available online at http://journal.uny.ac.id/index.php/jolahraga

Jurnal Keolahragaan, 10 (2), 2022, 157-166

Flipped learning as a learning method for students of sports coaching education during the Covid-19 pandemic: a systematic literature review

Abdul Alim *, Risti Nurfadhila, Wahyu Dwi Yulianto

Faculty of Sports Science, Universitas Negeri Yogyakarta, Jl. Colombo No.1 Karang Malang, Caturtunggal, Depok, Sleman, Daerah Istimewa Yogyakarta, 55281, Indonesia.

* Corresponding Author: abdulalim@uny.ac.id

Received; 29 July 2022 Revised;23 August 2022 Accepted:21 September 2022

Abstract: The ongoing COVID-19 pandemic has resulted in the inability to carry out face-to-face lectures in all universities, including courses for sports science students. It results in less than optimal learning outcomes during the pandemic. Since the closing of face-to-face lectures, most universities in Indonesia have used virtual classrooms in the implementation of learning. However, the data shows that lessons in virtual classrooms without appropriate learning methods can result in a learning loss. This literature review study aims to analyze the effectiveness of flipped learning as a learning solution during the pandemic. The technique used in this study was a literature review. A systematic search of literature regarding the implementation of flipped learning during the pandemic, and the obstacles to the teaching and learning process for sports science students during the pandemic, were conducted on the PubMed, Scopus, Google Scholar, and Semantic Scholar databases. The literature analysis used the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) method. A total of seven articles were selected for review. The article review results revealed that implementing flipped learning increased students' motivation, participation, and learning performance. To conclude, flipped learning can be applied to students in sports science to increase their motivation, participation, and learning outcomes.

Keywords: flipped learning, sports coaching education, COVID-19 pandemic.

How to Cite: Alim, A., Nurfadhila, R., & Yulianto, W. D. (2022). Flipped learning as a learning method for students of sports coaching education during the Covid-19 pandemic: a systematic literature review. *Jurnal Keolahragaan, 10* (2), 157-166. https://doi.org/10.21831/jk.v10i2.52243

INTRODUCTION

The COVID-19 pandemic has confronted the world with challenges in various sectors of life. Health, social, economic, political, and educational crises occurred due to the COVID-19 pandemic conditions. (Anthony, 2020; Filho et al., 2020; Gupta et al., 2020; International Monetary Fund (IMF), 2020; Mofijur et al., 2021; Wang & Chen, 2022). Education is a pillar of every country's development, so education is essential for the development and growth of every nation. Education is one of the sectors in Indonesia affected by the COVID-19 pandemic. This has created a new order in the world of education. Face-to-face classes are abolished, and until 2022, face-to-face classes cannot be implemented 100% in all universities. This condition causes several problems in the implementation of the learning process. Some of the obstacles faced in the learning process during the pandemic are as follows: lack of digital competence in lecturers and students, lack of competence in digital education strategies, student environmental conditions (which cannot be controlled during lecture hours), lack of interaction with students (which makes lectures are less effective), internet connectivity difficulties, and lack of student motivation in attending classes (Mustafa, 2019; Nastiti et al., n.d.; Al-Maskari et al., 2022; Divjak et al., n.d.)

Sports science students in Indonesia also experience similar challenges (Andrianto Pangondian et al., n.d.; Asmuni, 2020; Jamaluddin et al., 2013; Veramyta, 2019). The COVID-19 pandemic, which led to the emergence of policies to impose restrictions on community activities (PKKM), also impacted lecture activities at universities, including lectures at the faculty of sports science. It dramatically affects the learning process to be less than optimal. Sports coaching education is an applied science where sub-disciplines such as anatomy, biomechanics, psychology, and physiology are taught through theoretical

lectures, physical activity, and laboratory practice (Keogh et al., 2017). Therefore, the limitation of campus lecture activities causes students to lose learning. Distance learning using technology is unavoidable during a pandemic (Almanthari et al., 2020; Kerres, 2020). E-learning is one of the technology platforms used during the pandemic. It provides facilities for lecturers to integrate learning media in the form of written materials, videos, quizzes, questions, and discussion forums into one platform to organize the learning process. Through e-learning, it is expected to increase student learning activities. However, optimizing learning outcomes through e-learning still requires an effective learning method.

Based on several previous studies, the flipped learning method is one solution to optimize the learning process during a pandemic compared to traditional learning methods (Campillo-Ferrer & Miralles-Martínez, 2021; Campos-Gutiérrez et al., 2021; Susana & Wahyu Brahma, 2021). Compared to conventional teaching methods, flipped learning provides an opportunity for students to first study the material to be studied and discussed in class forums. This can increase student involvement in the learning process because the learning process focuses on students. different from conventional teaching methods. In this method, the learning process focuses on the lecturer. The lecturer will explain the material more than discuss it with the students. This results in a lack of student involvement in the learning process. Therefore, students cannot develop in conventional methods due to monotonous learning styles (Wallace et al., n.d.). In addition, flipped learning gives students the opportunity to study the material first so that they get a learning experience that suits their needs. In the implementation of flipped learning students are given the opportunity to learn outside the classroom and inside the classroom. Outside the classroom students will carry out analysis at the level of understanding and acknowledging information, while in the classroom setting, students are required to perform analysis at a higher level (application, analysis, synthesis, and/or assessment) because their lecturers and classmates support them.

The flipped learning method is implemented by learning material both through video and written material outside the classroom through distance learning and formal learning through online classes. Online classes allow students to discuss collaboratively during study time that would otherwise be on the study schedule. In flipped learning, making learning models is very important because it relates to the student's learning environment (Mehring, 2016). However, there has not been much research on the implementation of flipped learning in sports science lectures. Therefore, it is necessary to have a study on the application of flipped learning in sports coaching education lectures during the pandemic.

METHODS

This qualitative research used a systematic literature review method with PRISMA. A systematic search of literature regarding the implementation of flipped learning during the COVID pandemic and the barriers to the teaching and learning process for sports science students during the pandemic were conducted on PubMed, Scopus, Google Scholar, Web of Science, and Semantic Scholar databases. There were four stages in this PRISMA. The first stage, identifying the selected articles, must meet the conditions, such as articles published from 2017 to 2022, and reviewing flipped learning and sport coaching and pandemic, flipped classroom and sport coaching, flipped learning or flipped classroom or flipped instruction and sport coaching. The second stage was screening a total of 414 articles obtained from PubMed, Scopus, Google Scholar, and Semantic Scholar, which were then evaluated. For articles that indicated the same or were duplicated, 67 were deleted; selected articles were assessed for relevance. The third stage, namely the article's eligibility, was analyzed and evaluated for eligibility. Evaluation of the significance of the article at the eligibility stage was assessed based on the title and abstract conducted by two independent reviewers. Next, the reviewer reviewed in detail the articles as a whole that met the inclusion criteria. Articles that fell under the exclusion criteria, as in Table 1, would be deleted. The fourth stage was the inclusion of the screening results under the criteria.

Selected articles had to meet predetermined criteria. The databases used in the literature review were PubMed, Scopus, Google Scholar, Semantic Scholar, and Web of Science. The articles used were those published from 2017 to 2022. The search process for database articles used keywords such as: flipped learning and sport coaching and pandemic, flipped classroom and sport coaching, flipped learning or flipped classroom or flipped instruction and sport coaching, and other keywords. The

keywords focused on flipped learning, sports coaching, and pandemics. After searching for keywords, the next step was to determine the inclusion and exclusion criteria (See Table 1).

Table 1. Inclusion and Exclusion Criteria

	Inclusion Criterion		Exclusion Criterion
1	Scientific articles	1	Books, Book chapters, Proceedings
2	International Journals	2	Articles that are not in english
3	Articles published in 2017-2022	3	Articles published before 2017
4	Student respondents		
5	Flipped learning increases motivation and learning		

The selected articles had to meet the inclusion criteria to answer the research questions. At this identification stage, 414 articles were obtained, with details of 18 articles from PubMed, 57 from Scopus, 265 from Google Scholar, and 74 from Semantic Scholar.

Screening

The identification results of 414 articles obtained from PubMed, Scopus, Google Scholar, and Semantic Scholar were then evaluated. Articles that indicated the same or duplicates, a total of 67 articles, were deleted; selected articles were evaluated for relevance.

Eligibility

At this stage, the articles were analyzed and evaluated for eligibility. Evaluation of the relevance of the articles at the eligibility stage was carried out based on the title and abstract conducted by two independent reviewers. Furthermore, the reviewer reviewed in detail the articles as a whole that met the inclusion criteria. Articles included in the exclusion criteria, as in Table 1, would be deleted.

Inclusion

Based on the PRISMA stages, seven articles met the inclusion criteria. These seven articles were the articles reviewed in this study.

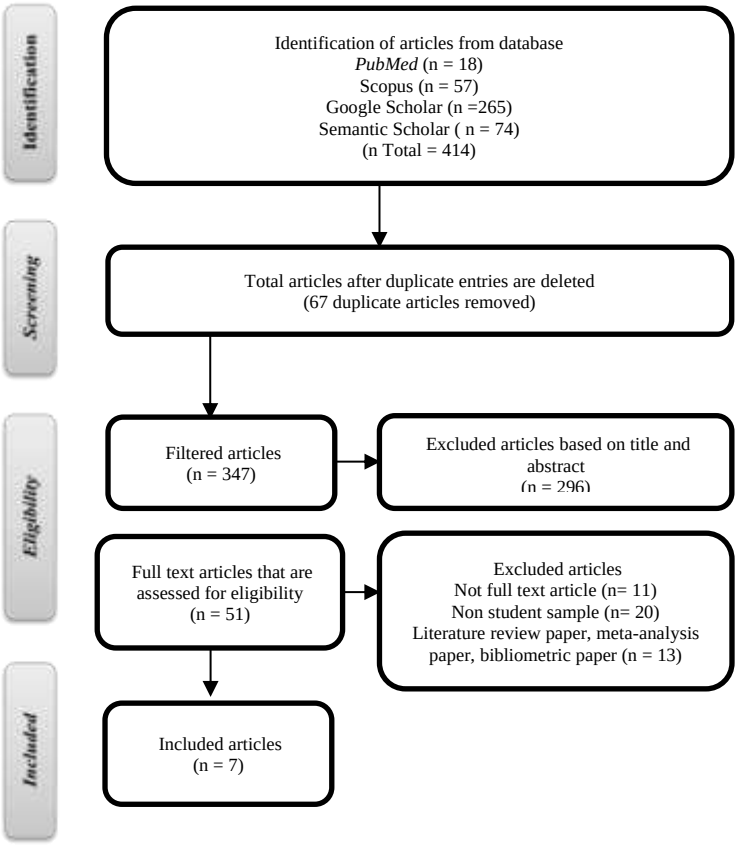

Figure 1. Systematic Review Process Flowchart (PRISMA)

Based on the systematic review process, seven articles were selected that met the flipped learning criteria to improve the learning outcomes of sports coaching education students during the COVID-19 pandemic.

RESULTS AND DISCUSSION

Based on the systematic review process, there were 414 articles in the early stages published in the last five years, namely 2017 to 2022, from four databases, namely PubMed (n = 18), Scopus (n = 57), Google Scholar (n = 265), and Semantic Scholar (n = 74). The screening stage continued by finding the same 67 articles from the four databases, so 347 articles were obtained at the screening stage. The next stage was eligibility, where 347 articles were evaluated for eligibility by two reviewers based onthe title and abstract as well as the entire article until a total of seven articles were obtained that matched the article criteria to be reviewed in this study (Table 2).

Table 2. Description of The Seven Articles

No.	Author	Title	Country	Method	Subject	Result
1	Halim Mohamed, E. A. et al. (2021)	Effectiveness of an Educational Strategy on the Performance Level of Underhand Serve in Volleyball under COVID-19 (Corona) Precautionary Measures	Saudi Arabia	Quantitative (experimental)	120 students of the Faculty of Sports Science	The results showed that the flipped learning strategy increased the skill performance in volleyball more than the explanation and presentation methods. In addition, the implementation of flipped learning also increased the students' interaction and motivation.
2	Monje et al. (2022)	The Flipped Classroom and the Development of Competences:A Teaching Innovation Experience in Higher Education	Spain	Mixed Methods (pre-experimental design)	136 Physical Education and sports science students at the University of Seville	The results showed a significant difference in learning outcomes after applying flipped learning, which also substantially impacted students' competency levels.
3	Aridhotul, H. et al. (2021)	Flipped classroom model integrated with the online learning platform and video biomechanic analysis to enhance learning outcome of pencak silat during the COVID-19 pandemic	Indonesia	Quantitative (experimental)	38 Students of Universitas Islam 45 of Bekasi	The results showed that the flipped learning methods integrated with the e-learning significantly improved the learning outcomes of martial art (p = 0.05).
4	Cuervo and Fernandez (2021)	Implementation of the flipped classroom methodology in the subject "Legal and professional context of physical activity and sport." Implications on the perception, motivation, and student academic results	Spain	Quantitative (experimental)	Students of Physical Education and Sports Science	The results showed that applying flipped learning in the experimental group increased motivation and learning outcomes.
5	Efendi, H., Nurhizrah, G., & Ananda A. (2020)	Hypothetical Web-Based Flipped Classroom Model Of Instruction For Student Of Sport Science	Indonesia	Research and Development	Students of Sports Science	The web-based flipped classroom was valid to be implemented in actual classes.
6	Huimin, W. & Chen, M. (2022)	Application of the Flipped Classroom Mode under Few-Shot Learning in the Teaching of Health	China	Quantitative (experimental)	Students of Physical Education and Health	The results showed that flipped learning could improve the students' learning outcomes.

No.	Author	Title	Country	Method	Subject	Result
		Physical Education in Colleges and Universities				
7	Campillo et al. (2021)	Effectiveness of the flipped classroom model on students' self-reported motivation and learning during the COVID-19 pandemic	Spain	Quantitative (experimental)	179 students of the Faculty of Education at the University of Murcia	The results showed increased learning outcomes, student motivation, and independent learning based on pretest and posttest data.

The review results show that the flipped learning approach has been applied at the university level. The review results show that using flipped learning can improve learning outcomes. In particular, the application of flipped learning can increase students' learning motivation (Abdel-Halim Mohamed & Mourdy Abdel Bary, 2021; Campillo-Ferrer & Miralles-Martínez, 2021; Effendi et al., 2020; Haqiyah et al., 2021; Sevillano-Monje et al., 2022; Wang & Chen, 2022), their interactions in class (Abdel-Halim Mohamed & Mourdy Abdel-Bary, 2021), their perception (Abdel-Halim Mohamed & Mourdy Abdel-Bary, 2021), and their learning performance (Abdel-Halim Mohamed & Mourdy Abdel Bary, 2021; Campillo-Ferrer & Miralles-Martínez, 2021; Effendi et al., 2020; Haqiyah et al., 2021; Sevillano-Monje et al., 2022; Wang & Chen, 2022).

SARS-CoV-2 is a new virus closely related to the coronavirus caused by bats (Zhu et al., 2020)and the coronavirus caused by pangolins (Cyranoski D, 2020; Zhu et al., 2020). The first virus was discovered in Wuhan, China in November 2019. The initial case occurred in people who had visited the seafood wholesale market in Wuhan (Maxmen, 2017; Sun et al., 2020). However, it is possible that human-to-human transmission of infectious diseases started earlier (Graham & Baric, 2020; Hu et al., 2021). The Covid-19 disease is an infectious disease of the respiratory tract caused by infection with the corona virus 2. Corona virus is spread fast all over the world. This causes a very serious world health problem. Coronavirus disease began to spread in Indonesia in March 2020. At that time there were two Indonesian citizens who were confirmed to be infected with the corona virus after returning from abroad. Furthermore, the two infected Indonesian citizens were isolated and the government began to take preventive measures in an effort to prevent the spread of the corona virus. As of April 1, 2021, Indonesia has reported that the number of confirmed cases of corona virus in Indonesia has reached 1,517,854 positive cases of Covid-19 with the number of patients who recovered as many as 1,355,578 people and died positive as many as 41,054 people. -19 reached 121,222 people (bnpb.go.id, 2021). While in the Special Region of Yogyakarta as of April 1, 2021, 33,648 people were confirmed positive, with 27,786 patients recovered and 814 dead, so up to now there are still 5048 active positive cases (corona.jogjaprov.go.id, 2021).

Symptoms of SARS-CoV-2 are undetectable but deadly. Generally in the form of fever, fatigue, and dry cough. Severe disease is more likely to occur in elderly patients and those with certain medical conditions (comorbidities). COVID-19 is transmitted when people breathe air contaminated by droplets and small particles in the air that contain the virus. The risk of these inhalations is highest when people are nearby, but they can also be inhaled over longer distances, especially indoors. Transmission can also occur if contaminated fluids reach the eyes, nose, or mouth, but rarely through contaminated surfaces. An infected person is usually infectious for ten days and can spread the virus even without symptoms. Mutations have resulted in many variants with varying degrees of infectivity and virulence. The easy transmission of the COVID-19 virus is the cause of the policy of limiting community activities. Situations like this can certainly harm health and fitness, therefore, to break the rope of the spread of the corona virus, it must be done together (Nasrulloh, Yuniana, & Pratama, 2021).

The learning process is not only carried out in the form of cognitive knowledge transfer but also involves practical experience to understand the material. Sports science learning is directed to applied sciences where sub-disciplines such as physiology, anatomy, biomechanics, psychology and sports skills are taught through theoretical lectures, physical activities, laboratory practices (Keogh et al., 2017). The learning process is carried out in the form of cognitive knowledge transfer but also with the concept of understanding.

Flipped learning is becoming a very popular pedagogical method used in many educational institutions around the world. The main idea in flipped learning is that it transfers lecture material outside

class time via internet videos to have more time available in online classrooms during the pandemic for further learning. Flipped learning has been studied extensively, especially at the college level. Flipped learning gives lecturers and students more time in class to discuss and optimize knowledge. The application of flipped learning can improve students' communicative abilities and form students who are more independent in terms of learning and change the character of students habits (O'Flaherty & Phillips, 2015; Bernard, 2015; Zainuddin & Halili, 2016; Presti, 2016; Zuber, 2016)

Flipped learning is associated with bloom theory which shows that the highest level of bloom theory, namely creating, is carried out in formal class meetings. While the lowest cognitive domain, namely remembering and understanding, is learned outside of lecture hours through videos and reading materials. This can facilitate the achievement of analysis, evaluation, create better ones and implement them in formal classrooms (Bergmann, 2012). The flipped learning approach directs and trains students' learning where they watch videos and learn the substance of learning outside the classroom setting through distance learning and direct practice in formal classrooms. Online classes allow students to study together during study time that should be included in the learning and teaching schedule. In flipped learning, making learning models is very important because it relates to the student's learning environment (Mehring, 2016). The implementation of flipped learning consists of three stages, namely the pre-class stage, the class stage, and the post-class stage (D & Liu, 2015). In addition, through the stages of classes in flipped learning students will go through the stages, namely: do not understand, understanding, adapting, and becoming skilled.

Based on the research results, the application of flipped learning has five advantages, namely increasing students' learning motivation along with their interactions, perceptions, and performance (Abdel-Halim Mohamed & Mourdy Abdel-Bary, 2021; Campillo-Ferrer & Miralles-Martínez, 2021; Sevillano-Monje et al., 2022)Through flipped learning, students are given material first before a face to face meeting, and later during a face to face meeting, they already have an idea of the material to be discussed (Monje, 2022). It can arouse students' motivation to be actively involved in face to face classes. Students' interaction increases because they already know or perceive the material to be studied (Halim, 2021 & Cuervo, 2021). Increasing students' motivation and perception of understanding the material improves their learning performance. (Effendi et al., 2020; Haqiyah et al., 2021; Wang & Chen, 2022) Seven studies discussing improving learning performance through flipped learning show that the application of flipped learning has significantly increased learning performance compared to traditional learning methods. It shows that application of flipped learning needs to be carried out continuously in sports science lectures.

CONCLUSIONS

Previous studies have shown that flipped learning method has a positive effect on improving the learning performance of college students. It shows that flipped learning can also have a positive impact if applied systematically in learning the field of sports science during the pandemic and later. Several previous studies examined the effect of flipped learning on learning outcomes in the field of science in general. Therefore, further research is needed to determine the impact of flipped learning on each subject or subject in sports coaching education. Subsequently, it can overcome the problems faced by students in achieving the competencies targeted by the study program.

REFERENCES

Anthony, K. I. (2020). COVID19 and the Economy African Perspective. Journal of African Studies and Sustainable Development, 3, 1-8.

Aridhotul, H., et al. (2021). Flipped classroom model integrated with the online learning platform and video biomechanic analysis to enhance learning outcome of Pencak silat during the Covid-19 pandemic. *Turkish Journal of Computer and Mathematics Education, 12 (11), 2267 – 2272.*

Asmuni, A. (2020). Problematika Pembelajaran Daring di Masa Pandemi Covid-19 dan Solusi Pemecahannya. Jurnal Paedagogy, 7 (4), 281 288. https://doi.org/https://doi.org/10.33394/jp.v7i4.2941

Azzah Al-Maskari, Thurayya Al R. & Kunjumuhammed, S.K. 2022. Student Academic and social concerns during covid-19 pandemic. *Education and Information Technologies Journal. 27(1): 1-21.*

Bergmann, J., & Sams, A. (2012). *Flip Your Classroom: Reach Every Student in Every Class Every Day*. Washington, DC: ISTE.

Bernard, J. S. (2015). The flipped classroom: Fertile ground for nursing education research. *International Journal of Nursing Education Scholarship*, *12*(1), 99-109. https://doi.org/10.1515/ijnes-2015-0005.

Blaženka Divjak, Bart Rienties, Francisco Iniesto, Petra Vondra, and Mirza Žižak, Flipped classrooms in higher education during the COVID-19 pandemic: findings and future research recommendations. *International Journal Educational Technology in Higher Education, 19 (1).*

Campillo-Ferrer, J.M., Miralles-Martínez, P. (2021). Effectiveness of the flipped classroom model on students' self-reported motivation and learning during the COVID-19 pandemic. *Humanit Soc Sci Commun* 8**,** 176. https://doi.org/10.1057/s41599-021-00860-4

Campos-Gutiérrez, L.M.; Sellés-Pérez, S.; García-Jaén, M. y Ferriz-Valero, A. (2021). A Flipped Learning in Physical Education: Learning, Motivation and Motor Practice Time. *Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte vol. 21 (81) pp. 63-81.* DOI:https://doi.org/10.15366/rimcafd2021.81.005

Cyranoski, D. (2020). "Mystery deepens over animal source of coronavirus". *Nature*. ***579*** *(7797): 18–19. doi:10.1038/d41586-020-00548-w.*

D, E. M., Ingram, R., & Liu, J. C. (2015). A review of flipped classroom research, practice, and technologies. *International HETL Review (IHR)*.

Efendi, H., Gistituati, N, & Ananda Azwar. (2020). Hypothetical Web-Based Flipped Classroom Model Of Instruction For Student Of Sport Science. *International Journal of Scientifik & Technology Research, 9 (2), 2776 – 2780.*

Ferrer, J. M. C. & Martinez, P.M. (2021). Effectiveness of the flipped classroom model on students' self-reported motivation and learning during the COVID-19 pandemic. *Humanities and Social Sciences Communications, 8 (176).*

Graham RL, Baric RS. (2020). "SARS-CoV-2: Combating Coronavirus Emergence". *Immunity.* ***52*** *(5): 734–736. doi:10.1016/j.immuni.2020.04.016. PMC 7207110. PMID 32392464.*

Gupta, M., Abdelmaksoud, A., Jafferany, M., Lotti, T., Sadoughifar, R., & Goldust, M. (2020). COVID-19 and Economy. Dermatologic Therapy, 33, 1-2.

Halim Mohamed, E. A. & Ayman, M. A. (2021). Effectiveness of an Educational Strategy on Performance level of Underhand Serve in Volleyball Under Covid 19 (Corona) Precautionary Measures. *The international scientific journal of Physical Education and Sport Sciences*, p 45 – 58.

Hu B, Guo H, Zhou P, Shi ZL. (2021). Characteristics of SARS-CoV-2 and COVID-19. *Nature Reviews. Microbiology.* ***19*** *(3): 141–154.* doi:10.1038/s41579-020-00459-7. PMC 7537588. PMID 33024307.

Huimin Wang, Min Chen, "Application of the Flipped Classroom Mode under Few-Shot Learning in the Teaching of Health Physical Education in Colleges and Universities", *Computational Intelligence and Neuroscience*, vol. 2022, Article ID 1465613, 10 pages, 2022. *https://doi.org/10.1155/2022/1465613*

International Monetary Fund (IMF), World Economic Outlook, April 2020: The Great Lockdown. https://www.imf.org/en/Publications/WEO/Issues/2020/04/14/weo-april-2020. Date accessed: 22nd September, 2020.

Jamaluddin, D., Ratnasih, T., Gunawan, H., & Paujiah, E. (2013). Pembelajaran Daring Masa Pandemik Covid-19 Pada Calon Guru: Hambatan, Solusi dan Proyeksi. Journal of Chemical Information and Modeling, 53 (9), 1–10.

Keogh J., Gowthorp L., McLean M. (2017). Perceptions of sport science students on the potential applications and limitations of blended learning in their education: A qualitative study. *Sports Biomechanics* 16(3): 297–312.

Kerres. (2020) Against all odds: education in Germany coping with Covid-19. *Postdigital Sci. Edu*. pp. 1-5

Leal Filho W., et al. (2020). COVID-19 and the UN sustainable development goals: threat to solidarity or an opportunity? Sustainability. 12(13):5343

Mehring, J. (2016). Present Research on the Flipped Classroom and Potential Tools for the EFL Classroom. *Computers in Schools*, *33*(1), 1–10.

M. Mailizar, A. Almanthari, S. Maulina, S. Bruce. (2020). Secondary school mathematics teachers' views on E-learning implementation barriers during the COVID-19 pandemic: the case of Indonesia Eurasia J. Math. Sci. Technol. Educ., 16 (7).

Maxmen, A. (2021). *"*WHO report into COVID pandemic origins zeroes in on animal markets, not labs". *Nature. **592** (7853): 173–174).* doi*:*10.1038/d41586-021-00865-8. PMID 33785930. S2CID 232429241.

M. Mofijur, et al. (2020). Impact of COVID-19 on the social, economic, environmental and energy domains: Lessons learnt from a global pandemic. *Sustain Prod Consum, 26: 343-359.*

Monje, V. S, Gutierrez, A. M., Gomez, C. H. (2022). The Flipped Classroom and the Development of Competences: A Teaching Innovation Experience in Higher Education. Education Sciences. 2022; 12(4):248. *https://doi.org/10.3390/educsci12040248*

Mustafa, N. (2020). Impact of the 2019-20 Coronavirus Pandemic on Education. International Journal of Health Preferences Research, 1-12.

Nastiti R. & Hayati N. (2020). Pembelajaran Daring pada Pendidikan Tinggi: Tantangan Bagi Mahasiswa dan Dosen di Tengah Pandemi. Jurnal inovasi bisnis dan manajemen Indonesia. 3(3), 378-390

Nasrulloh, A., Yuniana, R., & Pratama, K. W. (2021). The effect of skipping combination with body weight training on cardiorespiratory endurance and body mass index (BMI) as a Covid-19 prevention effort for overweight adolescents, *9*(2), 220–230.

O' Flaherty, J., & Phillips, C. (2015). The use of flipped classrooms in higher education: A scoping review. *The Internet and Higher Education*, *25*, 85-95. https://doi.org/10.1016/j.iheduc.2015.02.002

Pangondian, R. A., Paulus, S. I., & Nugroho, E. (2019). Faktor-Faktor Yang Mempengaruhi Kesuksesan Pembelajaran Daring Dalam Revolusi Industri 4.0. SAINTEKS (Seminar Nasional Teknologi Komputer & Sains) 56–60.

Perlman, S. (2020). "Another Decade, Another Coronavirus". *The New England Journal of Medicine. 382 (8): 760–762.* doi*:*10.1056/NEJMe2001126. PMC 7121143. PMID 31978944.

Presti, C. R. (2016). The flipped learning approach in nursing education: A literature review. *Journal of Nursing Education*, *55*(5), 252-257. https://doi.org/10.3928/01484834-20160414-03

Sun J, He WT, Wang L, Lai A, Ji X, Zhai X, et al. (2020). "COVID-19: Epidemiology, Evolution, and Cross-Disciplinary Perspectives". *Trends in Molecular Medicine. 26 (5): 483–495.* doi:10.1016/j.molmed.2020.02.008. PMC 7118693. PMID 32359479.

Susana, Y.G. & Brahma, G. R. W. (2021). The Effectiveness of Flipped Learning During the Pandemic to Improve the Writing Competence of STMIK STIKOM Indonesia Students. *Jurnal Ilmu Bahasa, Vol 7(1), 75-84.*

Veramyta, M.M. F. B. (2019). Pentingnya motivasi untuk memacu semangat belajar mahasiswa selama pandemic covid-19. Book Chapter. Tulungagung: Akademia Pustaka

Wang D., et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China. JAMA. 2020;323(11):1061–1069.

Wallace, M., Walker, J., Braseby, A., & Sweet, M. (2014). . (). "Now, What Happens during Class?" Using Team-Based Learning to Optimize the Role of Expertise within the Flipped Classroom.

Zainuddin, Z., & Halili, S. H. (2016). Flipped classroom research and trends from different fields of study. *International Review of Research in Open and Distributed Learning*, *17*(3), 313-340. https://doi.org/10.19173/irrodl.v17i3.2274

Zhang T, Wu Q, Zhang Z (2020). "Probable Pangolin Origin of SARS-CoV-2 Associated with the COVID-19 Outbreak". *Current Biology. 30 (7): 1346–1351.e2.* doi*:*10.1016/j.cub.2020.03.022. PMC 7156161. PMID 32197085.

Zuber, W. J. (2016). The flipped classroom, a review of the literature. *Industrial and Commercial Training*, *48*(2), 97-103.https://doi.org/10.1108/ICT-05-2015-0039