerships in the learning process. Students do not depend on teachers' material; however, students can explore other learning resources based on the internet. This learning model supports students in learning independently.

One of the considerations in developing smartphones into learning media for mobile learning is the basis of the system used. Data reported from the results of the Statcounter Global stats survey from November 2018 to November 2019, show that the android is the operating system that dominates the circulation of smartphones in Indonesia, as much as 93.75%, then followed by the iOS operating system 5.82%, Tizen 0.07%, Nokia 0,08%, series 40 0.07%, Windows 0.05% and below 1% (Statcounter Global Stats, 2019). This means that most smartphone users in Indonesia use the Android mobile operating system.

Android, Inc. is the name of the company that was built in October 2003 by Andy Rubin and his friends in Palo Alto, California (Wisudawan, Hendriana, Nuriadin, & Ramza, 2017). In 2005, Google bought Android, Inc., and took over its development as part of a strategy to include it in mobile space (W.-M. Lee, 2012). Android is a portable device platform that openly provides and makes it easy for developers to create applications as expected (Ichwan, Husada, & Rasyid, 2013; G.-Y. Lee, Yun, Lee, & Park, 2013). The android system that supports the development of its application is expected to produce representative learning media based on mobile learning (W.-M. Lee, 2012).

Wood (Sriyanti, 2009) argues that mobile learning (m-learning) refers to the use of mobile and portable IT devices, such as PDAs, cell phones, laptops, and tablet PCs, in teaching and learning. M-learning is unique because learners can access material, direction, and applications related to learning anytime, anywhere. It will increase attention on learning material, make learning pervasive, and can encourage learner motivation for lifelong learning. M-learning allows more opportunities for ad hoc collaboration and informal interaction between learners (Holzinger, Nischelwitzer, & Meisenberger, 2005).

M-learning can be classified based on the leading indicators, namely the type of device supported and the type of wireless communication used to access learning material and administrative information. From teaching technology, m-learning can be classified based on indicators, asynchronous and synchronous learning support, standard e-learning support, the availability of a permanent internet connection between the system and the user, the user's location, and access services to learning and administration material. According to the time the instructor and students share information, m-learning can be classified into: systems that support synchronous learning, systems that support asynchronous learning, and systems that support synchronous and asynchronous learning as well, as shown in Figure 1.

Figure 1. Classification of M-Learning

Learning mathematics using mobile phone technology is not a new concept of instruction (Hwang, Lai, & Wang, 2015). Recently, the mobile device has tremendously evolved in many kinds of features, and its impact is evident in the learning environment. The presence of technology has gradually enhanced the quality of teaching practice because the use of the mobile phone in the learning process has been extended for various purposes (Churchill et al., 2015). Trends in educational research indicate an increasing interest in how learning application may influence learning (Ke, 2011; Kebritchi, Hirumi, & Bai, 2008; Qian & Clark, 2016; Wu, Chiou, Kao, Hu, & Huang, 2012). For example, some studies (Boyle et al., 2014;

Dempsey, 1994; Qian & Clark, 2016; Randel, Morris, Wetzel, & Whitehill, 1992; Vogel et al., 2006) pointed out that learning application might be superior to traditional classroom instruction as it could increase students' motivation for learning and provide them with opportunities to explore and acquire new knowledge and skills.

Several studies that have been published in reputable international journals show that the use of ICT can improve self efficacy and student learning outcomes. The results showed that multimedia teaching materials could effectively increase attention to increase the potential and effectively develop reciprocal teaching functions (Chen & Kong, 2017). Calik (2013) research results show that the use of technology can improve self efficacy. Other research findings reveal that mobile-based learning applications can improve learning outcomes of ideal gas properties, such as Boyle's law, Charles's law, and Gay Lussac's law in high schools (Astra, Nasbey, & Nugraha, 2015).

Also, the results of Azhar, Kusumah, & Sabandar (2013) show that learning with the RME approach provides improved mathematical communication skills that are better and significantly different from conventional education at the Islamic Senior High School (Madrasah Aliyah) in Jakarta. The same thing was also found in Azhar's (2015) study, which showed that teachers and students were interested in using RME-based opportunity theory learning tools recorded in videos of learning activities.

Based on some of the research mentioned above, the writer wants to innovate mobile technology-based learning, that is "Development Combinatorics Realistic Mathematics Education Application based on the Android Mobile" at the high school level, which refers to the book "Learning Tools Opportunity Theory Based on Realistic Mathematics Education." That has been done by the author of previous research and has obtained IPR. The learning application developed in this research is a mobile android-based realistic mathematics education application for high school students which contains multiplication rules with examples of rules on how to dress, factorial concept material with examples of playing numbers, and permutation material with examples of class management arrangements, and learning evaluations for each material. This realistic mobile learning application based on android mobile is packaged and satisfying, so it is expected to be a practical and fun learning media that can be accessed anytime and anywhere, can increase students' interest in learning mathematics and can be used as a means for independent learning and as a student reference source.

Methods

The method used in this research is the research and development method. According to Sugiyono (2010), research and development methods are research methods used to produce specific products and test the effectiveness of these products. In the research and development

method (Research and Development), there are several types of models. The model used in this is the 4D model. The procedure consists of 4 steps: Define, Design, Develop, and Disseminate.

The data analysis technique used is qualitative and quantitative. Qualitative data were obtained using a feasibility test and a test of the quality of the media using a questionnaire instrument. To determine the appropriateness of applications that have been developed, this application will be tested for validation by material experts and media experts. To find out the quality of applications that have been developed will be publicly tested on students in partner schools before being disseminated.

The instrument used was a media validation questionnaire. The media validation sheet consists of a feasibility assessment sheet and a media quality assessment sheet prepared using a Likert scale. Feasibility assessment sheets for material experts, media experts and quality assessment sheets for public testing of students was used (Widoyoko, 2012).

Results and Discussion

Define. The initial step of this application is the book "Learning Tools Opportunity Theory Based on Realistic Mathematics Education " that has been written by the author of previous research and has been awarded IPR. The advantage of this book is that it is the only RME book that touches high school mathematics; so far, the new RME approach is in elementary and junior high school mathematics learning, considering that in its native Netherlands, RME was developed at the elementary school level. In addition to being guided by the book Theory of Opportunity Learning Theory Based on Realistic Mathematics Education, a preliminary study was also carried out covering literature studies and field studies.

Literature studies conducted are mobile-based learning and realistic mathematical education (RME), relevant research such as Sulistyorini, Argarini, & Yazidah (2018), who analyse errors in solving combinatorics problems and Cholila & Hidayanto (2019) who develop mathematical learning media for windows-based combinatorics material for vocational students. The weakness that can be seen from previous research is that the application developed still uses Windows as the basis of the system. In contrast, this research is a practical mobile-based learning application for Android mobile high school students in which there is a material and evaluation of learning, whereas the field study conducted was about the use of RME in mathematics learning in high school, supervision of lesson plans, and teacher learning, as well as limited interviews with teachers and experts.

Design. This design phase aims to design media that can be used in learning. In this stage, a draft RME application was made with the steps of making storyboard designs (manual) and illustration designs (graphic design). The use of RME is divided into three things, namely Multiplication, Factorial, and Permutation Rules. Issues for Multiplication Rules are carried

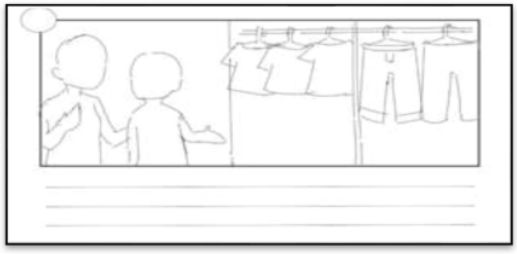
out for how to dress, Factorial for Playing Original Number Cards, and Permutations for Arranging Class Managers. Based on the design stages carried out in each problem as follows:

1. Problems with how to dress, the process carried out consists of:
   a. StoryBoard Preparation Manual.
   The Story Board Manual describes the narrative or manual storyline of the multiplication rules for how to dress to be applied. Table 1 shows a snapshot of the Story Board manual for the multiplication rules for how to dress.
   b. *Graphic Story Board*
   Visual storyboards provide sketch depictions of the narrative storyline on how to wear clothes that show different ways they can be worn. Figure 2 shows an illustration of the Graphic Design Rules for Multiplication of Dressing

Table 1. Draft Story Board Manual for Dressing

Pictures / Videos	Sound / Dubbing
The Concept of Multiplication Rules	Opening Music or Introduction
When Zainal wants to go to an event. Zainal opened the door and then approached the cupboard. The cupboard has two doors on the left, hanging three different clothes. Each shirt is red, yellow clothes, and blue shirts. On his right hung two long pants with different models. Each one is made of cotton and levis.	"Can anyone help me to buy clothes that are suitable for the event that I want to go to," said Zainal (expression confused).

Figure 2. Illustration Design (Graphic Design) Multiplication Rules How to Dress



2. Problems are playing with number cards
   a. *StoryBoard Preparation Manual*
   The Story Board Manual describes the narration or storyline of the Manually Playing Number Numbers Card that will be applied. The description tells the concept of multiplication rules obtained by many possible numbers formed. Many names are formed consisting of 3 number cards. Table 2 shows a snapshot of the Story Board stages of Playing Number Numbers Cards.

b. *Graphic Story Board*.

Visual storyboards provide a sketch picture of a factorial storyline/narrative for Playing Number Numbers Cards, which shows different ways to Play Number Numbers Cards. Figure 3 shows a factorial Graphic Design illustration for Playing Number Numbers.

Table 2. Draft Story Board Manually Playing Numbers Numbers Card

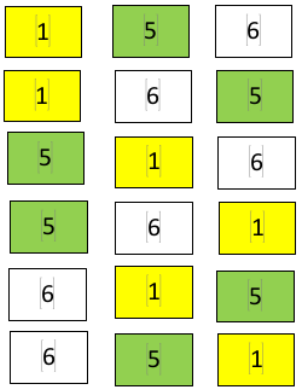
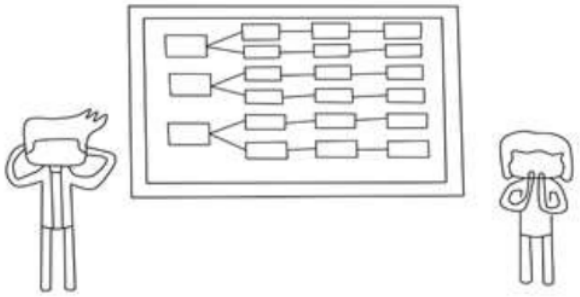
Pictures / Videos	Sound / Dubbing
The text "2. Factorial Rules "	We will learn factorial rules with realistic mathematics
The text "2.1. Appears Playing card."	Let's play cards
3 number cards appear with swapping arrangements such as: 	"Can anyone help me to arrange 3-digit numbers that can be formed from 3 number cards 1, 5, and 6."

Figure 3. Factorial Design Illustration (Graphic Design) Playing Numbers Numbers



3. Problems Arranging Class Managers

a. *StoryBoard Preparation Manual*

The Story Board Manual describes the narration or storyline of the Permutation manual for Arranging Class Administrators. The description tells the concept of Permutation for

Arranging Class Administrators. Table 3 shows an excerpt of the Story Board stages of Organising the Classroom.

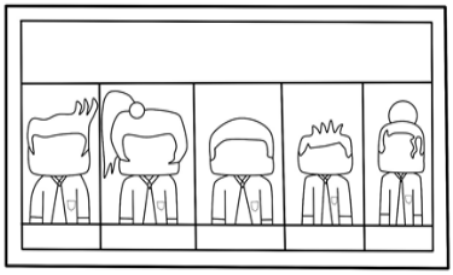
b. *Graphic Story Board*.

The graphic storyboard provides a sketch overview of the Permutation storyline/narrative for Arranging Class Managers that shows the many ways to Arrange Class Managers. Figure 4 shows a factorial Design Graphic Illustration for Arranging Classroom Managers.

Table 3. Draft Story Board Manual Arranging Class Managers

Pictures / Videos	Sound / Dubbing
The text "3. Learning Permutation "	We will learn permutation with realistic mathematics
Text appears "Arranging Class Managers"	Let's arrange the class administrator
Image appears: Class XI A will elect the Class Chair and Class Secretary from 5 candidates. See the following picture Class Management Candidates The message appears: "chosen by the Chair and Secretary of the 5 candidates. First the chairman is chosen and then the secretary "	Class XI A will hold a class management election consisting of 5 prospective administrators, namely A, B, C, D, and E. Of the 5 people as shown in the Figure, one of the 5 candidates will be chosen as Class Chair. One of the remaining 4 candidates will be chosen as a secretary. How many possible class arrangements are composed of class leaders and secretaries?

Figure 4. Illustration Design (Graphic Design Permutation Arranging Class Management)



Development. This development phase aims to apply the design into a medium that can be used in learning. In this stage, a draft of the RME application was made with the steps of the process of animation (visual effect), narrative dubbing, and motion graphic animation video (merging illustrations and dubbing).

1. The Process of Animation (Visual Effect), Dubbing Narrative, and Motion Graphic Animation Video (Combining Illustration and Dubbing) of the Problem of Dressing.
   In this process combining multiplicative frames for how to dress that has been poured in the visual effect and then given a voice-based on the narrative dubbing; the next manual is editing the finished video. The next step is the resulting video must pay attention to the duration, dubbing, and transitions between frames. Figure 5 shows the animation process (Visual Effect), Dubbing Narration, and Motion Graphic Animation video.

Figure 5. Visual Effect, Dubbing Narration, and Motion Graphic Animation Video (Combining Illustration and Dubbing) for Multiplication Rules for Dressing

2. The Process of Animation (Visual Effect), Dubbing Narrative, and Motion Graphic Animation Video (Combining Illustration and Dubbing) of Problems Playing Number Numbers Cards. In this process, combining factorial frames for playing numeric cards that have been poured in visual effects and then given a voice-based on narration dubbing; the next manual is editing the finished video. The next step is the resulting video must pay attention to the duration, dubbing, and transitions between frames. Figure 6 shows the animation process (Visual Effect), Dubbing Narration, and Motion Graphic Animation video for Playing Numbers Number Cards.

Figure 6. Animation Process (Visual Effect), Dubbing Narrative, and Motion Graphic Animation Video (Combining Illustration and Dubbing) Factorial Playing Number Numbers Cards

3. Animation Process (Visual Effect), Dubbing Narrative, and Motion Graphic Animation Video (Combining Illustration and Dubbing) of Problems Arranging Classroom Managers
   In this process, combining Permutation frames for Arranging Class Managers have been outlined in the visual effect and then voting based on narration dubbing; the next manual is editing the finished video. The next step is the resulting video must pay attention to the duration, dubbing, and transitions between frames. Figure 7 shows the animation process (Visual Effect), Dubbing Narration, and Motion Graphic Animation video for Arranging Classroom Managers.

Figure 7. Animation Process (Visual Effect), Dubbing Narration, and Motion Graphic Animation Video (Combining Illustration and Dubbing) Arranging Class Managers

Dissemination. After the application is complete, the next is product validation by material experts and media experts. This stage includes testing and authorisation from experts. The results will be in the form of criticism and suggestions that can be used as a basis for revising the developed media so that the media can become even better.

Material validation aims to assess the appropriateness of the material presented on a mobile android based realistic mathematics learning application for high school students. Material experts provide an assessment and advise on the material presented in the form using a Likert scale of 1 to 4. Validation was carried out by two people, namely, Nurlaela Rahmawati, S.Pd as a mathematics subject teacher at South Tangerang 6 Public High Schools, which became a partner school in this study, and Rudi Dwi Pramono, S.Pd, as a mathematics subject teacher and school principal at MA Kafila International Islamic School, who is also a partner school in this study.

The results of Nurlaela Rahmawati, S.Pd's assessment as the first material expert in the material aspect, were 85.71% with the right criteria; the learning aspect was 80.00% with reasonable measures, the evaluation aspect was 81.25% with suitable rules. The results of the assessment of Rudi Dwi Pramono, S.Pd as the second material expert in the material element amounted to 85.71% with the right criteria; the learning aspect was 80.00% with reasonable measures, the evaluation aspect was 87.50% with suitable rules. Overall the quality of the material in the learning media assessed by two material experts was 82.32% with appropriate criteria.

Media validation of realistic android based mobile mathematics learning applications for high school students are tested before being tested on partner school students or the general public. The aspects that are tested are the aspects of appearance, elements of writing, aspects of software engineering, and dubbing. Validation was carried out by one person, namely, Prof. Dr. Zulkardi, M.I.Komp., M.Sc. Sriwijaya University Professor, who is an expert in mathematics education in RME and Computer Science.

The results of the assessment of media experts in the aspect of display quality are 75.00% with the right criteria; the writing aspect is 75.00% with reasonable measures, the software engineering aspect is 75.00% with consistent standards, and the sound dubbing aspect is 75.00% with the criteria good. Overall the quality of instructional media assessed by a media expert was 75.00% with suitable measures.

The product trial phase is carried out by testing and distributing applications to students in partner schools, namely South Tangerang 6 Public High Schools and the MA Kafila International Islamic School. It is done to verify the functioning of the application on various types of Android-based smartphones and measure the level of product eligibility through the Google form http://bit.ly/ujicoba_product. Before the app is used, respondents are asked to install the application on their Android smartphone device. Request spreading is made via

Bluetooth, SHAREit, and the http://bit.ly/aplikasikombinatorik download link from Google Drive prepared by researchers.

The results of a public trial of 27 students of South Tangerang 6 Public High Schools, obtained the results of application quality in the aspect of display quality by 80.56% with reasonable criteria, writing characters by 86.34% with perfect measures, software engineering aspects by 84.26% with consistent standards, and sound dubbing aspects of 82.10% with suitable criteria. The results of a public trial of 23 students at the MA Kafila Internationa Islamic School, obtained the results of the quality of the application in the aspect of display quality by 84.24% with reasonable criteria, and writing characters by 85.60% with suitable measures. The results of aspects of software engineering was 85.73% with consistent standards, and sound dubbing aspects at 76.81% with appropriate criteria. The overall quality of learning applications assessed by 50 students from partner schools is 83.20% with suitable measures. The results of data acquisition show that practical mobile learning applications based on Android mobile are appropriate to be used as a source of learning mathematics at the high school level.

After the trial was limited to students in partner schools through the Google Form and the application was revised, the next step was the dissemination stage. The purpose of this stage is to disseminate the use. In this research, the form that has been made is planned to be distributed through the Google Play Store, but the research team has not yet uploaded the application to the Google Play Store.

Figure 8. Expert Material Assessment

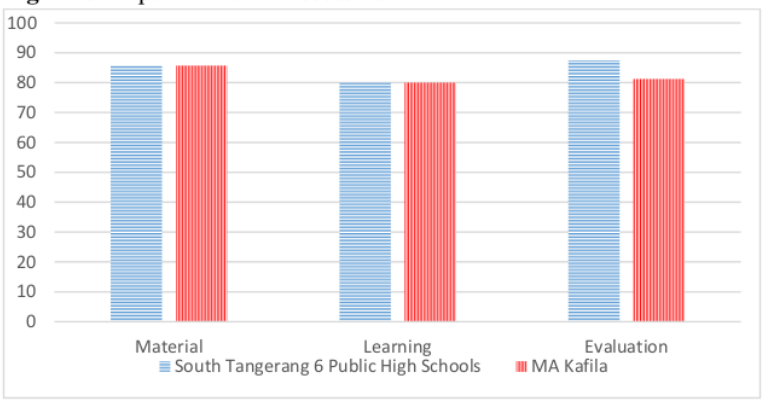


Figure 9. Media Expert Rating

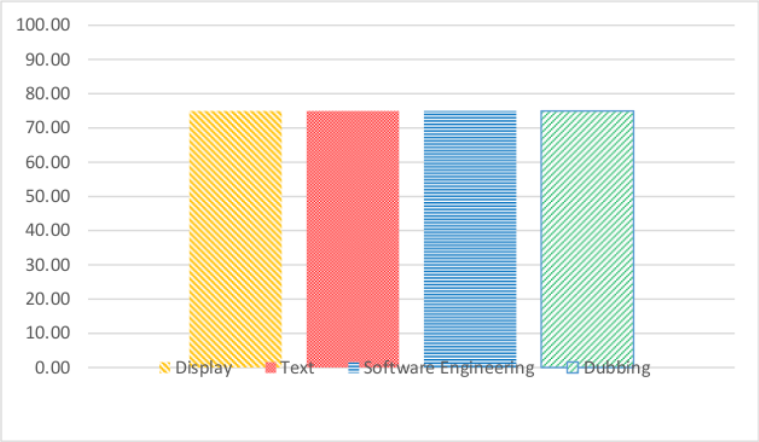
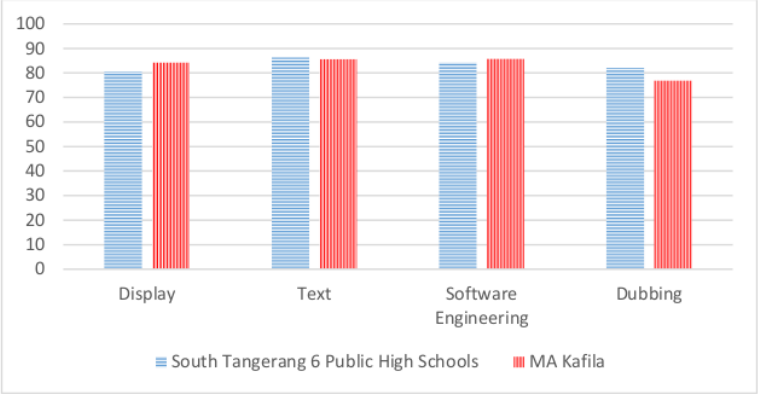


Figure 10. Application Trial Results



Conclusion

Based on the research development that has been done, the following findings can be obtained: Development of learning media for mobile android based practical mathematics learning applications for high school students was named "Combinatorics Application" using the 4D model. Define was in the form of preliminary studies, including library studies and field studies.

Design was in the way of making RME application drafts with the stages of storyboard design (manual), graphic design, animation (visual effect), dubbing narrative, and motion graphic animation video (merging illustrations and dubbing). Develop (development) was in the form of an expert validation stage and product trials, and Disseminate (dissemination). The final

product is a Combinatorics Realistic Mathematics Education Application based on the Android Mobile for high school students named "Combinatorics Application" with the extension .apk (dot apk). This application was developed as a learning medium for high school level students. This application contains multiplication rules with examples of rules on how to dress, factorial concept material with examples of playing numbers, permutation material with examples of class management arrangements, and learning evaluations for each material that can be accessed with an Android-based smartphone. This application is packaged as interesting, so it is expected to be a practical and fun learning media that can be accessed anytime and anywhere. It can increase students' interest in learning mathematics and can be used as a means for independent learning and as a student reference source.

The results of the overall material validation assessed by two material experts were 82.32% with suitable criteria. The results of the media validation were validated by the media expert obtained a percentage score of 75.00% with appropriate measures. The results of product trial on 50 students in partner schools got quality results of 83.20% with functional categories. Based on the results of data acquisition, it shows that practical mobile learning applications based on the Android mobile should be used as a source of mathematics learning at the high school level.

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