

Review

Strategies for Flipped Learning in the Health Professions Education in South Korea and Their Effects: A Systematic Review

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Abstract: This study aims to identify and synthesize recent literature on the effect and strategies of flipped learning in the health professions education. Participant–intervention–comparator–outcome (PICO) strategies were used to identify articles from published peer-reviewed papers from January 2017 to March 2020 in Korea Med, Korean Citation Index, National Digital Science Library, and Korean Studies Information Service System. Of the 83 screened articles, 10 published articles met all the inclusion criteria. Most of articles targeted nursing students and focused on practicum classes. The effects of flipped learning were measured based on satisfaction, self-motivated learning, information literacy, and critical thinking disposition. Further, pre-class, in-class, and post-class activities were analyzed. The findings revealed that flipped learning improved class performance, overall evaluation, self-motivated learning, self-efficacy, and problem-solving abilities. The study suggests implementing a tailored flipped learning design based on class characteristics and appropriate post-class activities for enhancing students' learning abilities.



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1. Introduction

The European Union Joint Research Center argues that traditional lecture-based education is severely limited and incapable of adequately embodying the key visions of future education [1]. The traditional classroom, focusing on knowledge delivery via rote learning, has seen a shift toward a more learner-centered classroom with the introduction of various teaching and learning methods. Flipped learning is one such methodology that is focused on interaction with students as opposed to a unidirectional monologue; it is also known as reverse learning. Flipped learning, or a student-oriented learning method, consists of pre-class, in-class, and post-class activities. Pre-class activities guide students to actively learn the lesson beforehand using multimedia materials; in-class activities involve instructor-learner interaction based on knowledge acquired via pre-class activities. Post-class activities help reinforce and expand on the acquired learning [2].

Flipped learning promotes instructor-student interaction in contrast to unidirectional teaching. With the introduction and popularization of various educational media that help increase learners' understanding, the demand for high-quality lectures is also on the rise [3]. Many colleges use learner-centered classes to strengthen students' competence, in which the class contents are explored in depth [4]. There is also active ongoing research on flipped learning [5,6]. Since students learn the lesson in advance using media that can be accessed anywhere and at any time, their understanding of the lesson is improved during the actual class, which leads to greater satisfaction in class [7]. However, to maximize the

effectiveness of flipped learning, few conditions need to be met, such as active student participation, appropriate instructor intervention, and regulation of pre-learning. Courses must be designed specifically for each subject based on an analysis of numerous cases prior to applying flipped learning.

Learner-centered instruction is also being implemented currently in undergraduate health professions education to foster the competencies of health professionals [8]. Studies on learner-centered instruction, including flipped learning, have reported that such learning methods are effective in improving students' self-directed learning abilities, problem-solving, interpersonal skills, clinical performance, critical thinking, and academic achievements, thereby increasing academic performance [9–12]. A recent systematic literature review on flipped learning in South Korean nursing education found improvements in students' learning capability [5]. Hew and Lo conducted a meta-analysis on the flipped classroom approach in education for the health professions using journals in the Journal Citation Report [7]. However, no systematic literature review has been published that targeted health professions education in South Korea. It is necessary to conduct an in-depth analysis of learner-centered instruction cases in health and allied health majors to foster prospective health professionals who will be in charge of public health. Further, as flipped learning was introduced in colleges in Korea only in 2013, efforts to stabilize and enhance its efficiency of operation and develop instruments for quality control have been inadequate [13]. Therefore, this study proposes directions for research on flipped learning in health professions education and for an effective application of flipped learning in health professions education by systematically reviewing the latest pertinent studies. The specific objectives of this study are to analyze the general characteristics, the measured variables and outcomes, and the strategies used in studies on flipped learning in the health professions education.

2. Materials and Methods

2.1. Study Design

This paper is a systematic review of studies analyzing the effects of flipped learning in undergraduate health majors in Korea to identify the latest research trend and assess the teaching strategies and their effectiveness. The literature search strategy was based on the participant-intervention-comparators-outcome (PICO) framework [14].

2.2. Literature Search

The keywords for the participants (P) of the study were undergraduate allied health majors (excluding medicine, dentistry, Korean medicine, pharmacy). The keyword for the intervention (I) was flipped learning. The comparator (C) referred to conventional lecture-based classes. The keyword of the outcomes (O) referred to the major outcomes of flipped learning. To examine the latest trend in flipped learning research, the search was limited to Korean studies published between January 2017 and March 2020. The search was performed on Korea Med, National Digital Science Library (NDSL), Korean Studies Information Service System (KISS), and the Korean Citation Index (KCI). The database used for the search was based on the report of Kim et al. [15] and included the search engine of the Core of the Core, standard ideal (COSI) model, which is the protocol for literature review databases in Korea. Four researchers performed the search independently, and studies were selected after reviewing them against the inclusion and exclusion criteria. The search strategy generated a total of 2155 studies with 20 studies from Korea Med, 549 studies from KISS, 784 studies from NDSL, and 802 studies from KCI. After excluding 1539 studies on medicine and non-health majors, 533 duplicate searches, and 62 studies that meet the exclusion criteria (but were qualitative studies, literature reviews, or published before 2017), the manuscripts of 21 studies were selected and subsequently acquired.

The quality of the selected studies was appraised independently by four researchers using the methodology checklist for cohort studies published by the Scottish Intercollegiate Guidelines Network (SIGN) [16]. Studies that compared the outcomes of flipped learning

and conventional lecture-based classes were included, and after re-discussing studies on which the researchers had divided opinions regarding the comparison groups, a total of 10 studies were finally selected for the analysis (see Figure 1).

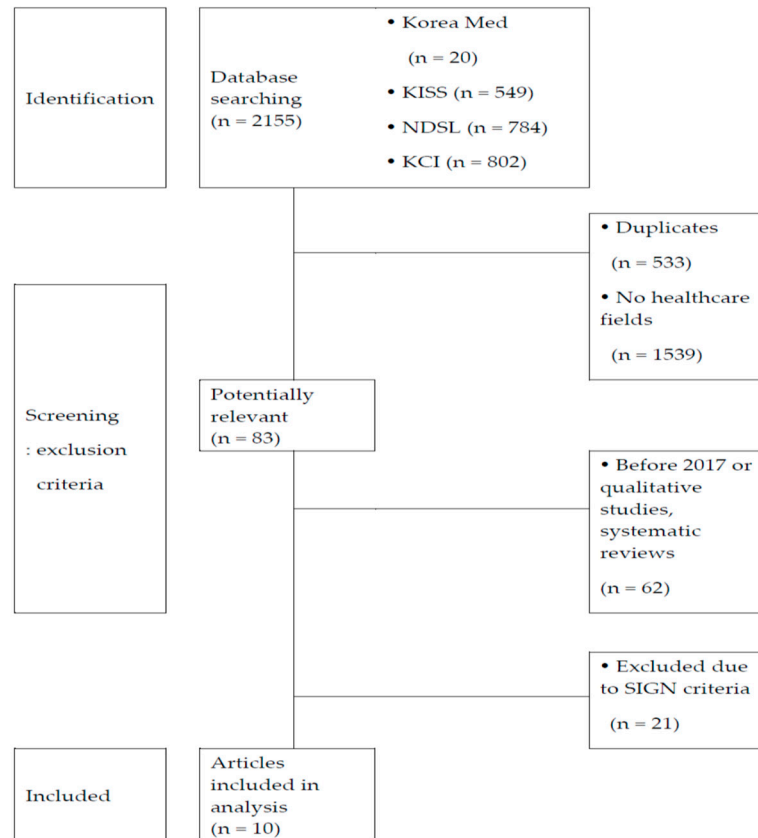


Figure 1. Precedent studies' selection flowchart.

2.3. Literature Analysis

All the 10 selected studies were quantitative studies. The features of each study were organized in a table by four researchers, and the assessments were reviewed among them. The following features of the studies were analyzed: author and publication year, institutional review board (IRB) review, course subject, pedagogical features (strategy, intervention period), participant features (sample size, inclusion criteria), measured variables (instruments, reliability and validity), and outcome variables (Table 1).

Table 1. Overview of studies included in the analysis.

No.	Author (Year)	IRB	Course	Pedagogical Feature		Participant Feature		Measured Variables		Results
				Strategy	Period	Sample Size	Inclusion Criteria	Instruments	Reliability Validity	
1	Kim and Park (2019) [17]	+	Comprehensive practicum II	Jigsaw model, flipped learning, cooperative learning	5 weeks	81	+	Nursing knowledge, critical thinking, self-directed learning, learning satisfaction	+	Improved learning satisfaction
2	Park et al. (2019) [18]	+	Geriatric nursing	Team-based learning	4 weeks	54	-	Class experience, level of communication anxiety, learning satisfaction, intent to continue learning	+	High class experience, learning satisfaction, intent to continue learning
3	Jung and Yang (2019) [19]	+	Fundamentals of nursing practicum	Create video, self-evaluation journal	11 weeks	74	+	Information literacy, critical thinking	+	Improved information literacy and critical thinking
4	H. Kim and E. Kim (2018) [20]	+	Health assessment	Video- and scenario-based learning, self-evaluation journal	10 weeks	178	+	Knowledge, performance, comprehensive knowledge	+	Improved academic achievement
5	Lee and Park (2018) [21]	+	Surgical nursing practicum	e-learning	1 week	102	-	Clinical self-efficacy, self-directed learning, problem-solving skills	+	Improved goal setting, self-directed learning, and problem-solving skills
6	Kim (2017) [22]	-	Health education	Team-based learning	7 weeks	48	-	Academic achievement, course satisfaction, learning attitude, health education self-efficacy	+	High academic achievement, learning attitude, health education self-efficacy

Table 1. Cont.

No.	Author (Year)	IRB	Course	Pedagogical Feature		Participant Feature		Measured Variables		Results
				Strategy	Period	Sample Size	Inclusion Criteria	Instruments	Reliability Validity	
7	Park and Woo (2017) [23]	+	Fundamentals of nursing	Question formation by students, team-based learning, MOOCs (Massive Open Online Courses)	5 weeks	102	+	Self-directed learning, problem-solving skills	+	Student question-centered teaching method is effective for self-directed learning and problem-solving skills
8	Lee and Han (2017) [24]	-	Health education and methodology	Cooperative learning	6 weeks	49	-	Learning motivation, class participation, course satisfaction	+	Learning motivation and class participation have positive impact on course satisfaction
9	Lee et al. (2017) [25]	+	Psychiatric nursing	Develop video module Write WSQ (Watch-Summarize-Question) journal	2 weeks	146	+	Undergraduate key competencies, academic performance, satisfaction with teaching method, and perceived usefulness	+	Improved academic performance and undergraduate key competencies, highly rated satisfaction with teaching method and perceived usefulness
10	You and Kim (2017) [26]	+	Fundamentals of nursing	Create video, utilize the time for self-training, self-evaluation journal	15 weeks	78	+	Self-directed learning, information literacy	+	High self-directed learning, information literacy

3. Results

3.1. General Features of the Selected Studies

The 10 selected studies were published between 2017 and 2020. The study design used to examine the effects of flipped learning was either pre-test–post-test or quasi-experimental design, and all studies were conducted on nursing students. The mean intervention period was six weeks and six days, and the mean number of participants in the flipped learning group was 91. Six studies presented evidence for determining the sample size for flipped learning (study no. 1, 3, 4, 7, 9, and 10). Eight studies were either approved by an IRB or mentioned obtaining consent from students undergoing flipped learning. Although flipped learning was generally applied to practicum courses, it was also sometimes used in theoretical courses such as fundamentals of nursing, health assessment, health education and methodology, and geriatric nursing.

3.2. Variables for Flipped Learning Outcomes and Results

The most common variable used to measure the outcomes of flipped learning was satisfaction, namely, satisfaction with learning, the course, or the teaching method ($n = 5$). This was followed by self-directed learning ability ($n = 4$), knowledge ($n = 3$), and critical thinking, problem-solving skills, information literacy, and academic achievement ($n = 2$ each). Other variables included class experience, level of communication anxiety, intent to continue learning, clinical performance, self-efficacy, learning accomplishment, learning attitude, learning motivation, class participation, undergraduate competencies, academic performance, and usefulness. The studies generally reported that flipped learning had a positive impact on the measured variables (Table 1).

3.3. Flipped Learning Teaching Strategies

To compare the teaching strategies used in studies that examined the effects of flipped learning, the activities were classified into pre-class, in-class, and post-class activities for analysis. Pre-class activities included team-based learning, video-based learning, e-learning courses, individual study, student question formation, watch-summary-question (WSQ) journal, skill practicing, and self-evaluation journal. In-class activities included team-based discussion and cooperative learning, team-based presentation, instructor feedback, hands-on training, pre-learning readiness assessment, scenario-based application, quiz on the e-learning materials, nursing diagnosis training, discussion on student-formed questions, instructor-led training (discussion, simulation, case study, conference), and 1:1 evaluation and guidance by the instructor. Post-class activities included review of key contents, peer evaluation, post-class evaluation and survey, Q&A, post-class self-study, self-evaluation journal, instructor feedback, application of case study, and team-based answer review and sharing (Table 2).

Table 2. Major features of flipped learning strategies.

No.	Author (Year)	Courses	Pre-Class	In-Class	Post-Class
1	Kim and Park (2019) [17]	Comprehensive practicum II	Assign team-based learning tasks	Team-based discussion and cooperative learning	Review key contents, peer review, post-class evaluation and survey
2	Park et al. (2019) [18]	Geriatric nursing	Team-based learning	Team-based presentation and discussion	Q&A, peer review
3	Jung and Yang (2019) [19]	Fundamentals of nursing practicum	Video-based learning	Team-based discussion, instructor feedback, hands-on training	Post-class self-training, self-evaluation journal
4	H. Kim and E. Kim (2018) [20]	Health assessment	Video-based learning	Evaluation of pre-learning readiness, scenario-based learning, hands-on training	Self-evaluation journal, instructor feedback
5	Lee and Park (2018) [21]	Surgical nursing practicum	e-learning	Quiz on the e-learning materials, nursing diagnosis training	Apply to case study, instructor feedback
6	Kim (2017) [22]	Health education	Self-study	Team-based discussion and presentation	Instructor feedback
7	Park and Woo (2017) [23]	Fundamentals of nursing	Video-based learning, question formation by student	Evaluation of pre-learning readiness, discussion of student-formed questions	Team-based answer checking and sharing
8	Lee and Han (2017) [24]	Health education and methodology	Team-based learning	Team-based discussion and presentation, instructor feedback	None
9	Lee et al. (2017) [25]	Psychiatric nursing	Video-based learning, write WSQ (Watch-Summarize-Question) journal	Instructor-guided training (e.g., discussion, simulation, case study, conference)	None
10	You and Kim (2017) [26]	Fundamentals of nursing	Video-based learning, Self-skills training, self-evaluation journal	Check on pre-class activities, 1:1 evaluation, and guidance by instructor	Self-training

4. Discussion

This study systematically reviewed Korean studies on flipped learning in allied health majors published within the past three years and based on the results, identified the latest trends in flipped learning research. Although we attempted to include studies on flipped learning in various health majors, all 10 selected studies were conducted on nursing students. As per the SIGN checklist for cohort studies, only studies that extracted both a control group and experimental group from the source population were selected.

This led to the exclusion of a number of studies that did not include a comparator (C). These excluded studies were conducted on students majoring in radiology, emergency medicine, occupational therapy ($n = 2$ each), and physical therapy, dental hygiene, and dental technology ($n = 1$ each). This suggests that flipped learning is less frequently applied in other health majors compared to nursing, necessitating an expanded application of flipped learning in more health professions courses. A pre-post analysis with a single group is limited in comparing the effects of flipped learning with that of the traditional

classroom approach. Thus, study designs should be chosen carefully to clearly assess the effects of flipped learning.

The courses in which flipped learning was applied were generally practicum courses, including comprehensive practicum II, geriatric nursing, fundamentals of nursing practicum, health assessment, surgical nursing practicum, health education, fundamentals of nursing, health education and methodology, and psychiatric nursing practicum, which was consistent with other studies that analyzed flipped learning methods in health professions education [27–31]. The educational effects of flipped learning approach in practicum courses included improved student attitude, fewer errors in practice [5], and improved student perception, self-directed learning, academic achievement, and satisfaction with the class [27,29,31].

In a meta-analysis of the effects of learner-centered class in nursing, Lee and Yang [9] reported that a learner-centered class is effective in enhancing clinical performance and learning of major-related knowledge; they demonstrated that learner-centered approaches, such as flipped learning, are more effective than the traditional lectures in the study of nursing. Prior to 2017, common measured variables were self-directed learning [27], academic achievement [27], self-efficacy [32,33], critical thinking and communication [32], and learning motivation [33]. On the other hand, in the past three years, a number of variables, such as knowledge and performance, self-directed learning [34,35], critical thinking [34,36,37], academic self-efficacy [36,37], satisfaction with major [36], and communication and problem-solving skills [36]. As flipped learning enables students to repeatedly learn the contents related to their lesson of the day through pre-class learning without restrictions of time and place, students are able to adequately familiarize themselves with the lesson in advance, which increases their understanding of the lesson during the actual class. Many studies on flipped learning confirmed positive changes after applying flipped learning, and they generally used variables that influence students' tendencies or academic competence and performance, that is, variables positively correlated with the flipped learning approach [4,5,7,9]. As shown in previous studies, the results of the literature review section in this study confirmed that flipped learning improved satisfaction with class ($n = 4$), academic achievement ($n = 3$), self-directed learning, problem-solving skills, and information literacy ($n = 2$), and critical thinking. Future studies should discover new significant variables to examine the effects of flipped learning. To expand the utilization of the flipped learning approach, active research and effort are needed to verify its effects.

Flipped learning strategies were analyzed by dividing the class into pre-class, in-class, and post-class activities. Video lectures were primarily used in pre-class activities for practicum courses, while team-based learning or individual study were performed in pre-class activities for theoretical courses. In-class strategies included pre-class readiness assessment, instructor feedback, and hands-on training during practicum courses, while team-based discussions or presentation were performed in theoretical education. Popular post-class strategies included peer evaluation, self-evaluation journal, and instructor feedback, and post-class activities were not used in two cases. Gan et al. [13] analyzed flipped learning cases and proposed a basic operational model for theory and practicum courses, and a similar flipped learning model was used in the ten studies reviewed in this article. Lee and Chang [25] had students write a WSQ journal, which required them to watch, summarize, and question activities as a form of pre-class activity. WSQ journal writing was proposed by Kirch [38], which involves instructor-student interaction in finding the solution during in-class activities and helps students take responsibility for completing the pre-class portion. Lee and Chang [25] reported that the WSQ strategy has a positive influence on self-directed learning and academic achievement. Friedman and Friedman [39] proposed the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model. Lee [40] applied the ADDIE model to flipped learning and proposed pre-learning, in-class learning activities, and evaluation and self-evaluation after class as the major teaching strategies. Gan et al. [13] argued that the post-class part of learning is the stage in which the learned materials are maintained and expanded. Among the studies analyzed

in this review, two studies did not use post-class activities, but appropriate post-class activities, such as reviewing, summarizing, complementing, and writing self-evaluation journals, must be implemented to facilitate continuity of learning. The results of previous studies and this study highlight the need to use flipped learning designs and strategies tailored for each subject to boost their learning effects on students.

5. Conclusions

The purpose of the study is to identify and synthesize recent literature on the effects and strategies of flipped learning in education for the health professions in South Korea. We used participant–intervention–comparators–outcome (PICO) strategies to identify the published peer-reviewed articles from January 2017 to March 2020 in Korea Med, KCI, NDSL, and KISS. Ten published articles from 83 screened articles met the inclusion criteria. All articles targeted nursing students and mostly focused on practicum classes. The effects of flipped learning were measured by satisfaction, self-motivated learning, information literacy, and critical thinking disposition. We further analyzed pre-class, in-class, and post-class activities. The limitation of this study is that it was not possible to evaluate the effect of different types of flipped learning approaches under the limited number of analyzed studies. Despite these limitation, we found that the flipped learning model improved class performance, overall evaluation, self-motivated learning, self-efficacy, and problem-solving abilities. The study results suggest implementing a tailored flipped learning design based on class characteristics and emphasizing appropriate post-class activities to enhance students' learning abilities.

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References

1. Redecker, C.; Leis, M.; Leendertse, M.; Punie, Y.; Gijssbers, G.; Kirschner, P.; Stoyanov, S.; Hoogveld, B. *The Future of Learning: Preparing for Change*; Institute for Prospective Technological Studies, European Commission Joint Research Center: Luxembourg, 2011.
2. Goodwin, B.; Miller, K. Evidence on flipped classrooms is still coming in. *Educ. Leadersh.* **2013**, *70*, 78–80.
3. Shim, J.G.; Kim, Y.M.; Park, S.J. Effect of smart learning applied on achievement goal, self-directed learning for students in health college. *Korean J. Radiol.* **2017**, *39*, 661–667. [[CrossRef](#)]
4. Estrada, A.C.M.; Vera, J.G.; Ruiz, G.R.; Arrebola, I.A. Flipped Classroom to improve university student centered learning and academic performance. *Soc. Sci.* **2019**, *8*, 315. [[CrossRef](#)]
5. Bae, S.H.; Shin, S.J. The effect and strategies of flipped learning in nursing education: A systematic review. *Health Nurs.* **2018**, *30*, 1–9. [[CrossRef](#)]
6. Shin, J.H. Analyzing the level of concerns about learner-centered pedagogical method of university faculty. *J. Lifelong Learn. Soc.* **2014**, *10*, 109–132. [[CrossRef](#)]
7. Hew, K.F.; Lo, C.K. Flipped classroom improves student learning in health professions education: A meta-analysis. *BMC Med. Educ.* **2018**, *18*, 38–50. [[CrossRef](#)]
8. Rezaee, R.; Moadeb, N.; Shokrpour, N. Team-based learning: A new approach toward improving education. *Acta Med. Iran.* **2016**, *54*, 679–683.
9. Lee, J.E.; Yang, S.H. The effects of learner-centered instruction in nursing: A meta-analysis. *Asian J. Educ.* **2018**, *19*, 1049–1077. [[CrossRef](#)]

10. Kim, E.J. A meta-analysis of team-based learning effects in university classes. *J. Learn. Cent. Curr. Instr.* **2017**, *17*, 721–743. [CrossRef]
11. Je, M.S.; Nam, C.W. Developing a teaching and learning model using flipped learning for the course of core fundamental nursing skills in nursing education. *J. Learn. Cent. Curr. Instr.* **2017**, *17*, 375–401. [CrossRef]
12. Woo, C.H.; Park, J.Y. The preference of instructional methods and Kolb's learning styles of nursing students. *J. Digit. Converg.* **2016**, *14*, 339–348. [CrossRef]
13. Gan, J.S.; Han, S.B.; Seo, Y.J.; Lee, E.J.; Bae, S.M.; Shin, M.S.; Kim, Y.H. *Case Analysis for Flipped Learning Course Operation and Development of Operational Model*; The 9th Research Project Contest; Korean Association of Center for Teaching and Learning: Bucheon, Korea, 2017; pp. 3–52.
14. Yensen, J. PICO search strategies. *Online J. Nurs. Inform.* **2013**, *17*. Available online: <http://ojni.org/issues/?p=2860> (accessed on 10 June 2020).
15. Kim, S.Y.; Park, J.E.; Seo, H.J.; Lee, Y.J.; Son, H.J.; Jang, B.H.; Seo, H.S.; Shin, C.M. NECA's guidance for undertaking systematic reviews and meta-analyses for intervention. *Natl. Evid. Based Healthc. Collab. Agency* **2011**, *25*, 1–19.
16. Harbour, R.; Miller, J. A new system for grading recommendations in evidence-based guidelines. *BMJ* **2001**, *323*, 334–336. [CrossRef]
17. Kim, H.J.; Park, D. Effects of convergence education by jigsaw model and flipped learning in nursing students. *J. Converg. Inform. Technol.* **2019**, *9*, 36–43.
18. Park, B.N.; Shin, M.K.; Jeon, H.J. Analysis about the effect of flipped learning based team activity. *J. Converg. Inform. Technol.* **2019**, *9*, 44–51.
19. Jung, H.G.; Yang, Y.K. Effects of flipped learning-based fundamentals of nursing practice. *J. Learn. Cent. Curr. Instr.* **2019**, *19*, 555–572. [CrossRef]
20. Kim, H.; Kim, E. The effects of flipped learning based health assessment on academic achievement of nursing students. *J. Korea Acad. Ind. Coop. Soc.* **2018**, *19*, 201–210.
21. Lee, M.K.; Park, B.K. Effects of flipped learning using online materials in a surgical nursing practicum: A Pilot Stratified group-randomized trial. *Health Inform. Res.* **2018**, *24*, 69–78. [CrossRef]
22. Kim, H. A case study on flipped learning of health education class-comparison with the lesson that applied the reflective journal method. *J. Educ. Cult.* **2017**, *23*, 135–148. [CrossRef]
23. Park, J.Y.; Woo, C.H. The effects of lesson with student-generated questions: Based on flipped learning utilizing massive open online courses. *J. Learn. Cent. Curr. Instr.* **2017**, *17*, 283–306. [CrossRef]
24. Lee, N.Y.; Han, J.Y. Nursing students' learning motivation, class participation, and class satisfaction on flipped class and instructor-centered class. *J. Learn. Cent. Curr. Instr.* **2017**, *17*, 253–267. [CrossRef]
25. Lee, M.K.; Chang, S.J.; Jang, S.J. Effects of the flipped classroom approach on the psychiatric nursing practicum course. *J. Korean Acad. Psychiatr. Ment. Health Nurs.* **2017**, *26*, 196–203. [CrossRef]
26. You, H.S.; Kim, N.Y. The effects of flipped learning on the self-directed learning and information literacy of nursing students. *J. Learn. Cent. Curr. Instr.* **2017**, *17*, 491–510. [CrossRef]
27. Lee, Y.A.; Kim, H.S. Effect of flipped learning on self-directed learning and academic achievement in emergency medical technology students. *Clin. Exp. Emerg. Med.* **2016**, *20*, 99–111. [CrossRef]
28. Park, S.H.; Lee, M.Y. A study on the satisfaction of flipped learning with pre-class using video in basic medical subjects. *J. Korea Entertain. Ind. Assoc.* **2017**, *11*, 261–269. [CrossRef]
29. Chung, E.J. The effect of flipped learning on self-directed learning and class satisfaction in a class of college physical therapy students. *J. Korean Soc. Integr. Med.* **2018**, *6*, 63–73.
30. Lee, N.H.; Jung, H.R. The effects of flipped learning in sensory integration therapy class using online learning platform on learning participation. *J. Korean Soc. Integr. Med.* **2018**, *12*, 247–256. [CrossRef]
31. Choi, M.S. A case study on flipped learning convergence in dental hygiene major: Focusing on learning awareness and academic achievement. *J. Converg. Inform. Technol.* **2019**, *9*, 252–263.
32. Lee, Y.S.; Eun, Y. The effect of the flipped learning on self-efficacy, critical thinking disposition, and communication competence of nursing students. *J. Korea Acad. Soc. Nurs. Educ.* **2016**, *22*, 567–576. [CrossRef]
33. Gu, H.J. Effectiveness of flipped learning in fundamental nursing practice education. *J. Korean Stat. Soc.* **2016**, *18*, 2829–2841.
34. Kim, H.; Kim, Y.H. An action research on flipped learning for fundamental nursing practice courses. *J. Korean Acad. Fundam. Nurs.* **2017**, *24*, 265–276. [CrossRef]
35. Choi, Y.S.; Kim, J.Y. Effects of flipped learning in core competencies of nursing students: Based on communication, problem-solving, and self-directed learning. *J. Learn. Cent. Curr. Instr.* **2018**, *18*, 1163–1182. [CrossRef]
36. Jung, M.R.; Jeong, E. Effects of e-book-based flipped learning education on critical thinking disposition, academic self-efficacy, and major satisfaction of nursing students. *J. Korea Contents Assoc.* **2018**, *18*, 490–501.
37. Lee, O.S.; Noh, Y.G. The effect of flipped learning on learning motivation, academic self-efficacy, and critical thinking disposition of nursing students. *J. Digit. Converg.* **2019**, *17*, 253–260.
38. Kirch, C. *Flipping with Kirch: The Ups and Downs from Inside My Flipped Classroom*; Bretzmann Group: New Berlin, WI, USA, 2016.
39. Friedman, H.H.; Friedman, L.W. Crises in education: Online learning as a solution. *Creat. Educ.* **2011**, *2*, 156–163. [CrossRef]
40. Lee, D.Y. Research on developing instructional design models for flipped learning. *J. Digit. Converg.* **2013**, *11*, 83–89. [CrossRef]