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

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## TOPIC

### **Track 1. Information and Communication Technology**

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

### **Track 2. Applications of Digital Media Technology in Arts Design**

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

### **Track 3. Business and Economics Applications**

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

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

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## FOREWORD

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

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

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

Dr. Jusak

General Chair of the ICITAS 2018

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## KEYNOTE SPEAKER

### Keynote Speaker 1



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- 2010 – 2012: Deputy Dean Research and Postgraduate Studies, Faculty of Electrical and Electronics Engineering, Universiti Malaysia Pahang
- Feb 2014 till present:  
Dean of Faculty of Electrical and Electronics Engineering, Universiti Malaysia Pahang
- 1 March 2017 till present:  
Professor at Faculty of Electrical and Electronic Engineering, UMP

### CURRENT POSITION

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

**FIELD OF SPECIALIZATION**

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

**THERMAL IMAGING APPLICATION: THERMAL - VISIBLE FUSION FOR HUMAN DETECTION**

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



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**Keynote Speaker 2**

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

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

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

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

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**Keynote Speaker 3**

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

**Keynote Speech Title : Digital development for sustainable economy**

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

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

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

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

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

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

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# Utilizing ADDIE Model for Developing Brilliant, Learning Application in Institute of Business and Informatics Stikom Surabaya, Indonesia

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**Abstract**— Brilliant is a blended learning developed based on the ADDIE model. This study aims to float learning applications to meet the characteristics of Z generation with ADDIE model. ADDIE model has been used in general as a foundation for constructing instructional design, especially in developing Computer Based Training (CBT) or multimedia-based teaching applications and e-learning. Brilliant having been implemented and evaluated in 65 classes that involve 65 lecture and 1153 students. The result of evaluation shown 79% of the student users said they found it convenient to use the application while 82% of lecturer users agreed that this application supported their teachings.

**Keywords**—ADDIE Model, Learning Application, Google Apps, Brilliant.

## I. INTRODUCTION

Institute of Business and Informatics Stikom Surabaya, Indonesia, is higher education establishment in Indonesia that has committed to and focused on Information Technology sector. Students learning in this establishment are certainly students who are interested in growing in Information Technology sector. This is reflected in their characteristics as students of Z-generation. Z-generation characteristics include: (1) Convenient and very dependent on technology since individuals of Z-generation have grown surrounded by technology, (2) Multitasking with various online products and sophisticated technology devices, as well as having highly appreciation for simplicity and interactive design, (3) Having social responsibilities given much information that can be accessed online, (4) Stay connected and communicate through social network cross-country and cross-cultural which influences way of thinking and decision-making process [1]. Adapting to characteristics of Z-generation, learning system cannot be developed conventionally. Higher education establishments cannot disregard Z-generation needs of learning model that suits their characteristics. Learning systems that are

lecturer centered, learning media focusing on face-to-face interaction, assignment submission on paper-based, doing assignments has to be done at home or campuses, engaging the lecturers only via face-to-face, are no longer suitable learning model for a student in these days. Teaching division should start to think about learning model that can adapt to fulfill the needs of students nowadays, especially students of Information Technology who always follow the latest gadget development. Meanwhile, newly developed learning model cannot disregard conventional method which face-to-face interaction since humanity senses are still highly required. Given the existing problems of learning for students with Z-generation characteristics and students of Information Technology, ADDIE model is introduced for designing the construction of a learning model that suits the existing needs.

Based on the analysis, hybrid learning is the most suitable learning model. Hybrid learning [2] is a new era in education sector that combines e-learning and conventional learning in classrooms, in order to obtain harmonious combination of face-to-face interaction in class presented by teachers and online learning experiences outside the classes as complement, so that students can become more motivated in improving their capabilities, both inside and outside classrooms. It strikes the chord with findings of Hariadi [3]. The findings expose that optimum learning results can be achieved by using the internet as learning media collaborating with conventional learning to complement learning process in the form of blended learning (hybrid learning). Dziuban [4] emphasize that hybrid learning should be a learning model that can incorporate effectiveness and social capabilities in classrooms with unlimited technology to increase knowledge of the students.

Hybrid Learning requires an application that can be a place in which learning is taking place for both lecturers and students. By considering how often Google has been used for its search engine and many other applications favored by the young generation, such as; Gmail, Google Groups, etc.; the application to be developed will be built upon applications provided by Google Apps for Education (GAFE).

GAfE is a feature provided by Google to assist learning through Information Technology, particularly to facilitate collaboration between students and lecturers. Benefits of using GAfE are allowing users to stay connected anywhere; capability to unite students and lecturers instantly without any physical location and time limitations; easiness of managing assignments, marks, and modules; no limitation in exploring learning sources for both students and lecturers. Those benefits are provided by GAfE useful features, including Gmail, Google Drive, Google Hangout, Google Calendar, Google Group, dan Google Site. Many researchers which have been done in learning subject by using those features of GAfE are Suwantarathip [5] using Google Docs for improving writing skills in foreign language classes for students. The research result demonstrates that writing skills in class by using Google Docs is developed more significantly compared to writing skills that are being improved in a class by using face-to-face interaction as the only learning media. Meanwhile, Railean [6] used Google Docs and Google Calendar separately for improving skills in meta-system for mathematics by collaborating with fellow students, lecturers, as well as selected groups. Application from GAfE will be optimally used through an integrated application in which Hybrid Learning is taking place.

## II METHOD

Analysis, Design, Development, Implementation, and Evaluation. (ADDIE) model is one of the most common models used in the instructional design field a guide to producing an effective design [7].

### 2.1. Analysis

At this stage of the analysis, researchers attempt to meet the needs of students as a Z-generation that has characteristics heavily dependent on the gadget. Results of analysis as in table 1.

TABLE 1. DESIGN OF REQUIREMENTS AND APPLICATIONS FOR LEARNING

Requirement	Sub Requirement	GAfE Feature to be used	Menu Term
1. Information about design of learning for a module in period of one semester	Semester Lesson Plans	Google Drive Google Doc Google Site	Course – Lesson Plans
2.	Lecture	Google	Course –

Requirement	Sub Requirement	GAfE Feature to be used	Menu Term
Easiness to access to reference sources	materials	Drive Google Doc Google Site	Course Materials
	Journal/e-book	Google Drive Google Site	Course – References
3. Communication in class	Online discussion forum	Google Site Google Group	Forum
	Synchronous Learning	Google Hangout	Synchronous Learning
	Information about assignment evaluation result from lecturers for students	Google Doc	Score List
	Information from lecturers for students.	Google Site Google Group	Announcement
	Schedules of lecture sessions and their changes	Google Calendar	Calendar
4. Tool for doing group assignments	Collaboration	Google Doc Google Drive	Assignment
5. Online assessment/assignment systems and feedback submission.	Online exams/assignments	Google Doc Google Drive	Assignment
	Assess similarities between student work	Google Detective	Plagiarism

### 2.2. Design

After analysis stage then made the design as in figure 1.



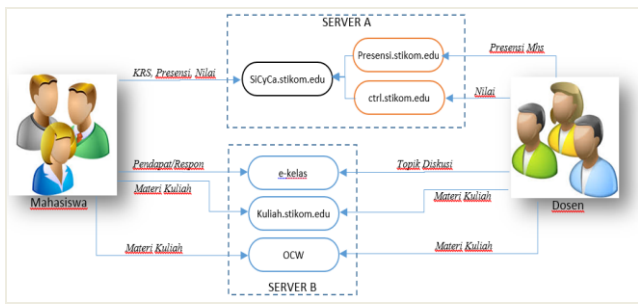


Fig. 1 Design Architecture

2.3. Development

The development stage of this study selected Google Apps for Education (GAfE) with a web-based platform. GAfE is a feature provided by Google to help education through Information Technology especially collaboration between faculty and students.

2.4. Implementation

This Brilliant learning application has been implemented in 65 classes involve 65 lecturers and 1153 students.

2.5. Evaluation

This evaluation phase of the researcher using a questionnaire distributed with the help of google application forms. Incoming data onto this questionnaire then presented in the conclusion and recommendation.

III RESULT

3.1. Instructional Design and Development Result of Brilian

The learning application with Hybrid Learning which maximizes applications of GAfE in integrated mode is named Brilian. The purpose of giving the name is not only to extract some alphabets from Hybrid Learning but also putting an expectation that students who use Brilian can obtain excellent achievements and skills.

Brilian is built based on learning design which is not other than placing facilities for learning objectives, learning strategies, learning and teaching activities, as well as evaluation systems to be applied. [8] states that user requirements on a learning application in general are: (1) Information about related units in learning and teaching processes (objectives and targets, syllabus, teaching methods, lecture session schedules, assignments, exam schedules, references or reading materials as well as profiles and contacts of lecturers), (2) Easiness to have access on reference sources (college textbooks and lecture notes, presentation materials, example of pass exams, Frequently Asked Questions (FAQ), reference sources for doing assignments, useful websites, articles from online journals), (3) Communication in class (online discussion forum, mailing list discussion, announcement board which provides information such as: changes in lecture session schedules, assignments, and latest deadline for submissions), (4) Tool for doing group assignments (tool for file sharing and

group directory, discussion media for doing assignments in groups), and (5) Online exam system and feedback. Once a design which is able to fulfill requirements for learning the application, next to more detail design for each menu is specified as follow.

3.2. Initial Display of Brilian

Each lecturer will find the most initial display of Brilian as illustrated in Figure 2.

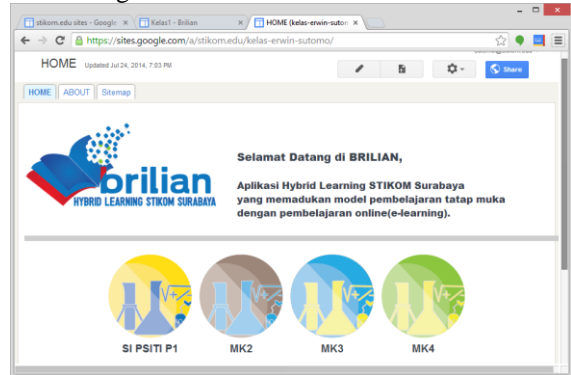


Fig. 1. Initial Display of Brilian

Every circle represents module and classes that can be managed by the lecturer. In order to use the existing application, the lecturer is required to click on the circle based on what module and class he wants to refer. On each module with a specific class, there are some students registered as members through Google Groups which is created earlier by the lecturer.

Once a module and a specific class have been chosen, Brilian will display sub menus. Every sub menus illustrate requirement design of learning.

Next section explains the description of the submenus.

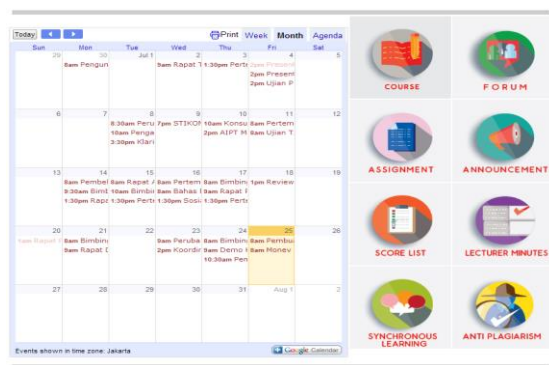


Fig. 2. Submenus of Brilian on Module - Class

IV. IMPLEMENTATION BRILIAN

In the implementation stage of Brilian, there are two groups of subjects that need to get the attention. Those groups are learner group and teacher group. Learner group consists of the learner of the millennial generation who was born after the 80s. They

are part of a generation in which virtual world has incredibly developed, so there is no doubt if they do not face major difficulties in using Brilian. Besides, Brilian development is based on the needs of learners. Therefore, training is provided only for first-year students whereas more senior students practice using Brilian directly in classes with their lecturers.

Implementation of Brilian for teacher group is not as easy as it is in learner group. The teachers or lecturers are mostly from an earlier generation. Lecturers are not certainly familiar with the existing applications. Aware of the condition, some supports are given for the lecturers: (1) trainings and module explaining features of GAfE, (2) trainings and modules about Brilian (3) policy based on rector decree that requires the use of Brilian as learning application in Business and Informatics of Stikom Surabaya, (4) regulation support by publishing rector decree which govern responsibilities of lecturers to teach by using Brilian, applied to all lecturers under Business and Informatics Institute of Stikom Surabaya, (5) discussion tool for those who face difficulties in the form of clinic service in a room with full access to Brilian in which Brilian team is at present to give direct responses to them, and (6) assistances for each lecturer to guide during the learning processes.

Learning implementation by using Brilian in the first sessions in classes are started with an introduction to Brilian as well as its objectives, functionalities, and benefits for learning processes. This introduction is done by lecturers. Then, lecturers introduce each menu, followed by an explanation of its exposure to learning processes so that learners can understand general objectives of their learning. This general introduction should be done in order to make students understand what will be done for the whole semester and prepare to do the learning activities well. The agenda for next meeting will be adjusted according to the constructed lesson plans, whether to perform the learning online or face-to-face based.

In general, learning activities with Brilian are fun, challenging, and giving various learning models for both learners and teachers. Even so, there are still some weaknesses that require improvements in the developed application. In regards to this, the Brilian team always put the best efforts in performing improvement actions.

## V. EVALUATION

During the period of September 2014 to December 2014, 65 lecturers simultaneously started the Brilian application on their teachings. This means at least 65 classes used Brilian application. It is more likely that more than 65 classes have used Brilian since every lecture teaches more than one class.

In December 2014, questionnaires about Brilian application were distributed to students. The main purpose of these questionnaires is to measure students' acceptance level of Brilian and to observe whether Brilian had been suitable for the students' expectations. 1153 students were listed to fill in the questionnaires.

Some findings are gathered as specified in the following list.

(1) 82% respondents stated that their classes had used Brilian application. This means the Brilian application has been widely used by lecturers in Business and Informatics Institute of Stikom Surabaya.

(2) 79% respondents found it convenient to use Brilian application. This demonstrates that Brilian application can be accepted by students well and they can utilize it for supporting their learnings.

(3) Some reasons why students had inconvenient experience while using Brilian can be listed as follow : (a) Lack of knowledge of Brilian (for all academic year entrances), so that it is difficult to understand how Brilian works, (b) Difficulties in joining the group. This promotes difficulties in joining Brilian classes, (c) Uploading processes for assignments cannot always be successful, (d) There is no notification once an assignment is accepted so that students are noted not submitted the assignment, (e) Some lecturers have not committed to uploading lecture materials on Brilian. Instead, they are still using the ordinary flash drive, (f) Less interesting features, (g) Network traffic is very slow so that many users cannot have access Brilian easily, (h) It is still imperfect to be accessed in Smartphone.

Besides questionnaires for the students, developer team of Brilian in Institute of Business and Informatics Stikom Surabaya also approached education experts to ask for validation of benefits, displays, and functionalities as learning prototype of Brilian application. The gained results are specified in the following points: (1) Valuation of Brilian display: average = 4,88 (scale 1-5), (2) Valuation of Brilian benefits: average = 4,8 (scale 1-5), (3) Valuation of Brilian as learning prototype: average = 4,8 (scale 1-5). The General comment from the education experts is: In general, Brilian Hybrid Learning program package has fulfilled qualification standard of learning instrument system. This standard covers: Validation of substance and construction, Practicability, and Effectiveness which is assessed by measuring how lecture objectives are achieved by lecturers and students as users. The Recommendations are (1) If possible, recording video file (CCTV) of past lecture sessions should be added, so that students who did not attend the sessions can re-watch them again, (2) This software is recommended to facilitate lecturer and student activities in order to be considered as positive reward in career (for the lecturers) and academic activities (for the students) so that use of this software can motivate lecturers and students.

## VI. CONCLUSION AND RECOMMENDATION

Following the implementation stage, some points can conclude. Brilian application can support learning process in Institute of Business and Informatics Stikom Surabaya. It is demonstrated by questionnaire results filled by the students.

Integration of Google Apps produces an application that creates a convenient experience in which users do not have to refer to the individual application of Google Apps, instead they can refer to only one application which is not other than Brilian.

c. Brilian application has undeniable excellence: (1) Students can acknowledge and download lecture contract, lecture material, reference books, journals, announcement, assignments, and quiz problems anywhere and anytime, even when they cannot attend the lecture sessions in class because of certain reasons, (2) Students learn more actively because they can do group assignments in a document at the same time although they are in different in location while working on the assignments. Moreover, the students can submit the assignments by uploading the answers to Brilian application without having to come to the campus, (3) Students are able to manage schedule of study because every personal schedule is integrated to academic calendar, schedule of lecture sessions, as well as assignment deadlines, (4) It becomes more possible for students to learn more actively since they can discuss with lecturers and other fellow students by developing network through forum application and Google Plus, (5) Lecturers can provide corrections and comments on the students' work (assignments, reports, essays, etc.) directly so that students do not find any difficulties in meeting them through collaboration facility, (6) Students are allowed to conduct online survey and to process the survey results by utilizing Google Form facility, (7) External storage, such as flash drive, are no longer required since all lecture materials are stored in Google Drive, (8) Plagiarism can be minimized because of anti-plagiarism software integrated to the application.

Besides the conclusion, some recommendations are also provided as follow.

1. Brilian application should be developed continuously with improvements in order to create more convenient and easy-to-use experiences and to operate in mobile learning version.

2. A research is recommended to be conducted in classes by using Brilian application so that impacts of this application on learning results of the students can be observed in the more exact way.

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