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Is Flipped Approach a Panacea?: A Systematic Review of Trends, Conceptions, and Practices of a Decade of Research

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Abstract: Recently, the flipped learning approach has been widely endorsed as an effective active learning alternative that responds to some of today's educational challenges, such as learner engagement. Flipped learning is a movement coping with the global rise of hybrid and digital learning, not just a teaching model. Although this review covers studies published before the Covid-19 pandemic, the findings of this review were analyzed during the lockdown witnessing the escalation of digital approaches. This review systematically revealed patterns, trends, conceptions, and practices in research into the flipped approach in higher education published from (2010- 2019). It employed a descriptive analysis of 169 empirical studies in three highly indexed databases while focusing on authorship, subjective definitions, methods, theoretical frameworks, the role of media, and video in practice. Accordingly, the review provides an exhaustive summary of studies capturing the evolution of the flipped approach not restricted to a specific subject area or a study group. The findings revealed that the disciplines of education and medicine led the flip research. While the faculty was almost silent, students were the prominent participants in the investigation. Most studies employed the mixed-method research design, while they didn't employ a theory to guide the research. Furthermore, this review recommends using enhanced classification frameworks to contextually define key concepts addressing the gap of a unified framework defining this tangled and rich approach. Finally, this review suggests a better understanding of the flipped approach focusing on its value more than its modality.

Keywords: Flipped classroom, flipped learning, inverted classroom, video learning, digital learning, higher education.

Highlights

What is already known about this topic:

- There is a growing popularity of flipped learning research, especially in higher education.
- Flipped learning It is not about just technology but more about pedagogy.
- Effective flipped learning involves designing activities before, inside, and outside the class.
- Flipped learning is a solution to student dis- engagement, especially in large classes.

What this paper contributes:

- This review study enhances the understanding of flipped approach in higher education through a comprehensive analysis of research published on this approach over a decade.
- The review maps patterns, trends, conceptions, indicators, and technologies that frame the flipped approach research and practice.
- The review study provides a belief shift by rethinking the approach defining the flipped method.

Implications for theory, practice and/or policy:

- The COVID- 19 pandemic revealed the need for agility inside higher education institutions. Therefore, comprehensive studies support rapid and informed decision-making.
- There is an underutilization of theoretical frameworks for the design of the flipped classroom.
- There is a need for stronger evidence on what leads to effective flipped learning.

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Introduction

New terms on today's higher education campus are being introduced and communicated, describing the evident relationship between technology and pedagogy (Irvine, 2020). Especially during COVID- 19, education technology is no longer considered a luxury. One can witness the rise of certain concepts, terms, and pedagogies describing the different configurations and methods for running and delivering higher education courses. Flipped learning is often linked to multi-modality but "is more appropriately understood as pedagogy-related" (Irvine, 2020, p.54). For successful results, such rising teaching methods, as widely implied in the literature, demand the deployment of collaborative and flexible cultures, advancement of pedagogical and technological training for educators, and, most importantly, a whole institutional sustainable, innovative mandate is desired. (Lencaster et. al., 2020)

Flipped learning, as described by Birgilli et al. (2021), is a "global movement" that "serves an environment-independent teaching" (p. 368), which is at the forefront of digital learning. The growing number of higher education (HE) students highlights the need to change the physical classroom. The flipped approach is a pedagogical alternative for traditional classrooms engaging students in higher-level thinking. Communication, self-paced, flexible, and interactive learning are vital competencies for today's HE. Therefore, Flipped Learning (FL) is no longer a buzzword, however, a timely necessity (Bishop & Verleger, 2013; Hoffman, 2014). Also, FL as an 'approach' or as a 'method,' as some scholars agree, is a sub-type of blended learning that enhances learning practice and makes full use of the class time, focusing on student-centered interactive activities and individual scaffolding (Bergmann & Sams, 2012). Bozkurt (2022a) further elaborated that FL is sometimes used to refer to blended learning, while (Fanguy & Costley, 2021) visualized the constituent parts of blended learning in the flipped class while introducing a framework to define and understand this approach. Other authors (Gopalan & Klann, 2017) refer to the FC as a hybrid educational format that shifts guided teaching, allowing time for student-centered learning during class.

Rooted in classic didactic models and theories, those based on the works of Piaget and Vygotsky (Bishop & Verleger, 2013) and inspired by learning theories of constructivism, behaviorism, cognitivism, and social learning theory, FL encourages the learner-centered style. This learning style attaches the learners to their learning, and in which the educator promotes the learner's responsibility for their learning (Das et al., 2019). In a typical Flipped Classroom (FC), students regulate their knowledge by accomplishing pre-class learning through video, reading material, or online exercises to free up more time for collaborative learning tasks during in-class periods (Abeysekera & Dawson, 2015; Bishop & Verleger, 2013). The active learning experiences develop in an FL environment, which depends on various roles, uses, and needs. According to (Şahin & Fell-Kurban, 2016), FL depends on the roles of both students and instructors, while the use of technologies is an integral part of the FL environment.
At the same time, the need for interaction and collaboration, the need for learner training, and the need for feedback is also among the critical elements in FL environment and classroom design. This whole process of required transformation based on a timely twinning between technology and pedagogy has stimulated a line of thinking in this review that emphasized the potential of this innovative method (FC) to promote more than just an alternative but a value-driven one.

Currently, there is "no longer a lack of research in the field of flipped learning" (Lo, 2020; p.130). There has been an exponential increase in publications, as witnessed in 2019, and different subject matter areas such as Science, Technology, Engineering, and Mathematics (STEM). The research published over the past decade reflects the growing popularity of the flipped approach. Therefore, there is always a need to review this ever-increasing corpus. Like other reviews, this systematic review attempts to capture the research trends, focusing on research published over the past decade. Also, considering the need to develop a comprehensive systematic review with a relatively large corpus over a rather long duration, this review analyzes the flipped approach and its modality in general. It highlights highly addressed topics in related research in specific. This review aims at establishing and apprehending the

connections between the potential of the FL environment and driving value in higher education. Thus, the review responds to the following exhaustive sets of questions

1. What are the prevailing patterns and trends of flipped approach research in HE in terms of (a) authorship, (b) geographical distribution, (c) research methods, (d) subject area, (e) study group, and (f) theories employed?
2. How is flipped approach in HE defined? What are the mapped research contexts?
3. How can (F.L.I.P indicators) frame the flipped practice? What are the media and technologies reported in the flipped method? What are the challenges and benefits of video reported in the studies?

Literature

Flipped Learning in Higher Education

After the COVID- 19 pandemic, the urge for sustainable digital education has become crucial. Responding to this urge, the European Union (EU) has developed 'The Digital Education Action Plan (2021- 2027), addressing the witnessed sprints and opportunities for education during the COVID- 19 pandemic. The plan promotes a long-term vision for digital education and presents the required quality of teaching for "resilient remote learning" through digital learning (Abd Rahman, Yunus, & Hashim, 2021, p. 2). During the pandemic, the adoption of blended and hybrid models for teaching and learning has fundamentally transformed the traditional approaches of HE. Among the lessons observed during the global lockdown was the need to adopt learning models that enable flexible movement between remote and in-person experiences.

Meanwhile, universities are constantly facing challenges such as growing costs and the pressure to give students the knowledge, competence, skills, and ability to adapt to workplace requirements. Consequently, many universities are investigating new ways of collaboration and sharing resources to cater to the demands of students, industry, and society. Hamdan et al. (2013) earlier projected the emergence of the number of case studies reporting on measurable improvements because of the flipped approach, especially in teacher and student motivation, performance, and grades. Significantly, (He, 2020) describes FC as a teaching reform) that changes not only teaching time and teaching mode but also teaching ideas, and objectives. The first entirely flipped university, MEF University in Turkey (Birgilli et al., 2021), and giant HE institutions such as Harvard and Stanford in the USA will steer the prominence of FL (Şahin & Fell-Kurban, 2016).

Flipped Learning from Conception to Transformation

"Although flipped instruction is becoming increasingly common, there is still discussion and debate regarding how to define it and distinguish it from other forms of instruction" (Fanguy & Costley, 2021, p. 91). The term 'Flipped Classroom' originated from Baker's (2000) phrase "the classroom flipped" and was introduced as "inverted classroom" (Lage, Platt, & Treglia, 2000) before being established as 'Flipped Classroom' (Bergmann & Sams, 2012). According to Bergmann and Sams (2012), the basic description of FC is the activities traditionally done in class are done at home and vice-versa. The flipped approach consists of three main types: Traditional flip, In-class flip, and Mastery flip. The 'traditional flip' is the type in which students receive the basic knowledge of the content through videos, and the classroom time is for critical thinking activities and problem-solving skills (AlJaraideh, 2019). In comparison, the 'In-class flip' adds to the traditional flip and involves students watching videos in the classroom and working together, sharing knowledge, and completing given tasks (AlJaraideh, 2019). Lastly, Bergmann and Sams (2012) proposed a flipped-mastery classroom model that considered tailored instruction and addressed different subject areas while focusing on asynchronous pre-class activities for self-paced learning.

The flip in flipped classrooms provides the opportunity to employ group-based interactive learning activities inside the classroom. Therefore, the FC represents an expansion of the learning content rather than just a re-arrangement of activities; the flipped classroom is "an educator-guided learning environment in which students engage in higher-ordered learning behaviors inside the classroom and lower-ordered learning outside of class" (Lee & Liu 2016, p.50). Although the flipped approach redefines class time and emphasizes the role of technology, the underlying pedagogy FL is not entirely novel (Milman, 2012).

While FC and FL are not synonyms, only recent literature differentiates between them (Chen, Wang, & Chen, 2014). Thus, the fundamental transition from FC to FL emphasizes real learning in all aspects of classroom activities, not just video preparation and watching (Heo & Chun Bo, 2016). According to the Flipped Learning Network (FLN) FL is: "A pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter" (FLN, 2014, p.1). This definition reflects on the checklist of the prominent eleven indicators under the four guiding pillars: Flexible Environment, Learning Culture, Intentional Content, and Professional Educator (F.L.I.P) distinguish FC and FL.

Challenges and Affordancesof the Flipped Approach

In the scope of this review, more than 70% of the studies found that both students and educators have 'positive' views on the Flipped Learning Model (FLM). The flipped approach enhanced student satisfaction towards what one could call 'learning value.' As Deng (2019) explained: "The flipped classroom treats knowledge from the perspective of human development, regarding students as the real cognitive subject of knowledge, which means that students are not the warehouse that stores knowledge" (p. 1352). This review mapped such adjective descriptors signifying a 'positive' output of the flipped method.

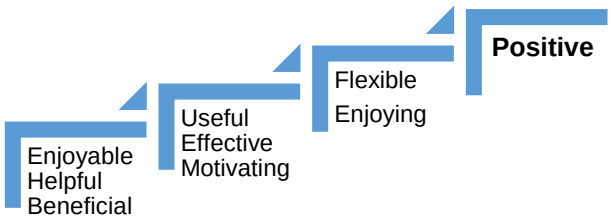

Figure1. Positive impact descriptors.

Therefore, the flipped approach is viewed as 'effective' when it enhances attitudes and behaviors towards the whole learning process. Cognitive and affective benefits are among the affordances of the flipped approach. While most studies reported significant progress in student performance on the flipped side, some found no significant student performance difference (e.g., Adnan, 2017; Bachelor, 2018). The flipped activities reported in studies (e.g., Tanner & Scott, 2015; Kim et al.,2017; Aljaraideh, 2019; Andreychik & Martinez, 2019) encouraged different learning styles such as enabling active, self-directed, self-paced, and meaningful learning alongside developing students' higher order and critical thinking skills. The advantages reported in studies echoed other reviews (e.g., Kozikoglu, 2019; Birgilli et al., 2021).

While many researchers agreed that the FC might have positive impacts, some argued that it has no measured effect. While reporting challenges remains considerably scarce, only 14.7 % of the studies mentioned the challenges. Therefore, it is advisable to address this gap; as Crompton et al. (2017) noted, "there is as much to learn from failed outcomes as there are from positive outcomes" (p. 56). Authors such as Betihavas et al. (2016) pointed out that the challenges of FLM are either related to students, faculty, or operational difficulties. Among the few studies that reported challenges is Strayer's

(2012) study- the frequently referred to study -in which students provided negative opinions regarding FL. Strayer compared traditional to flipped introductory statistics classes. Findings showed that students were not satisfied in the FC, as they felt disoriented to the learning tasks due to class structure. Therefore, revisiting the class structure to orient students was a suggested future improvement. Kennedy et al. (2015) investigated the difference in academic performance between the two groups (inverted and traditional) in a Calculus course. The authors found that the conventional learning group outperformed the IC group in the conceptual material and reported a remarkably decreased motivation among students. Thus, IC pedagogy is less suited for conceptual knowledge than procedural knowledge, as another study by Milman (2012) recommended.

It is also essential to consider the educator's perspective of possible challenges. Piotrowski and Witte's (2016) study with teacher participants of English language teaching reported on mainstream pitfalls. Among these pitfalls is the increased workload without any extra pay. Also, the excessive time required for making videos and adjusting to the flipped practice is needed. The educators were also concerned about the difficulty of modifying content and teaching style according to student understanding while teaching in an empty hall is challenging. When some students have not watched the videos, the problem is managing the class. The challenges include increased self-study load, reduced student-professor interaction, the reluctance of some students to take responsibility for learning, resistance to change, and frustration. Also, the reported challenges are the lack of immediate feedback, inability to engage in group discussions, and low-quality video that can distract the learning process (Khanova et al., 2015).

Review Studies on the Flipped Approach and Rationale of this Review

Systematic reviews have become more prominent in educational research (Gough & Thomas, 2017). Reviews on FL are gaining prominence, some of which are surveying early work (e.g., Bishop & Verleger, 2013; Giannakos et al., 2014). Other reviews on the flipped approach are more specific in their aims (Karabulut-Ilgu et al., 2018) or narrowed towards particular disciplines such as nursing, history, engineering, etc. (e.g., Betihavas et al., 2016), a particular geographic area (e.g., Kozikoglu, 2019), or a specific education setting such as K- 12 (Bond, 2020). Coping with the popularity of the Flipped Classroom (FC) approach, many reviews of the existing literature (O'Flaherty & Phillips, 2015; Chen et al., 2017; Lo & Hwang, 2018) have attempted to synthesize literature on the FC in HE. Systematic review studies (Birgilli et al., 2021; Zou et al., 2020; Zainuddin et al., 2019; Akçayır & Akçayır, 2018; Lo & Hew, 2017) gather and highlight the findings of primary studies, addressing trends and gaps in research. Some of these reviews reflect on the effectiveness of flipped learning in various aspects (e.g., academic performance, student satisfaction, level of engagement, active learning, curriculum, and a few possible challenges).

In contrast to the "narrow focus and prescribed methods of the systematic review [that] does not allow for comprehensive coverage" (Collins & Fauser, 2005, p.104), this review is considered among the few studies that can be described as 'comprehensive' (e.g., Birgilli et al., 2021). Although this systematic review responds to a series of objective questions, it still adopts the broad coverage of background knowledge and evolving concepts as narrative reviews. It analyzes a relatively large corpus (n = 169 articles), and several variables are not limited to a specific subject area, a specific geographic area, or a specific target group. The significance of this review to the domain of higher education is in its attempt to converge the heterogeneous body of flipped approach literature through mapping a relatively more extended publication date coverage reflecting on a decade of flipped approach from 2010 to 2019. It also reflects on the term's evolution before its popularization in 2012, its exponential growth from 2017 to 2019 marking the end of an era. A new era of the COVID- 19 pandemic, in which the whole world has realized the critical role technology has played in making education possible, steering the curiosity of the research community in general and education researchers in specific towards technology-enhanced and facilitated pedagogies such as flipped learning. At the same time, the rationale of this review is to reflect on patterns and gaps of research authorship rather than examining specific measures and outcomes. İt also frames the practice against the four FLIP pillars developed by the Flipped Learning

Network and maps the leading media and technologies employed in teaching and learning through flipped approach while highlighting the offerings and challenges of video. The review dedicates a whole section to shedding light on the flipped approach concept and categorizing the definitions used in the reviewed studies. This review adds to the body of knowledge by rethinking how the flipped method is defined, emphasizing the value and impact rather than the modality of the technique. Therefore, this review is said to inform both the practice and future research insightfully.

Methodology

The current systematic review aims to address the research questions using an explicit, systematic, and replicable search strategy (Gough et al., 2017). The systematic review reduces reviewer bias by using "objective, reproducible criteria" in selecting and assessing publications (Collins & Fauser, 2005, p.103) to determine relevant individual publications and evaluate their validity. Systematic reviews thoroughly analyze a specific research field to identify gaps (Gough et al., 2017). It is also advisable to use the Preferred Reporting Items for reporting Systematic Reviews and Meta-Analyses (PRISMA) (Page et al., 2021) to identify, select, appraise, and synthesize studies and reflect transparently on what the authors did, how they did it, and what they found.

Search Strategy

The initial search string and criteria for this SR are shown in Tables 1 and 2, respectively. The review included peer-reviewed articles on FL within HE written in English and indexed in three international databases: EBSCO Education Source, Web of Science, and Scopus. In the initial stage of this review, the aim was to retrieve as many articles as possible addressing video-based learning and the flipped approach. Such an attempt allowed for screening a large corpus of literature without limiting the flipped instructional approach to particular search terms such as FC. This search was undertaken in February 2019 including papers starting from 2006 (one year after the introduction of YouTube), then were limited to articles to those published during or after 2010, as the FC term was about to rise.

Table 1. Initial search string

Topic	Search terms
Video-based and flipped learning	("video based learning" OR "video- based learning" OR "video based instruction" OR "video- based instruction" OR "video based material" OR "video- based material" OR "flipped learning" OR "inverted classroom" OR "clip*")
AND Education Level	("higher education" OR college* OR undergrad* OR graduate OR postgrad* OR "university")
AND Learner setting	(learn* OR student*)

Table 2. Inclusion/Exclusion criteria

Inclusion Criteria	Exclusion Criteria
Published 2010- Dec 2019	Published before 2010
English language	Not in the English language
Higher Education	Not Higher Education
Primary research	Not primary research (e.g., review)
Journal article	Not a journal article (e.g., conference paper)
Flipped pedagogy	No flipped pedagogy
Indexed in Web of Science, Scopus, or EBSCO Education Source	No learning setting

Screening and Inter-Rater Reliability

Two coders carried out the screening of 1,108 titles and abstracts, including the author of the review. At the screening stage, articles were included rather than excluded to prioritize sensitivity rather than specificity. Thirty articles were randomly selected to evaluate the coding decisions of the two coders and to determine the inter-rater reliability using Cohen's kappa (κ), or the coefficient for the degree of consistency among raters (Cohen, 1960). Coding consistency for the inclusion or exclusion of articles between two coders was κ = .83, indicating excellent inter-rater reliability for the inclusion and exclusion criteria coding. After the initial screening, 479 articles were marked for full-text screening. Yet, 147 articles could not be retrieved through the library order scheme or by contacting authors. Therefore, 332 potential articles remained for screening on full text (see Figure 2), and only 169 articles were included for synthesis.

Data extraction and analysis

In this study, a descriptive analysis was used. As an initial step, a sample of 20 full-text articles was first openly coded to identify distinct concepts and themes for categorization. Subsequently, a comprehensive codebook has been created, including various categories of information to be extracted from the final list of included articles. For descriptive mapping, the codes include the article information (year of publication, journal name, countries of authorship, the discipline of the first author), the study design and execution (empirical or descriptive), the employed theories, the methods, sample, and subject area. The codes include the definition of the flipped approach, media and technologies (types and perspective of usage), and the flipped practice. All articles were uploaded into the systematic review software EPPI Reviewer for data extraction. A synthesis involved grouping the details and results of selected studies. Pre-determined questions helped general descriptive information on the studies' key methods and results. A narrative empirical synthesis has been employed, providing an interpretation of results in structured narratives alongside frequency and summary tables.

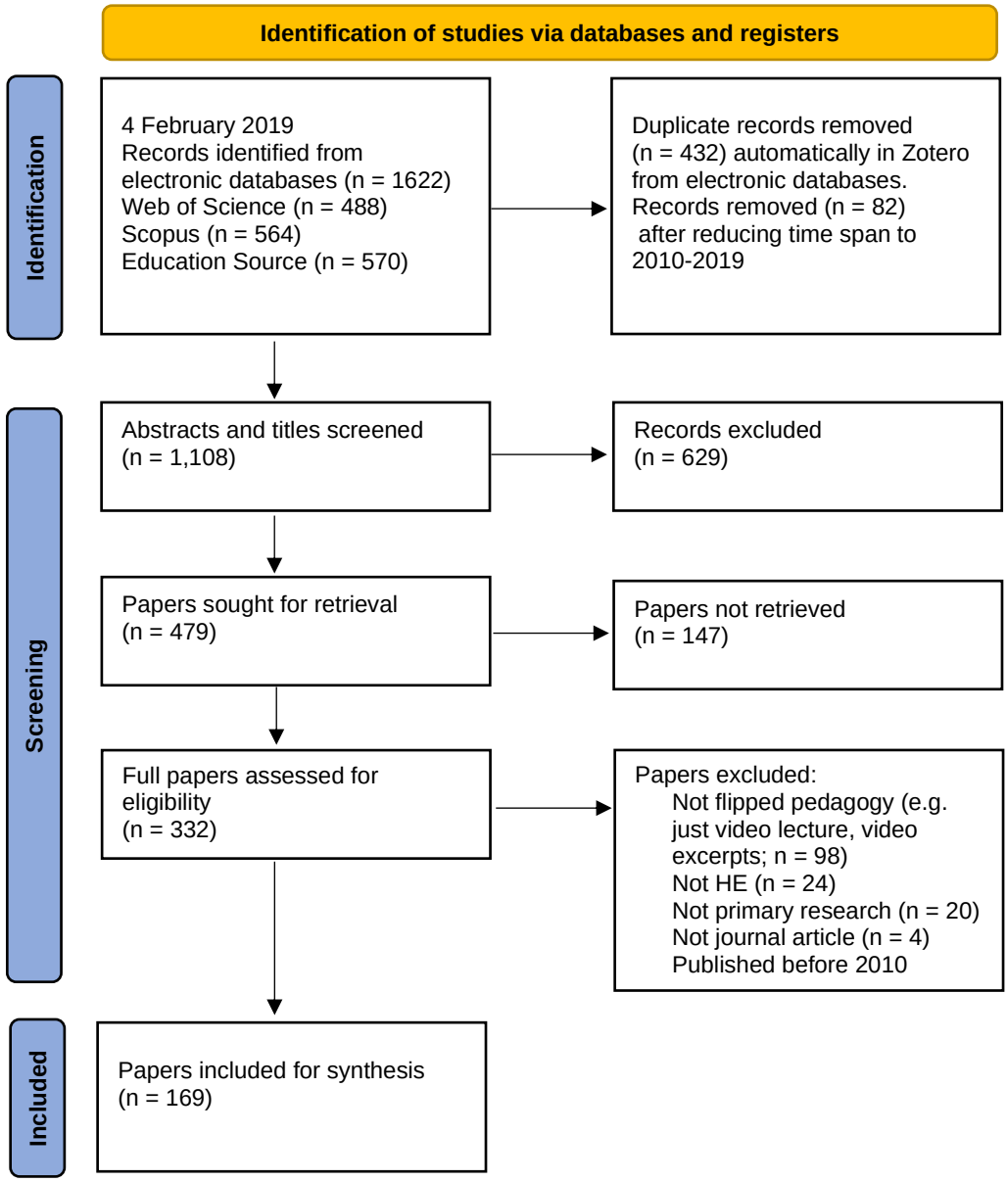

Figure 2. PRISMA 2020 flow diagram of new systematic reviews with included searches of databases and registers only

Limitations

Only the studies indexed by Web of Science, Scopus, and Education Source contributed to the study corpus. Though these three databases include many studies that enriched the analysis process, not all the flipped research was represented. Also, only peer-reviewed articles were examined. Other publications as grey literature and books, were not. Articles in English language were included; perhaps articles in other languages could help understand the flipped research landscape better. Lastly, only studies until 2019 were included in this review, while it is anticipated that the volume of research on this method will noticeably increase from 2020 onwards because of the COVID- 19 pandemic and the growth of the popularity of technology-centered pedagogies.

Findings and Discussion

In this review, 169 studies were examined during ten years of publication (2010–2019), capturing the term before and after its evolution. The data were analyzed using descriptive analysis. The following discussion is based on the percentages and frequencies reported systematically, beginning with the highest percentage authorship patterns and most frequently employed methodologies, area of studies, technology tools, most commonly used keywords and highly cited authors, impacts on students' learning, and challenges of flipping the class in HE.

Patterns and Trends

As mentioned earlier, a remarkably growing body of literature discusses the flipped pedagogy in HE. This section provides an analysis that responds to the first set of review questions: What are the prevailing patterns and trends of flipped approach research in HE in terms of (a) authorship, (b) geographical distribution, (c) research methods, (d) subject area, (e) study group, and (f) theories employed?

Articles Per Year: There has been a noticeable increase in the articles published on FC over the past decade. Despite the stagnant starting curve, with zero articles in 2010 and 2011. Then, the number of published articles noticeably grew in 2017 (n = 35) and increased significantly in 2019 (n = 57; see Figure 3).

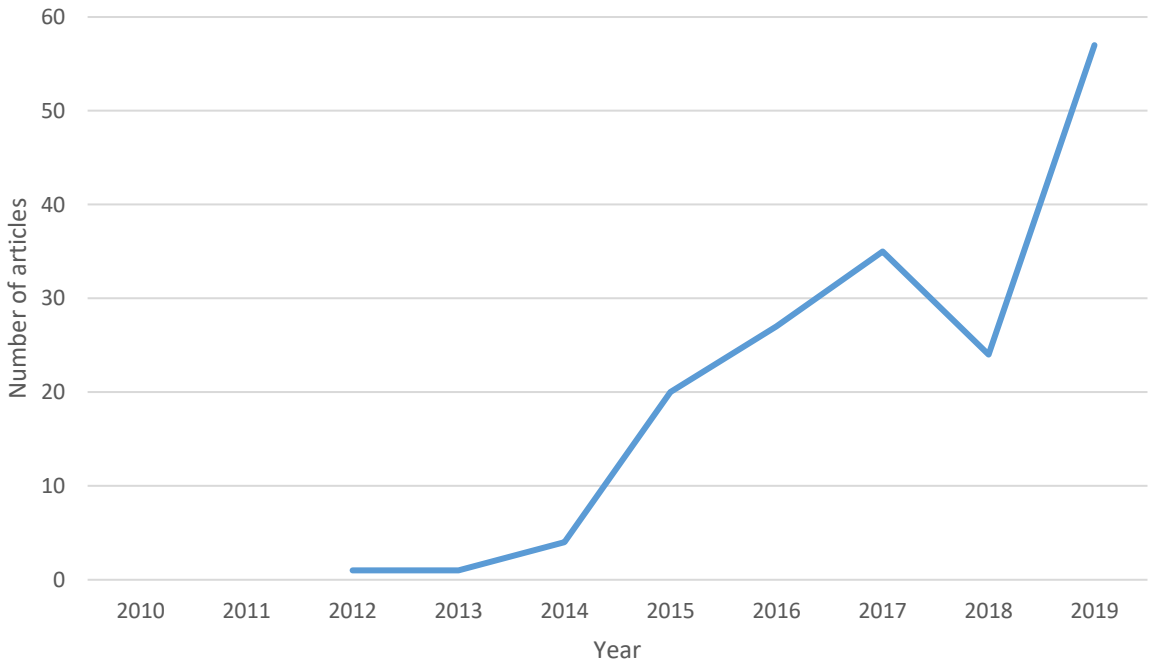

Figure 2. Number of included articles per year

Journals: The included articles were published in 114 different journals. İt is expected to see education-related journals as platforms where research on the flipped approach dominates. The Turkish Online Journal of Distance Education ranked first in terms of published articles (n = 6), followed by Educational Technology and Society (n = 5) and the International Journal of Educational Technology in Higher Education (n = 4). Table 3 lists 21 journals that published at least two articles on FC in HE from 2010 to 2019.

Table 3. Number of Included Articles (n = 169) By Journal

Rank	Journal	N
1	Turkish Online Journal of Distance Education	6
2	Educational Technology & Society	5
3	International Journal of Educational Technology in Higher Education	4
	Journal of Computing in Higher Education	4
4	Journal of Computer-Assisted Learning	3
	Medical Teacher	3
	Interactive Learning Environments	3
	International Journal of Emerging Technologies in Learning	3
5	British Journal of Educational Technology	2
	Journal of Chemical Education	2
	Journal of Chemical Education	2
	Computer Applications in Engineering Education	2
	International Journal of Technology in Teaching & Learning	2
	TechTrends	2
	The Journal of Social Sciences Research	2
	International Journal of Education Management	2
	BMC Medical Education	2
	Journal of Information Technology Education	2
	PRIMUS	2
	International Journal of Nursing Practice	2
	Journal of Asia TEFL	2
	Computers and Education	2
	Others with one article	112

Geographic Distribution*:* The geographical analysis of the included articles considered the first author's country only, revealing that the studies were distributed between 39 countries. Table 4 shows 17 countries that contributed at least two papers and indicates that almost 50% of all articles came from the USA. Second-ranked contributing countries were South Korea, Taiwan, and Turkey. Meanwhile, the contribution of some countries noticeably increased in 2019 (e.g., Spain; n = 4) or appeared only in 2019 (e.g., Mexico and Pakistan). Also, an increase was observed in the number of contributing Arab countries such as Jordan, UAE, and Oman.

Table 4. Distribution of Articles by Country and Cumulative Percentage (N= 169)

Rank	Country	n	Percentage
1	USA	49	29.9
2	Taiwan	13	7.6
	Korea	13	7.6
3	Turkey	12	7.1
4	Australia	7	3.3
5	UK	5	2.9
	China	5	2.9
6	Spain	4	2.3
7	Malaysia	3	1.7
	Indonesia	3	1.7
	Oman	3	1.7
8	Mexico	2	1.1
	Ireland	2	1.1
	Japan	2	1.1
	Pakistan	2	1.1
	India	2	1.1
	Russia	2	1.1
	UAE	2	1.1

Author Affiliations: Considering only the first author (see Table 5), colleague authors affiliated with the education domain contributed the highest number of articles (n=40). They were followed by researchers working in departments of STEM (n = 30), Medical and Healthcare (n=22), or domains that include conceptual and practical knowledge. In this case, it is feasible to employ flipped pedagogy to enhance

cognitive abilities. In comparison, the geographic distribution of author affiliation with respect to the country of origin is very dispersed except in some domains, like Education, STEM, Health, and Medical Care. The USA contributed the highest number of studies in most fields such as Education, STEM, Arts, Humanities, and Social Sciences. While South Korea contributed the highest number of studies (n=7) in Medical and Healthcare. Authors from Germany were limited to specific fields such as STEM, Medical and Healthcare, and Education and were absent in other areas.

Table 5.Affiliation of the First Author (n = 169 articles)

Affiliation	n	Percentage
Education	40	23.6
STEM	30	17.7
Medical and HealthCare	22	13
Arts, Humanities, and Social Sciences	21	12.4
Not Mentioned	19	11.2
Business, Management, and Law	10	5.9
Other	9	5.3
Computer and Information science	7	4.1

Subject Area: The review found a diversity of subject areas in which the FC has been applied and studied. The fields of study with the highest number of articles were STEM (n = 48; e.g., Kennedy et al., 2015; Heo & Chun, 2016), followed by Arts, Humanities, and Social Sciences (n = 41; e.g., Hung, 2015; Kim et al., 2014; Zhang, 2019), then Medical and Healthcare (n = 18). In some studies, subject areas were not specified (n = 6), while other studies specified multiple subject areas (n = 5). Figure 3 shows the distribution of studies among the different subject areas.

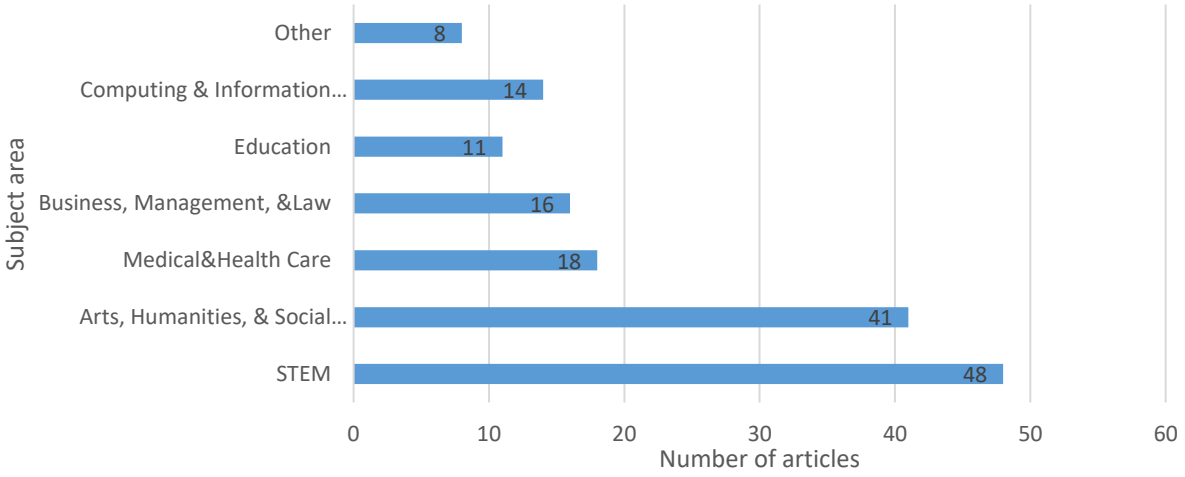

Figure 4. *Distribution of Articles among Subject Areas*

Research Methods and Tools: Only 50 studies (29.5%) were coded as descriptive or theoretical. The most frequently employed methodologies are quantitative (48%), followed by mixed methods (32%), while 20% of studies used the qualitative methodology. The order of the employed methodologies agrees with most of the preceding reviews (Karabulut-Ilgu et al., 2018; Kozikoglu, 2019). The current review found more qualitative studies in 2019, like previous reviews (e.g., Uzunboylu & Karagozlu, 2017). The survey is the most dominant tool used for data collection in more than 35% of the corpus of studies. The survey is often used to gauge student perception, as stated by many other reviews (e.g., Bishop & Verleger, 2013; Zainuldin & Halili, 2016). The second standard tool is the quasi-experiment,

which divides the research sample into the experimental group, applying the FC model, and the control group running a traditional classroom. While some of the studies employed test scores and log systems as tools for data collection.

Study Groups: In this review, a substantial number of studies (n = 124, 73%) were conducted with undergraduate students either gauging their perceptions or testing the effect of flipped approach on their learning and performance (e.g., Abushammala, 2019; Engel et al., 2017), while few studies included graduate student study groups. More than half of the studies drew on convenient random samples of undergraduate students. In 2019, the research participants were mostly undergraduates (n = 29), compared to graduates (n = 9). Strikingly, a very limited number of studies (n = 7, 4%) were conducted with faculty and educators (e.g., Bösner et al., 2015). At the same time, 17 (10%) reflected on both students' and educators' perceptions (e.g., Adnan, 2017; Cohen, 2016). Uniquely, one study (Conroy et al., 2019) surveyed perceptions of alums of agriculture on experiential learning in FC. Finally, one study by Altemueller and Linquist (2017) suggested that future research should study the impact of FC on students with learning difficulties, an often neglected student group.

Theory in the Flipped Approach Research*:* Despite the recommendation of Bishop and Verleger (2013) to employ theoretical frameworks to guide the FC activities, there is still a lack of published studies that included theories guiding the research investigation. This risk puts the research in a void of being not "theoretically connected" (Kara, 2017, p. 56). Mirroring findings of previous reviews (e.g., Karabulut-Ilgu, Cherrez, & Jahren 2018), almost 70% (n = 122) of studies in this review did not employ a theoretical model in their research. Of the 30% (n =47) that did, ten studies (e.g. Hibbard, 2016; Shalaby, 2017; Estriegana, 2019) drew on Bloom's Revised Taxonomy, while (n = 6) recruited Social Constructivist, and (n = 4) employed Self-Regulated Theory, and Technological Pedagogical Content Knowledge (TPACK). Table 7 represents the frequency of theories used in the sample of studies. The discipline with the most significant number of studies employing theoretical frameworks was Education Sciences, followed by Social Sciences. Few studies (e.g., Maycock, 2018) referred to the FLM and F.L.I.P pillars as the theoretical guide that underpins the studies.

Table 6. Frequency of Theories Employed in Studies

Rank	Theory	N
1	Bloom's Revised Taxonomy	8
2	Social Constructivist	6
3	Self-Regulated Theory TPACK	4
4	Community of Inquiry (COI)	3
5	Behaviorism Self-Directed Learning Kolb's Theory	2
6	Other	1

Definitions and Research Contexts

Almost all of the studies in the corpus (88.8%, n = 150) used different definitions of the flipped approach. However, most studies shared the same basic understanding of the flipped approach: general attributes of this pedagogy and video as the primary resource. To grasp a more developed sense of the flipped model, this section responds to the second set of review questions: How is flipped approach in HE defined? What are the mapped research contexts?

Defining the Flip*:* A previous study showed that there are synonymous terms of flipped teaching used in several studies (Hung, 2015). Also (FC) and (FL) often overlap., While Inverted Class (IC), and flipped teaching (FT) are also used to refer to the flipped approach for delivering and transferring knowledge. This overlap underscores the defining role of the flip through pre-class preparation as the integral pillar of this approach. Though there is a typical format for the flip, Lage et al. (2000) have not limited flipping

classwork and homework but extended it to flipping conventional events both inside and outside of the classroom. The term FC was used in 50% of the studies included in this review, followed by the term FL. The 'original' version of Bergman and Sam's (2012) work defining the flipped approach used the term FC and focused on the pre-class online video. While the later version developed by the same authors took a broader and more flexible approach using the term FL. Since FC, or, IC, FT does not mean FL. Researchers should employ the term that best describes the flipped approach specific to their studies, and keep the used term consistent with the operational definition. Some studies did not abide to the required consistency; however, many studies did. In such studies (e.g., Harun & Hussin, 2017; Strayer, 2012) authors employed consistent definitions of the terms FL and FC that were investigated.

In addition to the variation among terms describing the flipped approach, there is also a lack of consensus among researchers on a "recognized definition" of the flipped approach (He et al., 2016). The current review, therefore, agree with Lee and Choi (2018) that some researchers (Bishop & Verleger, 2013; Lee, Lim, & Kim, 2017; Milman, 2013) take a typical approach to defining the flipped experience by emphasizing the pre-class learning activities, materials, and video recorded lectures. While others (e.g., Lai & Hwang, 2016) use a much broader definition of FL that includes not only video but also reading assignments, homework problems, and PowerPoint presentations as pre-class learning materials. It is, therefore, significant to call for standardizing terminology defining the flipped construct, as this would help the progress of this area of research. Thus, the following section attempts to review the range of definitions used in the included articles and presents a developed classification of the definitions (see Table 7).

Table 7. Developed Classification of Flipped Method Definitions (Types and Example Studies)

Type	Description	Keywords	Studies
Basic	This type captures the 'flip', emphasizing the re-ordering fashion of teaching and learning activities.	Reverse, inside-outside class, homework, and classwork.	Enfield (2016) Khodr &Waller (2016) Ojennus (2016) Karaca & Ocak (2017)
Dynamic	This type emphasizes 'transformed' learning. It celebrates the purposeful order and dynamics of didactic activities.	Learner-centered, blended learning, transforms, group learning space, individual learning space	Adnan (2017) Altemueller (2017) Fisher et al. (2017)
Video- centered	This type acknowledges the central role of 'video'	Prescribed video, self-paced learning.	Akkaraju (2016) Clark et al. (2016)

After exploring the pattern of defining flipped pedagogy, the references citing these definitions were also examined. Adapting a similar quantification approach by Zainuldin &Halili (2016), Table 6 includes the most frequently cited references for the definition of the flipped approach. The highest-ranking citation (Bergmann & Sams, 2012) and the second-highest (Lage, Platt, & Treglia, 2000). The frequent citation of these references is presumably influenced by their contribution to framing and guiding this approach, whether before its popularization or towards what is so-called the "flipped-mastery classroom model". Even though the practice-oriented approach is scarce in research, there is a rising interest in informing the practice. This explains the increase in the number of citations of the FLN that was particularly evident among studies published in 2016, 2017, and 2019.

Table8. Most frequently cited defining references

Rank	Frequency	Reference
1	30	Bergmann, J., & Sams, A. (2012).
2	15	Lage, M. J., Platt, G. J., & Treglia, M. (2000).
3	12	Flipped Learning Network. (2014).
4	7	Bishop, J. L., & Verleger, M. A. (2013).
5	5	Baker, J. W. (2000).

Mapping Research Contexts*:* The goal of the research was clear to extract from the reviewed articles. Some research contributions were clustered due to the homogeneity in their purpose, sample, and methods. Figure 5 represents a primary classification and accommodates most of the FC research purposes and scopes. This classification provides an initial step toward a comprehensive classification framework for FC research in the future. Adapting to Lo (2020), the various purposes were consolidated into two primary goals: to examine the overall effect of flipped learning and to inform future FC practice.

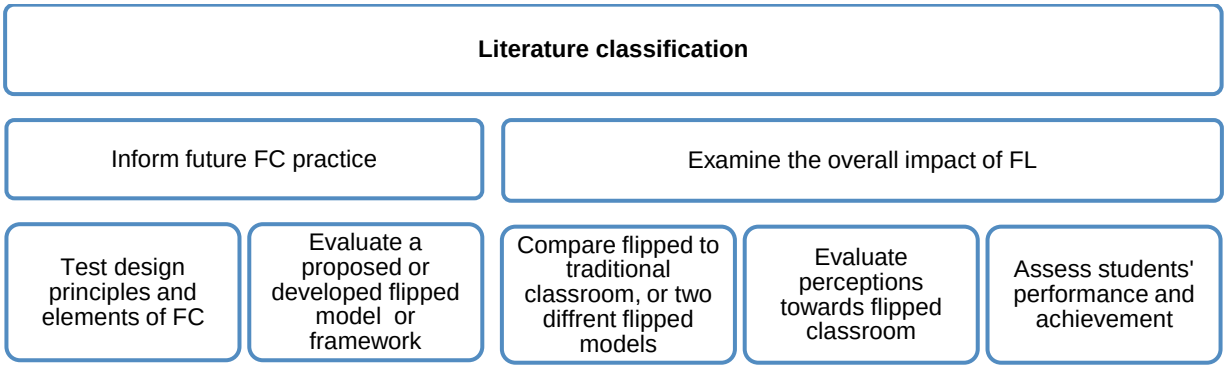

Figure 5. Literature Classification Summary

Expectedly, examining the overall effect of FL dominates 47.2% of the reviewed FC research, as educators often ask how far does a new approach work? (Seery, 2015). Such bulk of studies includes comparing the impacts of FC on traditional classrooms or typical blended learning (e.g., Talan & Gulsecen, 2019; Eriylmaz & Cigdemoglu, 2019) concerning specific elements such as workload and flexibility, etc.; or particular outcomes such as learning motivation, self-efficacy, etc. For instance, Ekmekci (2017) compares flipped and traditional face-to-face writing classes by evaluating writing performances in each learning scenario. Likewise, studies that gauge perceptions of students towards their FC experiences (e.g., AlJarrah et al., 2017; Basal, 2015; Choi et al., 2015) explored students' learning experiences and their acceptance of the FLM; and also identified key factors contributing to the success of FLM. This category of studies includes studies that evaluate the learning gain through test scores and students' achievement measures. In addition, the "does it work?" studies aim to assess the flipped approach regarding benefits and challenges comprehensively. An example of this type of study is the study developed by Clark et al. (2016), which provided a comprehensive evaluation of the overall effectiveness of flipped learning approach. The authors in this study compared exam and assignment results before and after the flip and interviewed instructors for further insight.

On the other hand, a wide range (35.5 %) of studies were conducted to guide and inform future practice. These studies showcased the FC instruction method by demonstrating developed models of the flipped approach that aim to improve examination scores and learning skills (Akkarju, 2017; Ali et al., 2017). As an example, Guo (2019) proposed a step-by-step general model named the "O-PIRTAS" (Objective, Preparation, Instructional video, Review, Test, Activity, Summary) flipped classroom model. The study examined the model's effectiveness in promoting student learning in an undergraduate psychology course. This genre of studies also includes evaluating certain design aspects or elements of FC; for

instance, the merger of flipped instruction with a specific technology or introducing a design solution into FC instruction (e.g., Christiansen et al., 2017).

The Flipped Classroom Practice

This review also highlighted the need for a deep investigation of the FLM as an educational practice and thus helped guide the future framing of such practice. Therefore, this section responds to the third set of review questions: how is the flipped practice framed (F.L.I.P indicators)? What are the media and technologies reported? What are the challenges and benefits of video in the flipped practice?

The F.L.I.P Pillars*:* This review suggests that employing the F.L.I.P pillars conceptual model of FL represented by the FLN (2014) can help guide the FL practice. The F.L.I.P pillars, which are the: **F**lexible Environment, **L**earning Culture, **I**ntentional Content, and **P**rofessional Educator, and their related indicators provide a comprehensive framework not only for implementation but also for assessment. They were reporting on the four pillars widely varied among studies. There was no explicit reference to the F.L.I.P pillars in most studies. At least one pillar was inferred in (n = 86) studies. While only (n= 12) studies explicitly mentioned at least one pillar in implementing the FC. The inferred pillars were then coded against the definition of each pillar provided by the FLN. This process involved a level of subjective interpretation of the implicit cues of each pillar.

Before coding, the 'Flexible Environment' pillar was assumed to be predominant due to the nature of the FC, in which educators can rearrange the learning space to accommodate the teaching scenario. However, the 'Intentional Content' pillar is the most prevailing, followed by the 'Learning Culture.' Most educator researchers reported on the differentiated order of learning material between direct instruction and self-study, making the 'Intentional Content' pillar the most obvious. The 'Learning Culture' pillar was evident as some studies emphasized freeing up class time to shift towards learner-centered instruction. The 'Professional Educator' pillar remained the least acknowledged pillar; though it celebrates the role of the educator, it is not easily inferred unless explicitly reported. Figure 5 shows the frequency of identified F.L.I.P pillars in the 57 studies published in 2019. Note that more than one pillar can possibly be identified in one study.

Media and Technology*:* The findings of this review again confirm the results of previous studies in terms of the role and choice of learning media and technologies in creating a coherent environment for designing pre-class, in-class, and post-class activities. The reported media were divided into three categories according to the use (see Table 8) and mapped according to users (faculty, student, both). It is easy to infer the implicit role of technology in the flipped practice even when some studies (n = 10) did not specify the technology used.

In designing and implementing FC practices in the different subject areas, synchronous and asynchronous educational technologies were used to enrich the blended learning experience. As expected, the video was the most common medium reported due to its integral role in the flipped classroom design. In many studies (n = 70), students accessed and viewed shared video resources (instructional videos, video lectures, video clips, podcasts, video tutorials, etc.) that were created and shared by the instructor. Correspondingly, Learning Management Systems (LMS), such as Blackboard and Canvas, were employed in some studies (n = 35) as repositories for learning resources and facilitation and management. The faculty also used different tools and applications (e.g., Camtasia, Edpuzzle, etc.) for video production and editing. Some studies (n = 18) reported using YouTube as the standard platform for video sharing and watching. To facilitate interactions outside the class, collaborative work, discussions, problem-solving, and the exchange of ideas, instant messaging applications such as WhatsApp (n = 5), and Google Hangout (n = 3) were reported in a few studies. While cross-platform sharing media such as Padlet, and share it were each reported only once. Some communication and messaging applications were limited to particular countries (e.g., KakaoTalk) in

South Korea and (e.g., LINE in Taiwan). Table 8 shows examples of online platforms, media, and technologies used in the FC practice.

Table 8. An Excerpt of Reported Media and Technologies Classified According to Uses and Users

Technology	**Used For**			**Used by**	
	Video publication, creation, and dissemination	Learning facilitation, and course administration	Communication, collaboration, and interaction	Faculty	Student
YouTube	*			*	*
Google Classroom				*	
Instructional video	*			*	
Video Lectures	*				*
Piazza			*	*	*
Padlet	*			*	
IRS (Clicker)			*	*	
Socrative					
Kahoot					
LMS: Blackboard, Canvas, Moodle, Unisa, Openedx, Edmodo		*		*	
What's app			*	*	*
Google Hangout			*	*	*
Quizlet			*		*
Facebook			*	*	*
Mediasite	*			*	
Camtasia	*			*	
Screencast-O Matic	*			*	
Edpuzzle	*			*	

Some researchers (e.g., Fisher, Ross, LaFerriere, & Maritz, 2017) reported more than one technology or a blend of technologies for multi-purpose usage. Their study examined the FLM in an entrepreneurship and innovation course at an Australian university. The interviewees' responses indicated a valuable experience of the various technologies (Twitter, blogging, online quizzes, online readings, and videos).

Certain Technologies for Certain Subject Areas: Certain types of technological tools, applications, or platforms were confined to a specific subject area. In the context of language instruction, which is one of the promising subject areas for the flipped method usage, applications such as Extempore are designed for teachers of foreign languages and used in flipping language instruction (e.g., Martyniuk, 2019). In the same context, Bachelor (2018) reported on specific technology platforms that were employed purposefully to accommodate the nature of the course (e.g., MySpanishLab, TalkAbroad) and yielded positive impressions. In a flipped-hybrid college-level Spanish language class, Bachelor employed MySpanishLab to move most of the class experiences online while engaging students in synchronous video-based conversations with native speakers via TalkAbroad, enhancing their learning experience.

The Video in the Flipped Practice

Positive Benefits**:** Video is linked to the concept of FC, mainly through pre-class video lectures, freeing up class time for engaged and active learning. Digital videos have become the most popular form of technology employed in FC, meeting some of the preferences (e.g., flexibility, engagement, and control over learning) of today's students. In contrast, 'flexible' and 'engaging' are among the highest reported impacts' descriptors of the flipped experience (see Figure 1). The video was found to be the leading technology reported in almost 100% of studies that reported 'flexibility' as the primary positive outcome and in 87% of the studies that reported 'engagement' as the most favorable outcome. Most studies found that video could have contributed to students' satisfaction with the FL experience (e.g., Moranski & Henery, 2017; Amstelveen, 2019; Andreychick & Martinez, 2019; Arruabarrena et al., 2019). Regardless of the discipline, video contributes to the effectiveness of FC. Andreychick and Martinez (2019) compared the efficacy of the flipped approach to a traditional lecture approach across two semesters and two disciplines (finance and psychology). They found higher satisfaction for FC in both fields due to video usage. Another study (Arruabarrena et al., 2019) tackled students' experience as video producers. The results showed that student-generated videos could facilitate experimentation and active engagement, thus enhancing the FC experience.

Negative drawbacks*:* On the other hand, some instructors found recording the videos difficult and time-consuming, thus increasing the FC burden and stress. Among the pitfalls of video that educators widely report is lacking the technical expertise to make the videos. In addition, some educators said they are uncomfortable using others' videos in their classes. At the same time, few studies in this review have emphasized that the quality of videos is a very tricky element to the success of the flipped class; too long or monotonous videos can disorient and demotivate students to follow the video. Watching videos also rely on student self-regulation, i.e., if students haven't watched videos as part of their preparation for class, instructors will not be able to proceed with the course calendar, or students will be left behind in following with required coursework. Poor video viewing, whether because of students' resistance to taking part in learning preparation (Moran, 2018), or poor video content design, will result in poor academic performance (Betihavas et al., 2016). However, after the impacts of the Covid-19 pandemic on teaching practices (Jandrić et al., 2021), provided the role video has played and will continue to play in education, uncertainty and frustration with video are likely to diminish, as video lectures pave the way towards the transition to the new normal. The rise of blended-hybrid modes and video will continue to be integral to education in this age (Bozkurt, 2022a).

Key Reflections

The current review study investigates three sets of questions that exhaustively map the trends, conceptions, and practices of the flipped approach in HE, across studies published in English. The publishing curve of studies examining the flipped approach has grown rapidly and exponentially, though the learning curve about this approach is still growing. Since the flipped approach is associated with active learning strategies, there is a consensus among the reviewed studies over the higher effectiveness of flipped learning compared to traditional learning. Most studies fall in the category that feeds better practices of the flipped approach in various HE disciplines promoting better students' performance and achievement.

According to this review, the higher volume of published flipped studies come from the USA, Asia, and Europe. This order is relatively different in recent reviews (Birgilli et al., 2021), in which Asia precedes the USA. It is expected that USA and Asia dominate the flipped research scene, being coined in the USA and highly accepted in Asian countries such as Taiwan and South Korea. İn agreement with other reviews (Zou et.al, 2020; Birgilli et al., 2021), mixed-method remains the widely used method, while educators are rarely examined compared to students' study groups. Both the educators' voices and the

lack of guiding theoretical frameworks are considered among the gaps identified in the flipped research trends.

Is Flipped Approach a Panacea? Rethinking the Concept of Flipped Method

Once the descriptive information of the articles included in this systematic review was gathered, the further analysis took place. The analysis of the coded studies took place during the second wave of COVID- 19, which led to extensive reading of the articles regarding the contribution of the flipped approach to more profound and richer learning.

It is seen to be "a panacea" for the disengaged learner in a well-flipped classroom, as described by O'Flaherty & Phillips (2015). However, the question remains what a well-flipped classroom is? This question leads to a new era of exploration. Some scholars argue that even if the flipped approach is not a panacea, it is still a powerful teaching tool. Whether it is a panacea or not, the value of flipped learning needs to be addressed. As such, this review suggests rethinking the flipped pedagogy concept.

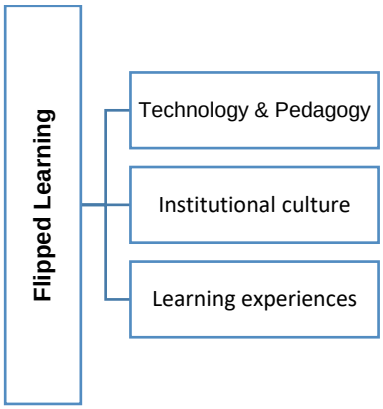

Figure 7.Flipped learning areas of change

Source: The author

Flipped learning urges educators to modify their traditional classroom environment (Sams & Bergmann, 2012) to deliver course content and meet learning outcomes while guiding students through active learning experiences. Also, FL provides an opportunity to transform traditional primary teaching (Birgilli et al., 2021) into an interactive teaching style, through which information is transformed into knowledge and accumulated experience. It is also inferred from various studies (Al-Zoubi & Suleiman, 2021; Abd Rahman, Yunus, & Hashim, 2021; Chatta & Haque, 2020) that the careful design of the flipped classroom content, activities, interactions, assessment, and the use of adaptive learning tools are key for driving the potential momentum of the flipped method. Modification, transformation, and design are all keywords driving systemic change inside today's HE institution. The HE institutions will eventually be mandated to maintain a suitable institution and organizational culture for such innovative methods and pedagogies without the need to rebuild the whole institution. Therefore, if the required change is encountered in an incremental but planned fashion, this shall lead to sustainable, adaptive, and resilient education strategies, as advised by Bozkurt (2022b). Figure 7 illustrates areas that exhibit change to deliver a practical FL experience. These main areas were inspired by the four F.L.I.P pillars (FLN, 2014), alongside findings and recommendations coded from the reviewed 169 studies. Advancement of pedagogical and technical training for teachers to twin paths between pedagogy and technology. Besides, institutional and technical support for an innovative sustainable mandate. Both happen against the careful design of innovative learning experiences that initially spark students' interests and sustain their engagement.

Yielding significant change in the three perspective areas (figure 7) could be guided through Value-Driven-Design (VDD), which enables the assessment of a value for every design option. Therefore, institutional choices and decisions are made to maximize system value rather than to meet performance requirements (Bertoni et al., 2019). Encountering change usually takes place in an incremental but planned fashion. In return, this change in perspective requires rethinking the whole flipped approach from a mere structural that focuses on modality to a more value-driven process. This belief shift is what this review eventually targets. Even though designing and implementing such pedagogies as the flipped requires a significant investment on the part of educators, the findings of the reviewed studies, including enhanced student satisfaction, performance, engagement, etc., clearly underscore the value of doing so for our students. Figure 8 captures the evolution of the approach of defining flipped learning across the surveyed literature and introduces the value-driven approach of defining the flipped approach that this review attempts to frame.

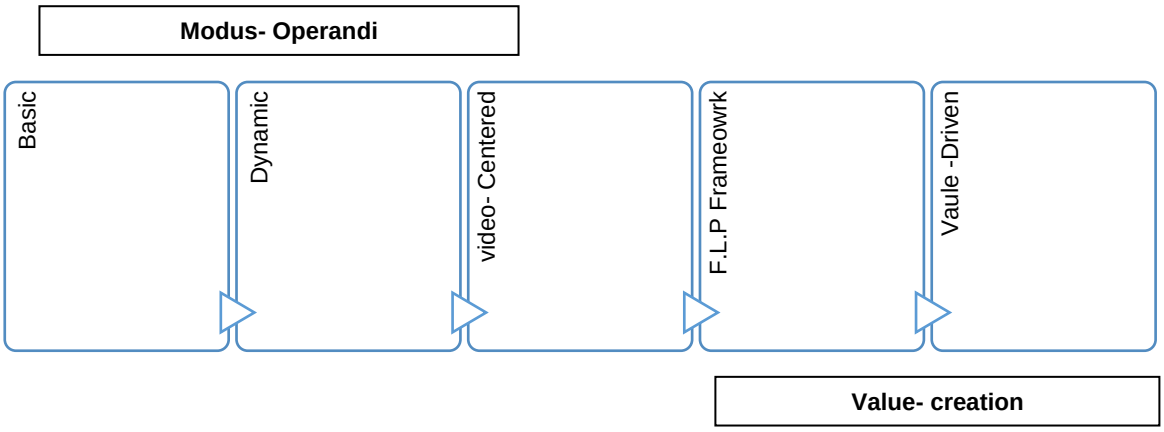

Figure 8. Evolution of defining the flipped approach from modality to value
Source: The author

As such, if the F.L.I.P framework introduced by (FLN, 2014) represents a point of departure towards the thinking of the flipped method as a transformative approach, this review proceeds to define flipped learning as an investment in the readiness of today's institution to bring real value to the learning experiences. The author suggests defining the flipped approach as follows:

> ***"****Flipped approach invests in the concept of readiness, arguing that readiness for this approach and its related elements is a crucial predictor of the whole institution's readiness to deliver value-driven learning experiences mediated by technology.****"***

Yes, FL might not be a panacea, but it might also be the next big thing. İt is the life- jacket for disengaged learners and institutions that wish to change the status quo, which realized after COVID- 19 that digital pedagogies are no longer just value-added but value-created.

Conclusion and Further Research

This review exhibited the development trends and conceptualization of the flipped approach, providing a reference to advance our understanding of this approach. İt has mapped the intellectual and scholarly landscape of the flipped approach research. This review has also called for a belief shift in recommending a new approach for defining the rich flipped pedagogy. Consistent with other review studies, this SR found that implementing FC in various disciplines is mainly advocated to promote

students' engagement, cognitive abilities, self-actualization, performance, and achievement. While among the critical challenges of the flipped approach are the overwhelming workload and the time consumption for educators and students. In early studies, research was oriented toward assessing the effectiveness of FL by comparing it with traditional instruction. However, today there is a growing tendency towards investigating whether adopting innovative strategies or technologies can make FL more effective, inspiring researchers to find valuable and sound research directions. Even though this review highlights critical topics examining FL, future review studies should explore in detail areas that are not widely visible in the literature. Examples of these areas are the challenges of this approach and the role of other media and technology besides video in enhancing FC interventions. Undoubtedly, there is also a need for rigorously reported studies that can promote our understanding of FL and its implementation rather than just a superficial statement of the approach's effectiveness. Also, in addressing gaps in the flipped approach research, educators' views and perceptions should be more voiced, and qualitative methods should be often employed for an in-depth examination of concepts within the scope of flipped approach. Yet, to improve the clarity of reporting on FC interventions, exhaustive descriptive frameworks are also required, as suggested by some authors (e.g., Lo & Hwang, 2018).

Further, researchers should employ theoretical frameworks to guide their research or design of the flipped intervention. Relatedly, this review encourages to use of the F.L.I.P pillars and related indicators framework more often to navigate the scope of implementation and assessment of the FL experience and bridge the gap between theoretical and practice-oriented research. Finally, given the growing popularity of the flipped classroom over the past decade, one can look forward to the vital role of this research focus after the Covid-19 pandemic.

References

Abd Rahman, S., Yunus, M., Hashim, H. (2021). Applying UTAUT in Predicting ESL Lecturers Intention to Use Flipped Learning. *Sustainability, 13*(15), 8571. https://doi.org/10.3390/su13158571

Abeysekera, L., & Dawson, P. (2015). Motivation and cognitive load in the flipped classroom: Definition, rationale and a call for research. *Higher Education Research & Development*, *34(1)*, 1-14. https://doi.org/10.1080/07294360.2014.934336

Abushammala, M.F. (2019). The effect of using flipped teaching in project management class for undergraduate students. *Journal of Technology and Science Education*, *9*(1), 41-50 https://doi.org/10.3926/jotse.539

Adnan, M. (2017). Perceptions of senior-year ELT students for flipped classroom: A material development course. *Computer Assisted Language Learning*, *30*(3), 204-222. https://doi.org/10.1080/09588221.2017.1301958

Akçayır, G., & Akçayır, M. (2018). The flipped classroom: A review of its advantages and challenges. Computers & Education, 126(1), 334–345. https://doi.org/10.1016/j.compedu.2018.07.021

Akkaraju, S. (2016). The role of flipped learning in managing the cognitive load of a threshold concept in physiology. *The Journal of Effective Teaching, 16(3)*, 28-43. https://www.researchgate.net/publication/321716223_The_Role_of_Flipped_Learning_in_Managing_the_Cognitive_Load_of_a_Threshold_Concept_in_Physiology

Aljaraideh, Y. (2019). Students' perception of flipped classroom: A case study for private universities in Jordan. *Journal of Technology and Science Education*, 9(3), 368-377. https://doi.org/10.3926/jotse648

AlJarrah, A., Thomas, M.K., & Shehab, M. (2017). Investigating temporal access in a flipped classroom: procrastination persists. *International Journal of Educational Technology in Higher Education, 15(1)*, 1-18. https://doi.org/10.1186/s41239-017-0083-9

Altemueller, L., &Lindquist, C. (2017). Flipped classroom instruction for inclusive learning. *The British Journal of Special Education (BJSE)*, 44(3), 342-358. https://doi.org/10.1111/1467-8578.12177

Ali, M., Bilal, H.S., Razzaq, M.A., Khan, J., Lee, S., Idris, M., Aazam, M., Choi, T., Han, S.C., & Kang, B. (2017). IoT FLIP: IoT-based flipped learning platform for medical education. *Digital Communications and Networks*, *3(3)*, 188-194. https://doi.org/10.1016/j.dcan.2017.03.002

Al-Zoubi, A. M., & Suleiman, L. M. (2021). Flipped Classroom Strategy Based on Critical Thinking Skills: Helping Fresh Female Students Acquiring Derivative Concept. *International Journal of Instruction*, 14(2), 791-810. https://doi.org/10.29333/iji.2021.14244a

Andreychik, M. R., & Martinez, V. (2019). Flipped vs. traditional: An analysis of teaching techniques in finance and psychology. *Teaching and Learning Inquiry*, 7(2), 154–167. https://doi.org/10.20343/teachlearninqu.7.2.10

Arruabarrena, R., Sánchez, A., Blanco, J.M.,Vadillo, J.,& Usandizaga, I. (2019). Integration of good practices of active methodologies with the reuse of student-generated content. *International Journal of Educational Technology in Higher Education*, *16*(10). https://doi.org/10.1186/s41239-019-0140-7

Bachelor, J. (2018). The "flipped-hybrid" classroom: A didactic technique for teaching foreign languages. *e-mentor*, 2(74), 73-77. https://doi.org/10.15219/em74.1355

Basal, A. (2015). The implementation of a flipped classroom in foreign language teaching. *Turkish Online Journal of Distance Education*, *16*(4), 28– 37. https://doi.org/10.17718/tojde.72185

Betihavas, V., Bridgman, H., Kornhaber, R., & Cross, M. (2016). The evidence for 'flipping out': A systematic review of the flipped classroom in nursing education. *Nurse Education Today*, 38, 15-21. https://doi.org/10.1016/j.nedt.2015.12.010

Bertoni, M., Bertoni, A., & Murat Hakki, E. (2019). Value Driven Design Revisited: Emerging Modelling Concepts and Applications. *Proceedings of the Design Society: International Conference on Engineering Design*, 1(1), 2407-2416. doi:10.1017/dsi.2019.247

Birgili, B., Seggie, F.N., & Oğuz, E. (2021). The trends and outcomes of flipped learning research between 2012 and 2018: A descriptive content analysis. *Journal of Computers in Education*, 8(1), 1 - 30. https://doi.org/10.1007/s40692-021-00183-y

Bishop, J., & Verleger, M. A. (2013). The Flipped Classroom: A Survey of the Research. *ASEE Annual Conference & Exposition*. Atlanta, Georgia. https://doi.org/10.18260/1-2--22585

Bond, M. (2020). Facilitating student engagement through the flipped learning approach in K-12: A systematic review. *Computers & Education. 151*, 103819. https ://doi.org/10.1016/j.compedu.2020.10381 9.

Bösner, S., Pickert, J. & Stibane, T. (2015). Teaching differential diagnosis in primary care using an inverted classroom approach: student satisfaction and gain in skills and knowledge. *BMC Medical Education* 15(63). https://doi.org/10.1186/s12909-015-0346-x

Bozkurt, A. (2022). A Retro Perspective on Blended/Hybrid Learning: Systematic Review, Mapping and Visualization of the Scholarly Landscape. *Journal of Interactive Media in Education*, *2022*(1), 2. https://doi. org/10.5334/jime.751

Bozkurt, A. (2022). Resilience, Adaptability, and Sustainability of Higher Education: A systematic Mapping Study on the Impact of the Coronavirus (Covid-19) Pandemic and the Transition to the New Normal. *Journal of Learning for Development*, *9*(1), 1–16. https://doi.org/10.56059/jl4d.v9i1.590

Chatta, B. S., & Haque, M. I. (2020). Improving Paragraph Writing Skills of Saudi EFL University Students Using Flipped Classroom Instruction. *Arab World English Journal (AWEJ)* Special Issue on CALL (6). 228- 247. https:// doi.org/10.24093/awej/call6.15

Chen F, Lui AM, Martinelli SM. (2017). A systematic review of the effectiveness of flipped classrooms in medical education. *Med Edu,*51(6):585-597. https://doi.org/10.1111/medu.13272

Chien, C.-F., Hsieh, L.-H. C. (2018). Exploring university students' achievement, motivation, and receptivity of flipped learning in an engineering mathematics course. *International Journal of Online Pedagogy and Course Design (IJOPCD)*, 8(4), 22–37. https://ideas.repec.org/a/igg/jopcd0/v8y2018i4p22-37.html

Clark, R., Besterfield-Sacre, M., Budny, D., Bursic, K., Clark, W., Norman, B. et al. (2016). Flipping engineering Courses: A school wide initiative. *Advances in Engineering Education, 5*(3). https://advances.asee.org/wp-content/uploads/vol05/issue03/Papers/AEE-19-Flipping-Clark-2.pdf

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, *20*(1), 37–46. https://doi.org/10.1177/001316446002000104

Cohen, M.E. et al. (2016). Flipping the classroom in business and education one-shot sessions: a research study. *Journal of Information Literacy, 10*(2), 40-63 https://doi.org/10.11645/10.2.2127

Collins, J. A. & Frauser, B. (2005). Balancing the strengths of systematic and narrative reviews, *Human Reproduction* Update*, 11*(2), 103–104, https://doi.org/10.1093/humupd/dmh058

Conroy, A. B.; Overson, C. E. & Erickson, P. S. (2019). Alumni perspectives of using a flipped classroom and experiential learning at a university dairy farm. *North American Colleges and Teachers of Agriculture*, *63*(2), 299- 306.

Choi, H., Kim, J., Bang, K., Park, Y., Lee, N., & Kim, C. (2015). Applying the flipped learning model to an English-medium nursing course. *Journal of Korean Academy of Nursing*, *45*(6), 939-48. https://doi.org/10.4040/jkan.2015.45.6.939

Christiansen, M.A., Nadelson, L., Etchberger, L., Cuch, M., Kingsford, T.A., & Woodward, L.O. (2017). Flipped learning in synchronously-delivered, geographically-dispersed general chemistry classrooms. *Journal of Chemical Education*, *94*(5), 662-667.https://doi.org/10.1021/acs.jchemed.6b00763

Crompton, H., Burke, D., Gregory, k. (2017). The use of mobile learning in PK-12 education: A systematic review. *Computers & Education*,110, 51-63. https://doi.org/10.1016/j.compedu.2017.03.013

Das, A., Lam, T. K., Thomas, S., Richardson, J., Hon, K. B., Hung, L. K., & Zanda, N. M. (2019). Flipped classroom pedagogy: Using pre-class videos in an undergraduate business information system management course. *Education + training, 61*(6), 756–774. https://doi.org/10.1108/ET-06-2018-0133

Deng F. (2019). Literature review of the flipped classroom. *Theory and Practice in Language Studies, 9*(10). https: //doi.org/10.1108/ET-06-2018-0133

Ekmekci, E. (2017). The flipped writing classroom in Turkish EFL context: A comparative study on a new model. *Turkish Online Journal of Distance Education*, *18*(2), 151–167. https://doi.org/10.17718/tojde.306566

Engel, M., Heinz, M., and Sonntag, R. (2017). Flexibilizing and customizing education using inverted classroom model*. Information Systems Management*, *34*(4), 378–389.https://doi.org/10.1080/10580530.2017.1366221

Enfield, J. (2016). The value of using an E-text in a flipped course. *TechTrend*s, 60, 449-455. https://doi.org/10.1007/s11528-016-0100-1

Eryilmaz, M. & Cigdemoglu, C. (2019) Individual flipped learning and cooperative flipped learning: Their effects on students' performance, social, and computer anxiety. *Interactive Learning Environments*, 27(4), 432-442. https://doi.org/10.1080/10494820.2018.1522652

Fanguy, M., & Costley, J. (2021). Creating a Framework for Understanding and Defining Flipped Learning. *Journal of Educators Online, 18*, 1-14. https://doi.org/10.9743/jeo.2021.18.1.2

Flick, O., (2009). *An Introduction to Qualitative Research*: Sage Publications.

Fisher, R., Ross, B., LaFerriere, R., & Martiz, A. (2017). Flipped learning, flipped satisfaction, getting the balance right. *Teaching & Learning Inquiry*, 5(2). https://doi.org/10.20343/teachlearninqu.5.2.9

Flipped Learning Network (FLN). (2014) The Four Pillars of F-L-I-P. https://flippedlearning.org/definition-of-flipped-learning/

Giannakos, M. N., Krogstie, J., & Chrisochoides, N. (2014). Reviewing the flipped classroom research: Reflections for computer science education. In *Proceedings of the Computer Science Education Research Conference* (pp. 23–29). ACM. https://doi.org/10.1145/2691352.2691354

Gough, D., Oliver, S., & Thomas, J. (2017). *An introduction to systematic reviews* (2nd edition). Los Angeles: SAGE.

Gopalan C, Klann MC, (2017). The effect of flipped teaching combined with modified team-based learning on student performance in physiology. *Advances in Physiology Education,*41(3):363-367.doi: 10.1152/advan.00179.2016. PMID: 28679573

Guo, J. (2019). The use of an extended flipped classroom model in improving students' learning in an undergraduate course. *Journal of Computing in Higher Education*, 31, 362–390. https://doi.org/10.1007/s12528-019-09224-z

Halili, S. & Zainuddin, Z. (2015). Flipping the classroom: What we know and what we don't. *The Online Journal of Distance Education and Learning*, 3(1), 15- 22. https://www.tojdel.net/journals/tojdel/volumes/tojdel-volume03-i01.pdf

Hamdan, N., McKnight, P., McKnight, K., & Arfstrom, K. (2013). A Review of Flipped Learning: Flipped Learning Network. http://www.flippedlearning.org/cms/lib07/VA01923112/Centricity/Domain/41/

Hao, Y. (2016). Exploring undergraduates' perspectives and flipped learning readiness in their flipped classrooms. *Computers in Human Behavior, 59,* 82–92. https://doi.org/10.1016/j.chb.2016.01.032

Harun, F. & Hussin, S. (2017). The acceptance of flipped language learning (FLL): A study of engineering students at Technical Matriculation College. *International Journal of Applied Engineering Research*, *12*(24), 14495-14504. http://www.ripublication.com/ijaer17/ijaerv12n24_71.pdf

He, J. (2020). Research and practice of flipped classroom teaching mode based on guidance case. *Education and Information Technologies,* 25(4), 2337–2352. https://doi.org/10.1007/s10639-020-10137-z

He, W., Holton, A., Farkas, G., & Warschauer, M. (2016). The effects of flipped instruction on out-of- class study time, exam performance, and student perceptions. *Learning & Instruction*, 45, 61–71. https://doi.org/10.1016/j.learninstruc.2016.07.001

Heo, H., & Chun, B. (2016). A Study on the Effects of Mobile-based LMS on Flipped Learning: Focused on the Affective Pathway in Pre-service Teacher Education. *International Journal of Software Engineering and its Applications, 10*(12), 473-484. https://doi.org/10.14257/ijseia.2016.10.12.39

Huang, Y. M., & Chiu, P. S. (2015). The effectiveness of the meaningful learning-based evaluation for different achieving students in a ubiquitous learning context. *Computers & Education*, *87*, 243–253. https://doi.org/10.1016/j.compedu.2015.06.009

Hung, H. (2015). Flipping the classroom for English language learners to foster active learning. *Computer Assisted Language Learning*, 28*(*1), 81-96. https://doi.org/10.1080/09588221.2014.967701

Huang, B., & Hew, K. (2018). Implementing a theory-driven gamification model in higher education flipped courses: Effects on out-of-class activity completion and quality of artifacts. *Computers and Education, 125*, 254-272. https://doi.org/10.1016/j.compedu.2018.06.018

Hwang, G.J., Chengjiu, Y., & Chu H.C. (2019) The era of flipped learning: promoting active learning and higher order thinking with innovative flipped learning strategies and supporting systems. *Interactive Learning Environments*, 27(8), 991-994. https://doi.org/10.1080/10494820.2019.1667150

Jandrić, P., Bozkurt, A., McKee, M., &Hayes, S. (2021)Teaching in the age of Covid-19 - A longitudinal study. *Postdigital Science and Education, 3,* 743–770. https://doi.org/10.1007/s42438-021-00252

Irvine, V. (2020, October 26). The Landscape of Merging Modalities.*EDUCAUSE,4:40-58.*https://er.educause.edu/articles/2020/10/the-landscape-of-merging-modalities

Kara, H. (2017). *Research and evaluation for busy students and practitioners: A time-saving guide*, (2nd ed.,). Bristol: Policy Press. https://doi.org/10.2307/j.ctt1t89fsw

Karabulut-Ilgu, A., Jaramillo Cherrez, N., & Jahren, C. T. (2018). A systematic review of research on the flipped learning method in engineering education. *British Journal of Educational Technology, 49*(3), 398–411. https://doi.org/10.1111/bjet.12548

Karaca, C., & Ocak, M. (2017). Effects of flipped learning on university students' academic achievement in algorithms and programming education. *International Online Journal of Educational Sciences, 9*(2), 527-543. https://doi.org/10.15345/iojes.2017.02.017

Kennedy, E., Beaudrie, B., Ernst, D. C., & St. Laurent, R. (2015). Inverted pedagogy in second semester calculus. *PRIMUS* 25 (9-10), 892–906. https://doi.org/10.1080/10511970.2015.1031301

Khanova J, Roth MT, Rodgers JE, McLaughlin JE. (2015). Student experiences across multiple flipped courses in a single curriculum. *Medical Education*, *49*(10), 1038- 1048. https://doi.org/10.1111/medu.12807

Khodr M., & Waller L. (2016). Analysis of engineering students' responses to flipped classroom methodology in the United Arab Emirates. *Asian Social Science*, *12*(2). https://doi.org/10.5539/ass.v12n2p93

Kim, M. K., Kim, S. M., Khera, O., & Getman, J. (2014). The experience of three flipped classrooms in an urban university: An exploration of design principles. *The Internet and Higher Education, 22*, 37-50. https://doi.org/10.1016/j.iheduc.2014.04.003

Kim, H.S., Kim, M.Y., Cho, M.-K. & Jang, S.J. (2017). Effectiveness of applying flipped learning to clinical nursing practicums for nursing students in Korea: a randomized controlled trial, *International Journal of Nursing Practice*, 23(5). http://doi.org/10.1111/ijn.12574

Kozikoglu, I. (2019). Analysis of the Studies Concerning Flipped Learning Model: A Comparative Meta-Synthesis Study. *International Journal of Instruction, 12*(1), 851-868. http://doi.org/10.29333/iji.2019.12155a

Lage, M. J., Platt, G. J., & Treglia, M. (2000). Inverting the classroom: A gateway to creating an inclusive Learning environment. *The Journal of Economic Education*, *31*(1), 30-43. https://doi.org/10.2307/1183338

Lai, C., & Hwang, G. (2016). A self-regulated flipped classroom approach to improving students' learning performance in a mathematics course. *Computers and Education, 100*, 126-140. https://doi.org/10.1016/j.compedu.2016.05.006

Lee, A. M., & Liu, L. (2016). Examining flipped learning in sociology courses: A quasi-experimental design. *International Journal of Technology in Teaching and Learning, 12*(1), 47-64.

Lee, J., & Choi, H (2018). Rethinking the flipped learning pre-class: Its influence on the success of flipped learning and related factors. *British Journal of Educational Technology, 50*(2), 934-935. https://doi.org/10.1111/bjet.12618.

Lee, J., Lim, C., & Kim, H. (2017). Development of an instructional design model for flipped learning in higher education. *Educational Technology Research & Development, 65,* 427–453. https://doi.org/10.1007/s11423-016-9502-1

Lee, G. & Wallace, A. (2018). Flipped learning in the English as a foreign language classroom: Outcomes and perceptions. *TESOL Quarterly, 52*(1), 62-84. https://doi.org/10.1002/tesq.372

Lencastre, J. A., Morgado, J. C., Freires, T., & Bento, M. (2020). A Systematic Review on the Flipped Classroom Model as a Promoter of Curriculum Innovation. *International Journal of Instruction, 13*(4), 575-592. https://doi.org/10.29333/iji.2020.13436a

Lo, C. K. (2020) Systematic Reviews on Flipped Learning in Various Education Contexts. In: Zawacki-Richter O., Kerres M., Bedenlier S., Bond M., & Buntins K. (Eds) *Systematic Reviews in Education Research*. Springer VS, Wiesbaden. https://doi.org/10.1007/978-3-658-27602-7_8

Lo, C. K., & Hwang, G. J. (2018). How to advance our understanding of flipped learning: Directions and a descriptive framework for future research? *Knowledge Management & E-Learning*, 10(4), 441–454. https://doi.org/10.34105/j.kmel.2018.10.027

Martyniuk, O. (2019). American flipped classroom model in teaching linguistic disciplines to students majoring in a foreign language. *Comparative Professional Pedagogy*, 9(3), 22-28. https://doi.org/10.2478/rpp-2019- 0025

Moher D, Liberati A, Tetzlaff J, & Altman D G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. British Medical Journal, 339:b2535. https://doi.org/10.1136/bmj.b2535

Moranski, K. & Henery, A. (2017). Helping learners to orient to the inverted or flipped language classroom: mediation via informational video. *Foreign Language Annals*, *50*(2), 285-305. https://doi.org/10.1111/flan.12262

Milman, N. (2012). The flipped classroom strategy: What is it and how can it best be used? *Greenwich: Distance Learning*, 3, 85-87.

Nallaswamy, D., Saravanapandian, S., & Subha, M. (2019). Effects of flipped class based teaching in orthodontics & dentofacial orthopedics – A prospective study. *International Journal of Research in Pharmaceutical Sciences, 10*, 1415-1419. https://doi.org/10.26452/ijrps.v10i2.619

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

Ojennus DD. (2016). Assessment of learning gains in a flipped biochemistry classroom. *Biochemistry and Molecular Biology Education*, *44*(1), 20-7. https://doi.org/10.1002/bmb.20926

Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *British Medical Journal,* 372(71), 1-9. https://doi.org/10.1136/bmj.n71

Piotrowski, A., & Witte, S. (2016). Flipped learning and TPACK construction in English education. *International Journal of Technology in Teaching & Learning, 12*(1), 33–46. https://sicet.org/main/wp-content/uploads/2016/11/ijttl-16-01-3_Amy_Piotrowski.pdf

Şahin, M., & Fell-Kurban, K. (2016). *The flipped approach to higher education: Designing universities for today's knowledge economies and societies*. Emerald Publishing.

Schneider, A., Kühl, M., & Kühl, S. J., (2019) Utilizing research findings in medical education: The testing effect within a flipped/inverted biochemistry classroom, *Medical Teacher*, *41*(11), 1245-1251. https://doi.org/10.1080/0142159X.2019.1628195

Seery M. K., (2012), Moving an in-class module online: a case study for chemistry, *Chemistry Education Research and Practice Journal*, *13*(1), 39–46. https://doi.org/10.1039/C1RP90059E

Su, C.-Y., & Chen, C.-H. (2018). Investigating the effects of flipped learning, student question generation, and instant response technologies on students' learning motivation, attitudes, and engagement: A structural equation modeling. *Eurasia Journal of Mathematics, Science and Technology Education, 14*(6), 2453-2466. https://doi.org/10.29333/ejmste/89938

Talan, T., & Gülseçen, S. (2019). The Effect of a Flipped Classroom on Students' Achievements, Academic Engagement and Satisfaction Levels. *The Turkish Online Journal of Distance Education, 20(*4), 31- 60*.* https://doi.org/10.17718/tojde.640503

Tanner, M., & Scott, E. (2015). A flipped classroom approach to teaching systems analysis, design, and implementation. *Journal of Information Technology Education: Research, 14,* 219-241. http://www.jite.org/documents/Vol14/JITEv14ResearchP219-241Tanner1840.pdf

Tucker, B. (2012). The flipped classroom. *Education Next, 12*(1), 82-83. http://educationnext.org/the-flipped-classroom/

Uzunboylu, H., & Karagözlü, D. (2017). The emerging trend of the flipped classroom: A content analysis of published articles between 2010 and 2015. RED. *Revista de Educación a Distancia*, 54(4), 1-13. http://www.um.es/ead/red/54/uzunboylu_karagozlu.pd

Zainuddin, Z., Haruna, H., Li, X., Zhang, Y., & Chu, S. K. W. (2019). A systematic review of flipped classroom empirical evidence from different fields: What are the gaps and future trends? *On the Horizon*. 27(2), 72-86. https://doi.org/10.1108/OTH-09-2018-002

Zawacki-Richter, O., Marín, V.I., Bond, M. et al. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Higher Education*, *16*(39), 1-27. https://doi.org/10.1186/s41239-019-0171-0

Zhang, S. (2019). Chinese-as-a-foreign-language learners' use of self-regulated learning in flipped/blended learning environments: A descriptive study. *Studies in Self-Access Learning Journal, 10*(2), 181- 204. https://doi.org/10.37237/100205

Zou, D., Luo, S., Xie, H., & Hwang, G. J. (2020). A systematic review of research on flipped language classrooms: Theoretical foundations, learning activities, tools, research topics and findings. *Computer Assisted Language Learning,* 1-27. https://doi.org/10.1080/09588 221.2020.18395 02.

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