Technology-based blended learning to accommodate offline and online learning

Y Eryani* and B Mulyanti
Postgraduate School, Universitas Pendidikan Indonesia, Jl. Dr. Setiabudhi No.229, Bandung 40154, West Java, Indonesia

*yon4smile@gmail.com

Abstract. It is commonly known that learning is shifting from teacher-centered to student-centered and from offline to online. This paper investigates the implementation of blended learning, learning involving both offline and online activities, utilizing relevant technologies. The results showed that blended learning is preferable as it promotes both face-to-face activities and online activities at the same time. The online activities can use both web-based or mobile-based devices which are familiar with the users. It is implied that online digital learning is taking a bigger portion in the near future.

1. Introduction
Blended learning is a student-centered learning method using a systematic approach, face-to-face learning and online learning that is assisted by computer equipment [1]. Online learning or e-learning in blended learning becomes a natural extension of traditional classroom learning using face-to-face learning [2]. The purpose of blended learning is to combine the balance of face-to-face and online learning. The learning balance can change from one form to another [3]. Because of the basic features of some lessons that face-to-face learning is the most widely used, while in other lessons online learning is also more widely used.

E-learning process is a one-way process, so blended learning is a renewal of two-way learning. With blended learning, we can learn interactively approaching face-to-face learning, as well as combining face-to-face learning and e learning that is done when students and teachers are in great distances or outside the scope of the school [2,4-6]. This learning can be done anywhere by arranging study schedules according to the time available [6]. For this reason, this paper will analyze learning innovations by using the blended learning method used in the article to be sought, ranging from 2014 to 2019.

2. Methods
Review of the literature conducted by methods PRISMA (Item Reporting Selected for Review of Systematic and Analysis Meta), which was introduced by Moher et al. [3]. PRISMA is one of the methods the best that can help authors to conduct a review of systematic and meta-analysis to correctly and also help the writer to review the structure as a map of the road. PRISMA is also the method most commonly used in article as review the literature [3,4,7].

In addition it must specify the criteria that meet the requirements so that they can be selected with careful to describe the hypothesis [8]. This can be an important role in solving problems by explaining, synthesizing, and evaluating quantitative or qualitative evidence [9]. Next, selected scientific articles
related to Learning Innovation With the Blended Learning Method are published in journals indexed in the Scoldirect database and Google Scholar. Other searches were made through the Elsevier, Emerald, Hindawi, IEEE, IET Journal, Routledge or Taylor, and Francis Online, Springer and Online Wiley Library databases. Literature search is performed using keywords including "blended", "blended learning", "blended learning method". These articles were searched from 2014 to 2019. Based on the search strategy, 30 articles were taken and entered into citation management software such as Mendeley. By doing the PRISMA method, the next step is the automatic removal of duplication by the software. Deletion of duplicates is done, where the same 20 articles have been deleted. Finally, 10 articles remain after the stage.

Eligibility criteria are needed in selecting the appropriate article as reported by [9]. The articles are filtered based on the inclusion and exclusion criteria described in Table 1. According to the exclusion criteria, articles that meet the requirements were selected, but for the type of chapter book, thesis, brief report, study or non-empirical article, it was deleted. In other words, only journal papers are considered according to inclusion criteria.

Table 1. Criteria for inclusion and exclusion.

| INCLUSION CRITERIA                  | EXCEPTION CRITERIA                                      |
|------------------------------------|--------------------------------------------------------|
| Year range: 2014-2019              | Before the year 2014                                    |
| Empirical research was published through international conferences | Types of chapter books, theses, brief reports, studies or non-empirical articles |
| Associated with learning innovation with the blended learning method | All disciplines of science except in Learning Innovation with Blended Learning Method |

3. Results and discussion

Online learning or e-learning in blended learning becomes a natural extension of traditional classroom learning using face-to-face learning. There is no renewal in the e-learning learning process because of one-way learning, so blended learning is applied where the two-way learning process. With blended learning, we can learn interactively approaching direct learning face to face, can also be done when students and teachers are in great distances or outside the scope of the school. This learning can be done anywhere by arranging the learning schedule according to the available time [10].

Air is based on the analysis of blended learning objectives to the students is to give them a richer learning experience through careful structuring to-face and online components, research has stated how the two components are mutually supportive in reducing the concerns associated with each component. A face-to-face introductory meeting session that usually takes place at first blended learning usually provides students with information about institutions, study expectations, introducing technological institutions (eg learning management systems) and so on. The human touch experience in face-to-face introductory meetings initiates social component activities online by stimulating social interaction and communication between students and their teachers, and also among students. Thus, students will feel the feelings of their peers and even their real teacher. Face to face meetings have proven to be promising in promoting student understanding with their peers, there by reducing the level of unfavorable challenges. On the other hand, the advantages of online social interaction and enrichment of online components are getting richer and supporting the face-to-face component, where students feel more comfortable with their friends when they meet face-to-face sessions [1,2,5,10,11,12].

Study which meets the requirements of the Learning Innovation With Blended Learning Method summarized and classified based upon a writer on a variety of categories to be considered in relation to the purpose of research. Can be identified and reviewed 10 articles that match the search criteria are applying the learning model of blended learning taken in 2014 to 2015, as shown in Table 2.
Table 2. Summary of the application of the blended learning method.

| No | Author's name | Excellence | Weakness |
|----|---------------|------------|----------|
| 1  | M Georgsen et al [13] | Easy to use and navigate | commitment to group work is lacking so there is very little online activity in the group. |
| 2  | J Poon et al [14] | Easy to understand and apply | Lack of student interest in learning |
| 3  | A Sairoji et al [2] | The enthusiasm that tiggi of participants lea rners | The lack of readiness when the conduct took place so difficult to understand the participant students. |
| 4  | Alsahi et al [15] | Easy to use and attractive | A little online activity in groups |
| 5  | Ng et al [16] | Creating an attractive class state | Lack of interest in students |

Can be seen from table 2, learning with the blended methods has been widely used since 2014 in developed countries, like those in the USA, Taiwan, Denmark, Australia, especially at primary, secondary, and tertiary level education [1,2,5,10,11,12].

4. Conclusion
The findings of this study are by applying blended learning, learning becomes more varied and the teacher becomes easy in providing learning material. The use of appropriate blended learning methods in the learning process can improve student learning activities so that the material presented can be easily understood by students. Students also have the freedom to learn material from various teaching materials because teaching materials are not in book form but in the form of soft files stored online.

Acknowledgments
We thank to the governor of Riau Province, Republic of Indonesia for financially support, and I thank for the participation of the head of Riau Pro vincial Education Office.

References
[1] Hertsch M F 2013 Multimedia-Based Enrichment for Foreign Language Teaching Procedia - Soc. Behav. Sci. 70 615–621
[2] Sairoji A, Huriaty D and Ranti M G 2017 Peningkatan hasil belajar siswa melalui blended learning pada materi trigonometri di kelas X Farmasi 1 SMK Negeri 1 Martapura tahun pelajaran 2016-2017 Math Didact. J. Pendidik. Mat. 3(3) 145–154
[3] Moher D, Liberati A, Tetzlaff J, Altman D G and Grp P 2009 Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement (Reprinted from Annals of Internal Medicine) Phys. Ther. 89(9) 873–880
[4] Moher D, Liberati A, Tetzlaff J, Altman D G 2012 Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement... Preferred Reporting Items for Systematic reviews and Meta-Analyses BMJ Br. Med. J. (Overseas & Retired Dr. Ed.) 8 b2535
[5] Yigzaw M, Tebekaw Y, Kim Y M, Kols A, Ayalew F and Eyassu G 2019 Comparing the effectiveness of a blended learning approach with a conventional learning approach for basic emergency obstetric and newborn care training in Ethiopia Midwifery 78 42–49
[6] Marchalot A, Dureuil B, Veber B, Fellahi J L, Hanouz J L, Dupont H ... and Compère V 2018 Effectiveness of a blended learning course and flipped classroom in first year anaesthesia
training Anaesth. Crit. Care Pain Med. 37(5) 411–415

[7] Catalá-López F, Ridao M, Bernal-Delgado E, Moher D and Repullo J R 2019 Endorsement of guidelines for reporting economic evaluation studies by Spanish biomedical journals Gac. Sanit. 33(3) 255–258

[8] Sanchez-Redondo J, Espinosa G, Varillas Delgado D and Cervera R 2019 Recurrent Thrombosis With Direct Oral Anticoagulants in Antiphospholipid Syndrome: A Systematic Literature Review and Meta-analysis Clin. Ther. 41(9) 1839–1862

[9] Ahmadi H, Gholamzadeh M, Shahmoradi L, Nilashi M and Rashvand P 2018 Diseases diagnosis using fuzzy logic methods: A systematic and meta-analysis review Comput. Methods Programs Biomed. 161 145–172

[10] Dickfos J, Cameron C and Hodgson C 2014 Blended learning: Making an impact on assessment and self-reflection in accounting education Educ. Train. 56(2) 190–207

[11] Khodeir L M 2018 Blended learning methods as an approach to teaching project management to architecture students Alexandria Eng. J. 57(4) 3899–3905

[12] Cocquyt C, Zhu C, Diep A N, De Greef M and Vanwing T 2019 Examining the role of learning support in blended learning for adults’ social inclusion and social capital Comput. Educ. 142 103610

[13] Georgsen M and Løvstad C V 2014 Use of Blended Learning in Workplace Learning Procedia - Soc. Behav. Sci. 142 774–780

[14] Poon J 2014 A cross-country comparison on the use of blended learning in property education Prop. Manag. 32(2) 154–175

[15] Alsalhi N R, Eltahir M E and Al-Qatawneh S S 2019 The effect of blended learning on the achievement of ninth grade students in science and their attitudes towards its use Heliyon 5(9) e02424

[16] Ng Y M and Yip C W 2019 A 3-step teaching approach for a blended learning of ‘understanding and avoiding unintentional plagiarism Nurse Educ. Pract. 41 102643