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# BOOK OF ABSTRACTS

## INTERNATIONAL CONFERENCE ON EDUCATION, SCIENCE AND TECHNOLOGY (ICESTech)

### MARCH 15, 2019

AUDITORIUM UNIVERSITAS NEGERI PADANG

# EDUCATION, SCIENCE AND TECHNOLOGY IN INDUSTRIAL REVOLUTION 4.0

ORGANIZED BY UNIVERSITAS NEGERI PADANG

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## **FOREWORD**

Rector of Universitas Negeri Padang

A very warm welcome (Selamat Datang) to all speakers and delegates of Konvensi Nasional Pendidikan Indonesia (KONASPI) to Padang, West Sumatera Indonesia and to our International Conference on Education, Science and Technology (ICESTech) 2019 with Education for Industrial Revolution in 4.0, on March, 13th - 16th 2019, organized by Universitas Negeri Padang

It is an honour to be the host of the KONASPI and ICESTech as it provides great opportunity for respectable researchers, experts, scholars, students and even policy makers to share ideas on hot issues and trending topics on Education, Sciences, and Technology.

Our sincere appreciation goes to Kemenristek, Forkom of FKIP leaders of Indonesia, Asosiasi Lembaga Pendidikan Tenaga Kependidikan Negeri Indonesia (ALPTKNI), Kemendikbud, and sponsors. We appreciate your participation in this conference.

I would like to take this occasion to express my appreciation to keynote and invited speakers of the conference, the prominent figures in their field. My appreciation should also be addressed to all co-host universities who have shared significant contribution to make this event possible. To all parallel speakers as well as all participants coming from various places, your contribution makes this conference is truly special.

I appreciate the organizing committee, the scientific committee members, and the international board for their efforts in materializing this conference.

Finally, I encourage delegates to collaborate and participate actively in interesting discussion in this conference. Have a fruitful conference, and please enjoy your visit to Padang.

Sincerely,

Prof. H. Ganefri, Ph.D.

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## Comparison of ICT Using in Learning between Indonesia and Malaysia

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# Comparison of ICT Using in Learning between Indonesia and Malaysia

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**Abstract.** Transformation of technology in the 21st century required teachers to be able to integrate ICT in the classroom. Due to technological changes, curriculum changes have taken place in Indonesia and Malaysia. Changes in the curriculum were expected to be able to increase the competence and expertise of teachers in integrating ICT in the classroom so that an effective learning environment was created for students. This study aimed to explore Vocational Education learning strategies used by teachers in Indonesia and Malaysia. The best practices of Vocational education learning strategies were explored including various types of learning media that were integrated ICT. The research method used in this study was quantitative using a questionnaire as a tool to collect data consisting of indicators of remembering & understanding, application, analyze, evaluate and create utilized by the subject of the research, which was vocational school teachers in Malaysia and Indonesia. All data will be analyzed descriptively equipped with tabulations and distribution of empirical data. The results of the study showed that teachers in Indonesia and Malaysia have begun to integrate ICT in the classroom. Teachers have begun to be able to innovate and develop using the right information technology in existing learning situations.

**Keywords:** *Information and Communication Technology (ICT), Vocational teachers, Teaching and Learning Strategy*

## 1. Introduction

Malaysia and Indonesia are allied countries, namely *Rumpun Melayu* [1]. Both of these countries have a background once colonized by the West [2]. After gaining independence, Malaysia and Indonesia rose to develop their own country by beginning to utilize natural resources and human resources [3]. The creation of human resources is very strong in relation to education. Although the two countries are of the same family, they are independent in implementing the education system with the aim of developing humans as resources for the country. There are similarities between the Malaysian and Indonesian education systems. Both countries aim to develop quality human resources [1].

Facing 21st-century education, both countries are trying to change the curriculum so that there will be an increase in human resources that are ready to face 21st-century challenges [4];[5]. 21<sup>st</sup> century education integrates information communication and technology (ICT), including technical vocational education and training (TVET) in Indonesia and Malaysia [6]. The TVET curriculum urges teachers to be able to master ICT effectively with the aim to help students get information in developing their own competencies (*Vispārējās & Praksē*, 2015; Adrian, 2009). ICT has the potential to change the learning environment, as learning can take place without being at the front of the classroom [9]; [10]. Students can study anytime and anywhere by utilizing ICT with very many learning resources.

In the end, the potential of instructional media (IM) can be used in accordance with the teacher's ability to use IM tools in learning to create an attractive learning environment for



students [11]. Technology has a fairly good impact on learning [12]; [13]. Of major concern is how teachers and learners can more easily obtain information from new technology compared to conventional learning resources [14]. The challenge in integrating ICT in learning is to ensure that teachers and students must be prepared to use new learning methods and ICT-based materials and learning resources [12]. ICT must integrate with vocational schools throughout the country for 21st-century challenges that must be met [15]. Most teachers in tertiary education in Indonesia and Malaysia do not have the experience and competencies needed in the use of computers for educational and industrial purposes [16]. ICT facilities are underutilized in the learning and teaching process [17]. Extrinsicly, teachers have not been motivated in utilizing ICT because of the unavailability of ICT material in schools. However, after the curriculum changes carried out by Indonesia and Malaysia, there was a shift in learning that was initially conventional to become integrated with ICT [18]. In this article, we will discuss the comparison of ICT use between Indonesia and Malaysia.

## 2. ICT

ICT is a tool or facility that provides the environment needed, including service and physical infrastructure, for the generation, transmission, storage and processing and dissemination of information in form, text, voice, data, and graphics [19]. From this point of view, ICT is a tool for computer communication facilities and communication facilities. From the definition of ICT, ICT has a very important role and can be used wherever and whenever and the output produced can reach its users at a low cost and in a short time across all ICT users [20]. To prepare students to face the challenges of the 21st century in our industrial world, the integration of ICT in learning must be done, and the use of ICT tools and application of technology must be supported [21]. Teachers must be able to create a learning environment that enables students to be responsible for their own learning, with a focus on specific processes and results as expected by the 21st century. Students' ability to write, speak and analyse information can be improved by individual growth through ICT means [22].

The ability of people to write, speak and analyse information can be enhanced by individual growth through ICT facilities [23]. Several studies have shown the many benefits of using ICT as an important tool in developing teaching materials, learning and managing information for students [16]. Applications are used to make learning more effective and efficient in facilitating teacher pedagogical activities and student academic work. For example, the use of learning media such as PowerPoint has become one of the ways commonly used by students when learning. In addition, ICT allows students and teachers to control, contribute, manipulate information for teaching and learning process as journals, interactive books and the like are usually available through the Internet [24]. Integrating ICT in the classroom refers to the process of determining the right ICT tools and processes to create an effective classroom environment and situation. Referring to the use of ICT, teachers are expected to have competence and expertise in utilizing ICT so that it can be used correctly to share knowledge with students. In the teaching and learning process, teachers have goals, methods and teaching materials that will be integrated with ICT to achieve the expected results.

ICT interaction into the curriculum requires the willingness of ICT-friendly teachers to be teachers who are trained in their ability to operate computers, are able to program and utilize software that is appropriate to learning [25]. Most of the developing countries in the world, including Indonesia and Malaysia, are left behind in science education because of the inability to use ICT in learning. The conventional pursuit approach still leads in vocational schools. ICT in education should be seen an object, or a tool of learning media and



as a management tool at school. In essence, ICT cannot replace teachers but can be used as a teaching device that help teachers prepare lessons [24]. ICT should not be seen as a tool for learning but rather as a learning machine. The computer as a chase device is used to assist teachers in instructing students in the form of practice questions, video tutorials, and simulations, games as instruction subjects and as learning resources. This can be used as a tool to process information, analyze, and collect data. Using ICT in learning supported taxonomy bloom. Dr. Benjamin Bloom first created Bloom's Taxonomy in 1956 to "promote higher forms of thinking in education, such as analyzing and evaluation rather than remembering facts".

In the context of mobile learning, a revised version of Bloom's taxonomy, the Pedagogy Wheel, is useful for lesson development because it incorporates numerous examples of online tools and apps that allow instructors to integrate each part of Bloom's taxonomy into the classroom [26]. However, when the SAMR Model is coupled with Bloom's taxonomy, instructors may initially feel daunted because when the models are combined they appear more complex. The goal for the instructor, when designing a classroom, is to construct a simple SAMR ladder that is coupled with Bloom's Revised Taxonomy [27]. As the task moves from the lower to the upper levels of the taxonomy, it also moves from the lower to the upper levels of the SAMR ladder. The SAMR Model is like a lens, which allows instructors to look at how they use technology in the classroom. The name of the model is derived from the initials of each of its four levels. Starting from the bottom:

- a. Substitution is the direct replacement of existing tools or methods used in traditional classrooms, such as students using word processors instead of pens and paper to write reports
- b. Augmentation is when substitution provides more functionality, such as when students who write on a word processor also annotate it or share the document with instructors on Google Docs
- c. The modification is when parts of the tasks are redesigned, such as undertaking collaborative writing using Google Docs and using highlighting and chat functionality to give instant feedback to peers
- d. Redefinition is the highest level, which allows students to do tasks that were previously inconceivable in traditional classrooms, such as recording videos to submit as homework and then posting them on social media to ask for feedback from the audience.

The first two levels are referred to as Enhancement, where technology assists in the accomplishment of traditional tasks. However, sometimes these levels may not be needed when looking at all the possibilities technology offers. The other two levels are referred to as Transformation, where the real metamorphosis of the classroom takes place and technology allows creative tasks that are very different to those found in traditional classrooms. The SAMR model offers instructors "a continual re-examination of practice to make the best possible use of technology" [28]. Four ways to integrate technology with learning are provided, which takes the technology into the students' world and instills lifelong learning habits.

### 3. Methodology

This study uses quantitative methods survey. This study was aimed to explore the conditions of Vocational Education learning strategies used by teachers in Indonesia and Malaysia. In this stage, the best practices of Vocational education learning strategies are also explored, including various types of learning media that are integrated with ICT. The quantitative method with the survey will be applied to gather the information needed.

The data will explore the learning strategies and decisions about learning strategies in Vocational Education in accordance with the media used by the teacher. The population was teachers from all Vocational Schools in Western Indonesia and Vocational College Malaysia drawn from a sample using the stratified random sampling technique. Vocational Education learning strategies in Indonesia and Malaysia were then compared. All data will be analyzed descriptively, including tabulations and distribution of empirical data. Based on the scale level of the data, the average, standard deviation, and the minimum and maximum frequencies in absolute and relative terms are examined.

Respondents were determined based on purposive random sampling to ensure the selection of the right individual, with relevant experience, and wants to participate in this study. Chain Referral methods will also be used as a sampling technique. Respondents were teachers and students of the vocational school in West Indonesia, and so is Malaysia Respondents can be contacted through a network built by researchers in the second country.

### 3.1 Instrument of Research

Implementation of research quantification begins by distributing questionnaires to 200 teachers at Vocational Schools in Indonesia and Vocational College teachers in Malaysia. 4 clusters are purposely designated as data sources, namely Kota Padang, Bukittinggi, Medan, Batam, Lahat and Jakarta as the data source and Johor in Malaysia.

The questionnaire consisted of 5 indicators namely remember & understand, apply, analyse, evaluate and create. The questionnaire items are validated by Rasch Model. The indicators used in this study were adopted from the Taxonomy Bloom Revision. Instrument grid can be seen in table 1.

**Table 1.** Instrument Grid

|  |   |   |
|--|---|---|
| Remember<br>& Understand               | <input type="checkbox"/> Highlighting           | <input type="checkbox"/> Social Networking          |
|  | <input type="checkbox"/> Commenting             | <input type="checkbox"/> Subscribing                |
|  | <input type="checkbox"/> Recalling List Name    | <input type="checkbox"/> Social Bookmarking         |
|  | <input type="checkbox"/> Mind Mapping           | <input type="checkbox"/> Searching or Googling      |
|  | <input type="checkbox"/> Bullet Pointing        | <input type="checkbox"/> Bookmarking or Favouriting |
|  | <input type="checkbox"/> Blog Journaling        | <input type="checkbox"/> Recognize                  |
|  | <input type="checkbox"/> Word Processing        |   |
| Apply                                  | <input type="checkbox"/> Editing                | <input type="checkbox"/> Collecting                 |
|  | <input type="checkbox"/> Role Playing           | <input type="checkbox"/> Taking Photograph          |
|  | <input type="checkbox"/> Movie Making           | <input type="checkbox"/> Making Diary               |
|  | <input type="checkbox"/> Demonstrating          | <input type="checkbox"/> Scrapbooking               |
|  | <input type="checkbox"/> Presenting             | <input type="checkbox"/> Drawing Diagram            |
|  | <input type="checkbox"/> Interviewing           | <input type="checkbox"/> Sculpturing                |
|  | <input type="checkbox"/> Mapping                | <input type="checkbox"/> Simulating                 |
| <input type="checkbox"/> Making Puzzle |   |   |
| Analyze                                | <input type="checkbox"/> Diagraming             | <input type="checkbox"/> Spread sheeting            |
|  | <input type="checkbox"/> Reporting              | <input type="checkbox"/> Creating Advertisement     |
|  | <input type="checkbox"/> Summarizing            | <input type="checkbox"/> Graphing                   |
|  | <input type="checkbox"/> Building Questionnaire | <input type="checkbox"/> Creating Mash up           |

|          |                                      |  |
|----------|--------------------------------------|--|
| Evaluate | <input type="checkbox"/> Surveying   | <input type="checkbox"/> Charting        |
|          | <input type="checkbox"/> Hypothesis  | <input type="checkbox"/> Reporting       |
|          | <input type="checkbox"/> Critiquing  | <input type="checkbox"/> Summary         |
|          | <input type="checkbox"/> Judgment    | <input type="checkbox"/> Self-evaluation |
|          | <input type="checkbox"/> Opinion     | <input type="checkbox"/> Recommendation  |
|          | <input type="checkbox"/> Court Trial | <input type="checkbox"/> News Item       |
|          | <input type="checkbox"/> Survey      |  |

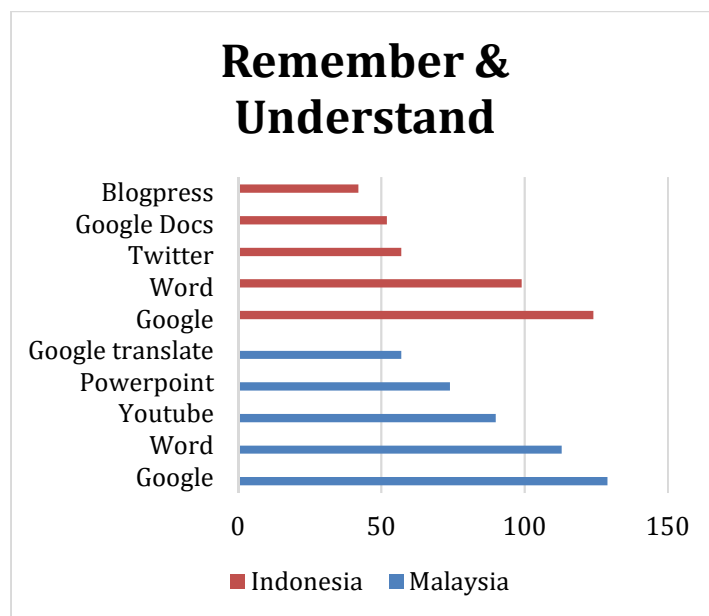
Source: Anderson (2001)

**4. Result**

The results of the study using ICT in learning in Indonesia and Malaysia based on indicator remember & understand are shown in Table 1 and Figure 1.

**Table 2.** Comparison of the indicator apps (remember and understand) between Malaysia and Indonesia

| Rank | Apps (Remember & Understand) | Malaysia (f) | Rank | Apps (Remember & Understand) | Indonesia (f) |
|------|------------------------------|--------------|------|------------------------------|---------------|
| 1    | Google                       | 129          | 1    | Google                       | 124           |
| 2    | Word                         | 113          | 2    | Word                         | 99            |
| 3    | YouTube                      | 90           | 3    | Twitter                      | 57            |
| 4    | PowerPoint                   | 74           | 4    | Google Docs                  | 52            |
| 5    | Google translate             | 57           | 5    | Blogpress                    | 42            |



**Fig 1.** Histogram of Remember and Understand of Malaysia and Indonesia

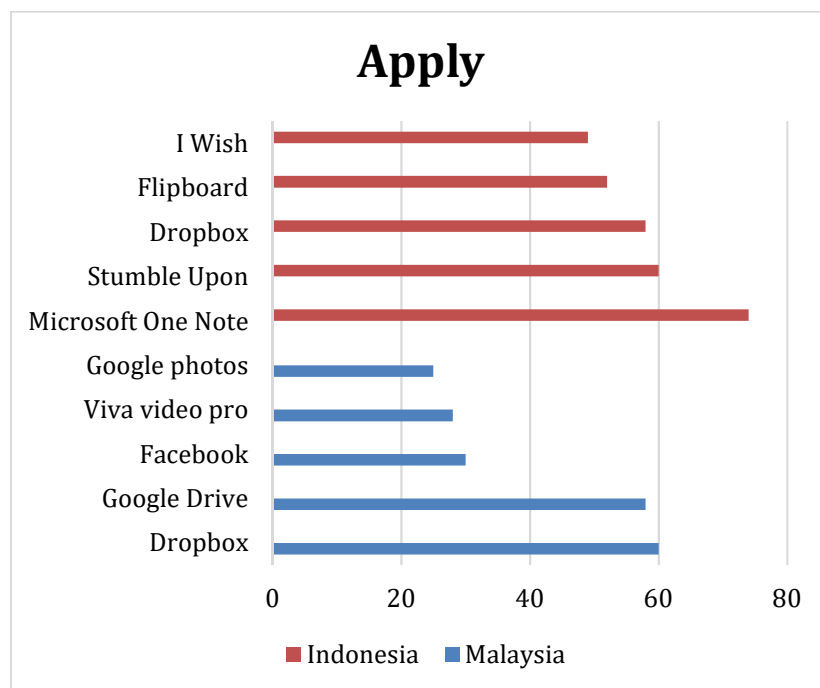
From the results of the above research, it can be seen that in Malaysia, on the Remember and Understand indicator, with 129 respondents used Google in learning, 113 respondents used Word, 90 respondents used YouTube, 74 respondents used Powerpoint and only 57

respondents used Google translate. In Indonesia, the indicator for Google's remember and understand is also the most in learning, which are 124 respondents, followed by Word with 99 respondents, Twitter with 57 Respondents, Google Docs with 52 Respondents and Blog Press with 42 respondents.

For the indicator app (apply) the results of the study using ICT in learning in Indonesia and Malaysia are shown in Table 2 and Histogram 2.

**Table 3.** Comparison of the indicator apps (apply) between Malaysia and Indonesia

| Rank | Apps (Apply)   | Malaysia (f) | Rank | Apps (Apply)       | Indonesia (f) |
|------|----------------|--------------|------|--------------------|---------------|
| 1    | Dropbox        | 60           | 1    | Microsoft One Note | 74            |
| 2    | Google Drive   | 58           | 2    | Stumble Upon       | 60            |
| 3    | Facebook       | 30           | 3    | Dropbox            | 58            |
| 4    | Viva video pro | 28           | 4    | Flipboard          | 52            |
| 5    | Google photos  | 25           | 5    | I Wish             | 49            |



**Fig 2.** Histogram of indicator apply of Malaysia and Indonesia

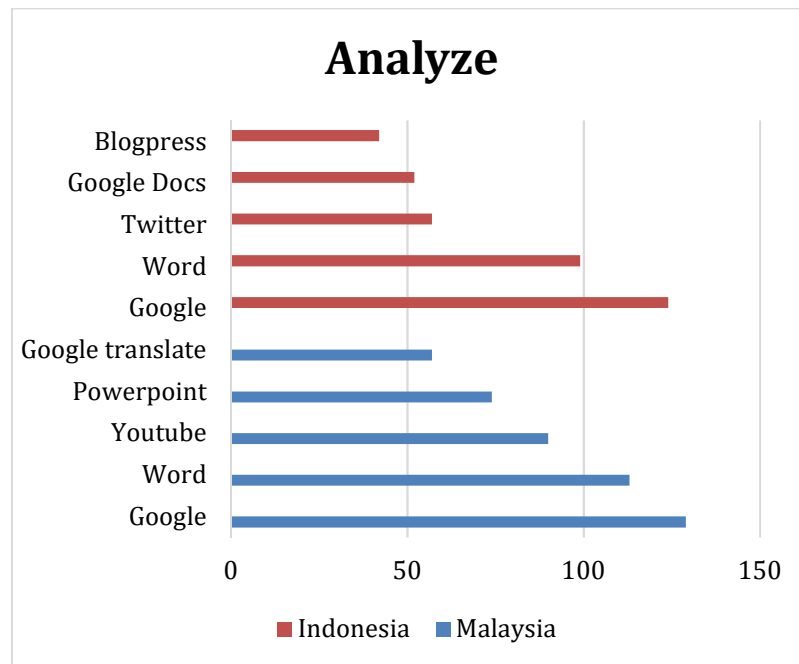
The most use of media in learning on the apps (apply) indicator for Malaysia is Dropbox with 60 respondents, Google Drive with 58 respondents, Facebook with 30 respondents, Viva Video with 28 respondents and Google Photo with 25 respondents.

In contrast, in Indonesia most use Microsoft One Note with 74 respondents, followed by Stumble Upon with 60 respondents, Dropbox with 58 respondents, and Flip board with 52 respondents, and I wish with 49 respondents. The study indicator of the resulting study can be seen in Table 3 and Histogram 3 which shows the tendency of media use in learning.

**Table 4.** Comparison of the indicator apps (analyse) between Malaysia and Indonesia

| Rank | Apps (Analyse) | Malaysia (f) | Rank | Apps (Analyse) | Indonesia (f) |
|------|----------------|--------------|------|----------------|---------------|
| 1    | Dropbox        | 65           | 1    | Numbers        | 74            |

|   |                 |    |   |                  |    |
|---|-----------------|----|---|------------------|----|
| 2 | Numbers         | 52 | 2 | Pool every where | 67 |
| 3 | Simple Note     | 37 | 3 | Easy Chart       | 63 |
| 4 | Priority Matrix | 31 | 4 | Priority Matrix  | 52 |
| 5 | Google docs     | 29 | 5 | Course Notes     | 35 |



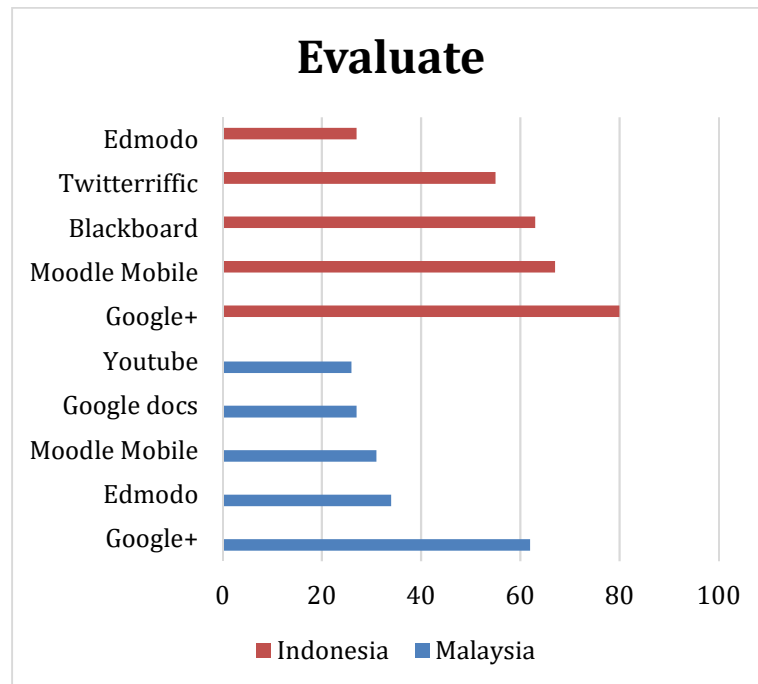
**Fig 3.** Histogram of indicator analyze of Malaysia and Indonesia

In Malaysia, the Dropbox indicator is the most widely used, with 65 respondents, followed by Numbers with 52 respondents, Simple Note with 37 respondents, Priority Matrix with 31 respondents and Google docs with 29 respondents.

In Indonesia, the most widely used indicator is 74 respondents, Pool everywhere with 67 respondents, Easy Chart with 63 respondents, Priority Matrix with 52 respondents and Course Notes with 35 respondents. The results of the study using ICT in learning in Indonesia and Malaysia based on indicator evaluation is shown in Table 5 and Figure 4.

**Table 5.** Comparison the indicator apps (evaluate) between Malaysia and Indonesia

| Rank | Apps (Evaluate) | Malaysia (f) | Rank | Apps (Evaluate) | Indonesia (f) |
|------|-----------------|--------------|------|-----------------|---------------|
| 1    | Google+         | 62           | 1    | Google+         | 80            |
| 2    | Edmodo          | 34           | 2    | Moodle Mobile   | 67            |
| 3    | Moodle Mobile   | 31           | 3    | Blackboard      | 63            |
| 4    | Google docs     | 27           | 4    | Twitterrific    | 55            |
| 5    | YouTube         | 26           | 5    | Edmodo          | 27            |

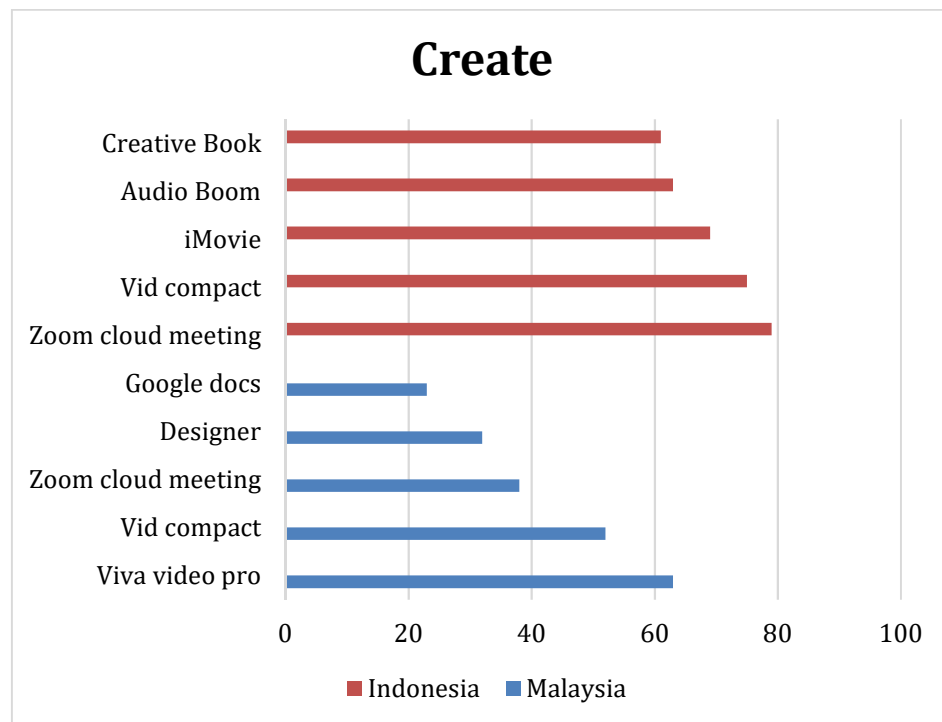


**Fig 4.** Histogram of indicator evaluate of Malaysia and Indonesia

The evaluating indicator in Malaysia uses Google+ the most with 62 respondents, Edmodo with 34 respondents, Moodle Mobile with 31 respondents, Google docs with 27 respondents and YouTube with 26 respondents. Similar to Malaysia, in Indonesia, the use of Google+ is also the most with 80 respondents, Moodle Mobile with 67 respondents, Blackboard with 63 respondents, Twitter with 55 respondents, and Edmodo with 27 respondents. For the indicator app (create) the results of the study using ICT in learning in Indonesia and Malaysia are shown in Table 6 and Histogram 5.

**Table 6.** Comparison of the indicator apps (create) between Malaysia and Indonesia

| Rank | Apps (Create)      | Malaysia (f) | Rank | Apps (Create)      | Indonesia (f) |
|------|--------------------|--------------|------|--------------------|---------------|
| 1    | Viva video pro     | 63           | 1    | Zoom cloud meeting | 79            |
| 2    | Vid compact        | 52           | 2    | Vid compact        | 75            |
| 3    | Zoom cloud meeting | 38           | 3    | iMovie             | 69            |
| 4    | Designer           | 32           | 4    | Audio Boom         | 63            |
| 5    | Google Docs        | 23           | 5    | Creative Book      | 61            |



**Fig 5.** Histogram of indicator create of Malaysia and Indonesia

The indicator (create) between Malaysia and Indonesia is very different. In Malaysia, the most widely used is 63 Viva video pro, followed by Vid compact with 52 respondents, Zoom cloud meetings with 38 respondents, Designer with 32 respondents and Google docs with 23 respondents. For Indonesia, the most widely used is Zoom cloud meeting with 79 respondents, Vid compact with 75 respondents, iMovie with 69 respondents, Audio Boom with 63 respondents, and Creative Book with 61 respondents.

## 5. Discussion

ICT is able to increase effectiveness in the learning process so that students can access knowledge anytime and anywhere. This can also affect student motivation in learning independently without the hard encouragement of the teacher. This can prepare students for lifelong learning and improve the results of the quality of learning. Education facilitated with ICT can eliminate learning constraints that are tied to space and time. [29]. One of the ICT Contributions that plays an important role in education is easy access to learning by using applications that have been provided [30]. Like the use of applications in learning that are used by vocational teachers in Indonesia and Malaysia.

The use of ICT between Indonesia and Malaysia is quite different. This is influenced by differences in curriculum changes carried out by the two countries. In Indonesia, curriculum changes are carried out by focusing on character education, where students are required to be able to learn independently by utilizing ICT with all available sources. The 2013 curriculum emphasizes honesty and courtesy that are below the affective domain and skills such as practical tasks or school projects that are under the psychomotor realm. There is always integration between cognitive domains, affective domains and psychomotor domains in the implementation of the 2013 curriculum.

Teachers are facilitators in learning and are given training tailored to the objectives of the (Kurikulum 2013) K13. ICT training is provided to teachers ranging from the regional level to the national level. The teacher is given 48 hours of training to master ICT such as Edmodo, google, Facebook and blog press training which can be used as learning media. At present in Malaysia it applies a standard curriculum in 2011 Elementary School Standard Curriculum (KSSR becomes its acronym in Malay). The content and standards of learning described in the standard curriculum are specifically aimed at ensuring students to acquire knowledge, skills and values and to achieve the basic competencies needed in current and future demand. Policymakers realized that the foundation and basic skill of ICT should be introduced into the school curriculum to equip children with 21st-century skills in their early learning environment due to the rapid growth of global information. The equipped multimedia and the established network will benefit learning outcomes by facilitating students to more self-direction and self-control in the learning process. Hence, by teaching ICT skills in primary school, the students are ready to face challenges in the ICT networked world (Grimus, 2000). Differences in the use of ICT between Malaysia and Indonesia are also influenced by curriculum training conducted by the two different countries which are adjusted to the curriculum objectives that have been arranged and are further influenced by different cultures and learning environments between the two countries.

## 6. Conclusion

The 21st-century learning environment is inseparable from technology. Learning must be innovative in adopting the technology, which is the basis of the shift in learning strategies and approaches in education 21st-century. Learning in Malaysia and Indonesia has begun to integrate with ICT. Teachers have begun to use ICT in the classroom to create an effective learning environment so that the goals of education can be achieved. However, Vocational teachers are still on the way to change to be the 21st century.

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