

## A scoping review on flipped classroom approach in language education: challenges, implications and an interaction model

Michael Yi-chao Jiang , Morris Siu-yung Jong , Wilfred Wing-fat Lau , Ching-sing Chai , Kelly Shu-xia Liu & Moonyoung Park

To cite this article: Michael Yi-chao Jiang , Morris Siu-yung Jong , Wilfred Wing-fat Lau , Ching-sing Chai , Kelly Shu-xia Liu & Moonyoung Park (2020): A scoping review on flipped classroom approach in language education: challenges, implications and an interaction model, Computer Assisted Language Learning, DOI: [10.1080/09588221.2020.1789171](https://doi.org/10.1080/09588221.2020.1789171)

To link to this article: <https://doi.org/10.1080/09588221.2020.1789171>



Published online: 09 Jul 2020.



Submit your article to this journal [↗](#)





View related articles [↗](#)



View Crossmark data [↗](#)



# A scoping review on flipped classroom approach in language education: challenges, implications and an interaction model

Michael Yi-chao Jiang<sup>a</sup>, Morris Siu-yung Jong<sup>a,b</sup> , Wilfred Wing-fat Lau<sup>a</sup>,  
Ching-sing Chai<sup>a</sup>, Kelly Shu-xia Liu<sup>c</sup> and Moonyoung Park<sup>a</sup> 

<sup>a</sup>Department of Curriculum and Instruction, Faculty of Education, The Chinese University of Hong Kong, Hong Kong S.A.R., China; <sup>b</sup>Centre for Learning Sciences and Technologies, The Chinese University of Hong Kong S.A.R., China, <sup>c</sup>Department of General Education, Shenyang Institute of Science and Technology, Shenyang, China

## ABSTRACT

The present work synthesizes the studies in flipped language education based on Social Sciences Citation Index publications up to the year 2018. A sum of 33 studies were finalized as the targeted studies and our research questions were formulated regarding (1) the overall trend and features of the existing studies, (2) their research foci, (3) the role of technology, and (4) the integration of FL/L2 learning and teaching theories, models or strategies into flipped classroom. Some research gaps were identified, including a bias toward outcome-oriented quantitative studies over process-oriented qualitative studies. Additionally, an overwhelming majority of the studies were conducted from the learners' perspectives, while few studies took the teachers' perspectives. More importantly, to guide the course design and implementation, the present review proposed a comprehensive 'interaction model' integrating four key elements into flipped FL/L2 education. The model featured two types of interaction, namely 'interaction with content' and 'interaction via content', highlighting the uniqueness of flipped FL/L2 education. The study incorporated learner preparedness in the interaction model, entailing a practical interface for the principle of 'design for failure', that is, predicting and preparing contingencies for the times when in-class interactions do not go as planned for technical or other reasons.

## KEYWORDS

Design for failure; flipped classroom; interaction model; language education; scoping review

## 1. Introduction

Flipping the classroom has been a popular pedagogical strategy since Bergmann and Sams (2012) implemented their chemistry course in a flipped manner in 2007. Although it is a relatively new term in

education, the flipped classroom approach (FCA) is not a fundamentally novel teaching approach from the perspective of educational philosophy (Berrett, 2012). However, it leads us to reconsider how to organize and connect learners' in-class activities and out-of-class efforts in an integrated fashion with technology (Hung, 2015). Even though a growing number of studies have claimed its effectiveness in language classrooms (e.g. Hung, 2017a, 2017b, 2017c; Kim, Park, Jang, & Nam, 2017; Lin & Hwang, 2018; Moranski & Kim, 2016; Shyr & Chen, 2018), more detailed and specific techniques concerning flipped classroom practice are yet to be investigated, such as how language teachers determine which content knowledge and materials are to be studied out-of-class and which are suitable for in-class higher order activities. Moreover, how language teaching theories, models or strategies are incorporated as pedagogical underpinnings in FCA is insufficiently addressed in the existing studies. A closer look at the pedagogical design of the existing studies reveals that there is no theoretical framework to combine FCA with language teaching. On the other hand, in light of technology, every empirical study has reported on their specific technology use in their 'flip' implementation, and yet on an overall basis, it is unknown how those technologies are integrated in flipped language classrooms. In other words, the role of technology in flipped language classrooms needs to be reviewed from a holistic perspective. In addition, among the existing review studies pertaining to flipped classroom, there seems to be a lack of studies conducted for the field of language education. The recently accepted in-press article reviewing flipped classroom for English language teaching (Turan & Akdag-Cimen, 2019) confirmed our assertion.

Scoping studies are often topic-based and used to map the literature on a particular research area, identifying key concepts and research gaps. Accordingly, the present scoping review aims to address the need to analyze and appraise the literature pertaining to language education that adopts FCA. Furthermore, building on past literature, the present study aims to propose a framework for designing flipped language courses. As the study unfolds, relevant gaps for future research are also identified.

## **2. Existing reviews on FCA**

In accordance with the underpinning assumption of FCA, the traditional instructional activities are partially or fully removed out of class, while the conventional out-of-class activities, such as homework, are carried out in class as higher order activities (Bergmann & Sams, 2012; Jong, Chen, Tam, and Chai, 2019). With its promising potentials in various educational settings, FCA has been gaining great momentum in language

education in the past few years, especially in foreign language (FL) and second language (L2) education. From the perspective of Bloom's taxonomy (Anderson & Krathwohl, 2001), a great amount of in-class time in traditional language classrooms is spent on remembering- and understanding-oriented tasks (e.g. vocabulary- and grammar-related drills). By adopting FCA, teachers can spend more in-class time engaging students in higher order activities that feature applying-, analyzing-, evaluating-, and creating-oriented tasks (Jong, 2019). Therefore, in flipped FL/L2 classrooms, learners can gain basic knowledge from technology-enhanced self-preparation before class, and spend the in-class time interacting with their peers in the higher order tasks. Since there is more interaction (e.g. peer interaction, learner-teacher, and learner-environment interaction) in a flipped classroom than in a didactic one, it is necessary to develop a more comprehensive perspective to research into the dynamics in both in-class and out-of-class learning. Also, studies investigating flipped language classrooms require a more technologically integrated framework that can combine FCA with the traditional FL/L2-related learning and acquisition theories.

To date, there are seven review studies regarding FCA (Table 1) on *Web of Science* (WoS). They either focused on the integration of FCA in higher education (e.g. Brewer & Movahedazarhouli, 2018; Lundin, Rensfeldt, Hillman, Lantz-Andersson, & Peterson, 2018; O'Flaherty & Phillips, 2015) or conducted a domain-specific synthesis, such as in engineering education (Karabulut-Ilgu, Cherrez, & Jahren, 2018) and medical courses (Lin & Hwang, 2019). These reviews have generated comparable findings concerning the trends and development of FCA. They acknowledge that (1) FCA has been gaining popularity since the early 2010s and growing fast (Karabulut-Ilgu et al., 2018; Lin & Hwang, 2019); (2) FCA is mostly implemented in higher education (Lundin et al., 2018) due to college students' higher self-regulation competence; (3) FCA mostly enhances academic performance and student/teacher satisfaction (Akçayır & Akçayır, 2018; O'Flaherty & Phillips, 2015; Zainuddin & Halili, 2016).

Despite the advantages, the review studies have unveiled numerous drawbacks and challenges of FCA. First, as a pedagogical approach, its theoretical foundations seem to be anecdotal rather than systematic (Lundin et al., 2018). The arbitrary use of learning theories or instructional design with educational technology has raised much confusion and concern among educational practitioners and theorists. Second, even though learner preparedness for pre-class activities is a key condition for the success of FCA, some review studies found that some flipped courses were implemented with a low level of learner preparedness (Akçayır &

**Table 1.** Existing review studies on FCA.

Author(s)	Title	Journal	Year
O'Flaherty & Phillips	The use of flipped classrooms in higher education: A scoping review	<i>Internet and Higher Education</i>	2015
Zainuddin & Halili	Flipped classroom research and trends from different fields of study	<i>International Review of Research in Open and Distributed Learning</i>	2016
Akçayır & Akçayır	The flipped classroom: A review of its advantages and challenges	<i>Computers &amp; Education</i>	2018
H. C. Lin & Hwang	Research trends of flipped classroom studies for medical courses: A review of journal publications from 2008 to 2017 based on the technology enhanced learning model	<i>Interactive Learning Environments</i>	2018
Brewer & Movahedazarhouli	Successful stories and conflicts: A literature review on the effectiveness of flipped learning in higher education	<i>Journal of Computer Assisted Learning</i>	2018
Karabulut-Ilgu et al.	A systematic review of research on the flipped learning method in engineering education	<i>British Journal of Educational Technology</i>	2018
Lundin et al.	Higher education dominance and siloed knowledge: A systematic review of flipped classroom research	<i>International Journal of Educational Technology in Higher Education</i>	2018

Akçayır, 2018; Lin & Hwang, 2019). Furthermore, Lin and Hwang (2019) reported that most studies focused on basic knowledge and skills training, and teachers had difficulties in developing students' higher order thinking skills. Theoretically, FCA is conceptualized mainly on a knowledge transmission paradigm (Bergmann & Sams, 2012) in which teachers flip out the basic content knowledge according to Bloom's taxonomy (Anderson & Krathwohl, 2001). Accordingly, content knowledge is broken down into pieces and delivered with excessive focus on examination-oriented learning. FCA as such contradicts its purpose of promoting higher order in-class learning. Lastly, O'Flaherty and Phillips (2015) pointed out the paucity of conclusive evidence that FCA could contribute to building lifelong learning and other 21st century skills, which are important aims of technology-based learning.

Five of the seven reviews were published in 2018. They seem to converge in pointing out that the development of FCA has arrived at a critical point where there is a need to further problematize and theorize FCA. However, none of the existing reviews put forward any theoretical framework that could guide pedagogical design (Karabulut-Ilgu et al., 2018), or focused on language education. Grounded upon the aforementioned gaps, the present review takes language education as a specific field of FCA, analyzes the emerging trends and issues, and provides a comprehensive framework specifically for flipped language classrooms.

### 3. Methodology

By definition, scoping reviews aim to ‘map rapidly the key concepts underpinning a research area and the main sources and types of evidence available and can be undertaken as standalone projects in their own right, especially where an area is complex or has not been reviewed comprehensively before’ (Mays, Roberts, & Popay, 2001, p. 194). The present study follows the five-step framework advanced by Arksey and O’Malley (2005): (1) identifying the research question(s) of the review; (2) searching for relevant studies through designated databases or other sources; (3) selecting the studies that are relevant to the question(s) by specifying the searching scale and search formula; (4) charting the data, that is, tabulating and illustrating the information on and from the relevant studies; and (5) collating, summarizing, and reporting the results and conclusions. Clearly, scoping reviews share some characteristics of systematic reviews in the way of attempting to be systematic, transparent, and replicable (Grant & Booth, 2009). Nonetheless, unlike systematic reviews, a scoping review tends to address much broader topics where many different study designs might be applicable, and it is less likely to address specific research questions (Arksey & O’Malley, 2005).

#### 3.1. Formulation of the scoping review research questions

The present study aims at describing the overall features/trend of flipped language education research, mapping the related key concepts, examining how technologies and language learning/acquisition theories, models or strategies are integrated into the flipped instructional design and implementation. Hence, four research questions (RQs) are formulated as follows:

RQ 1: What are the overall features of research in flipped language education in terms of timespan, setting, methodology, unit of analysis, and sample?

RQ 2: What are the research foci in flipped language education?

RQ 3: What is the role of technology in flipped language education?

RQ 4: How do studies integrate theories, models, or strategies of language teaching and learning into flipped language education?

Clearly, ‘flipped/inverted classroom’ and ‘language education’ are two key phrases in every RQ, and thus the database search queries were created to cover those keywords in each retrieval.

#### 3.2. Literature selection

As was argued by Duman, Orhon, and Gedik (2015), the studies published in Social Sciences Citation Index (SSCI) journals are thoroughly and rigorously peer-reviewed based on stringent academic criteria, which

**Table 2.** Retrieval formulae in Boolean expressions.

No.	Retrieval formula	Result
1	(TS = [language OR language learning OR language teaching OR language education OR English]) AND (TS = [flip* OR invert*])	297 entries
2	(TS = [language OR language learning OR language teaching OR language education OR listening OR reading OR writing OR speaking]) AND (TS = [flip* OR invert*])	556 entries
3	(TS = [language OR English]) AND (TS = [flip* OR invert*])	297 entries

often results in achieving higher impacts in the field. However, it should be noted that some well-established and influential but non-SSCI journals (e.g. CALICO) are systematically excluded in the present review. Moreover, using SSCI journals also excludes books, especially edited volumes, which have also been demonstrably influential in the field of computer-assisted language learning. This limitation is further addressed in the limitation section below. Our literature selection was conducted by searching for SSCI articles on WoS. The retrieval formulae were written in Boolean expressions (see Table 2) under the mode of advanced search. To ensure a broader retrieval coverage, ‘TS’ (i.e. topic, which includes ‘abstract’ and ‘keywords’ in addition to ‘title’) was used in the search queries; time span was set open, and the output was restricted to journal articles indexed by SSCI and published in English.

Three attempts were made to target the relevant studies (Table 2). ‘Language’ and related expressions (i.e. ‘language learning’, ‘language teaching’ and ‘language education’) were added with an ‘OR’ relationship and then formed an intersection with FCA studies (‘flip\*’ and ‘invert\*’, where the asterisk is a wildcard character that covers all related phrases beginning with ‘flip’ or ‘invert’, such as ‘flipped classroom’ or ‘inverting’). Moreover, in case there were studies that only used ‘English’ instead of ‘language’ in their titles or abstracts, we intentionally added ‘English’ to the search query. The retrieval was executed on 21 February 2019 and generated 297 entries. A second attempt was then made to enlarge the coverage using more language related terms (e.g. ‘speaking’ and ‘listening’) and 556 entries were retrieved. However, when manually comparing the output, it was found that none of the extra 259 articles was counted as the valid target literature within the scope. A third attempt was made to simplify the first retrieval formula (by keeping only ‘language’ and removing the other related expressions). The retrieval output was the identical 297 entries, so the formula was determined, and thus the output was finalized.

### 3.3. Inclusion and exclusion criteria

After three attempts to target the relevant studies, 297 articles were identified and numbered from 1 to 297, and were referred to by their numbers in parentheses hereinafter. A scrutiny of the abstracts excluded 262 of the

**Table 3.** Inclusion and exclusion criteria.

Criteria	Studies included	Studies excluded
Language	in English	in non-English
Document type	journal articles	non-articles (e.g. proceedings, book reviews, reports, etc.)
Index	indexed by SSCI only	non SSCI-indexed articles
Study content	FCA in language education at all levels	studies that either do not apply FCA or do not focus on (foreign) language education
Timespan	up to 31 December 2018	1 January 2019 and later

articles because they neither applied FCA nor focused on (foreign) language education (see Table 3 for specific inclusion and exclusion criteria), leaving 35 articles for further review. With that, another two articles were excluded because FCA was only mentioned as an implication for future research. Ultimately, 33 articles remained and constituted the final target literature (see Appendix). A flow chart (Figure 1) illustrates the whole process of the literature retrieval as well as the inclusion and exclusion procedures.

### 3.4. Data charting

The majority of these primary studies employed an evidence-based quantitative design, such as an experimental (e.g. 92, 96, 194), a quasi-experimental (e.g. 10, 49, 134), or a correlational approach (e.g. 16, 165, 205), and we extracted the key parameters of the studies and formed an initial coding scheme. According to Arksey and O'Malley (2005), the process is not linear but iterative, meaning the framework is prone to change whenever deemed necessary. In the present study, the first seven articles (21.2%) were coded by two of the co-authors repeatedly until a stable scheme emerged. The data chart (Table 4) comprised a mixture of general information (category) of each study and specific information (coding parameters).

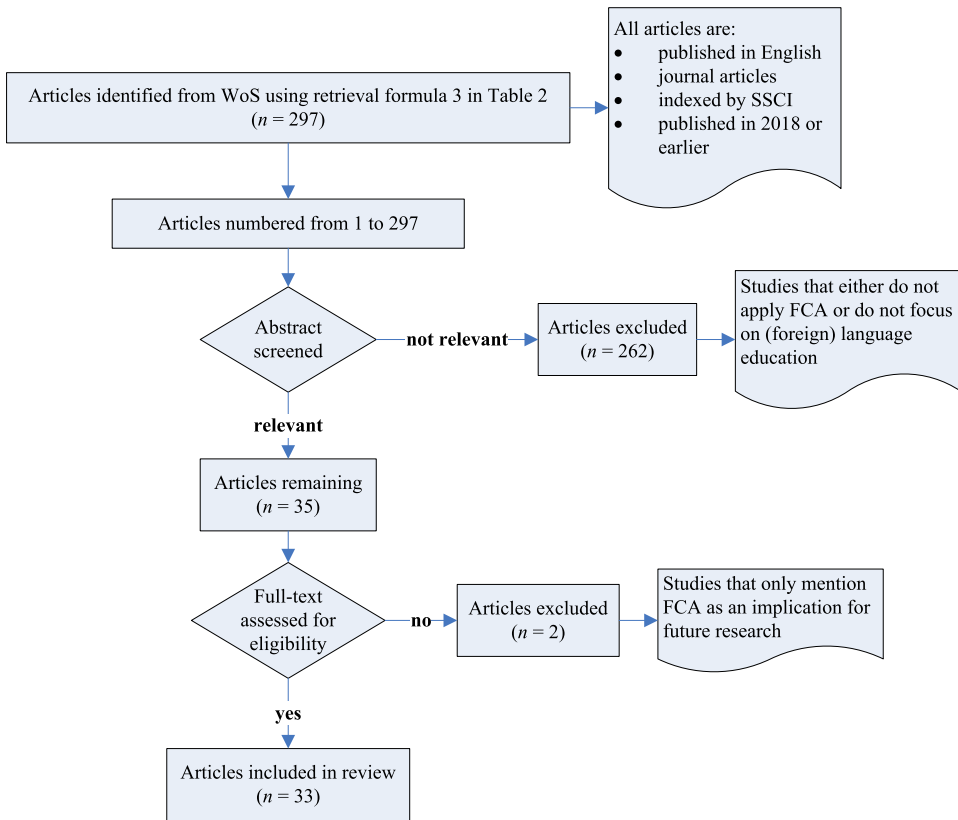
## 4. Results

The four research questions were answered in this section, respectively. We first summarized the overall trend and features of the studies. Then, we examined the research foci and the role of technology in each study. Finally, we investigated how language learning and teaching theories, models or strategies were incorporated as the foundation of the course design in flipped language classrooms.

### 4.1. What are the overall features of research in flipped language education in terms of timespan, setting, methodology, unit of analysis, and sample?

Descriptive statistics show that the timespan of the articles published in flipped language education is relatively narrow. Even though the





**Figure 1.** Flow diagram for article selection.

pedagogical implementation of FCA has been for more than a decade, its integration in language education has just commenced around 2015 with only two articles published in SSCI journals. We have witnessed a consistent upsurge of this number after the year 2015, from 7 in 2016 to 11 in 2017, and in 2018, this number increased to 13. [Figure 2](#) reveals that studies investigating flipped language education were mostly conducted in non-English speaking countries or regions, especially in Asia. Therefore, English as a foreign language (EFL) courses (3, 4, 5, 10, 12, 14, 18, 23, 27, 31, 49, 92, 165, 171, 184, 186, 194) constitute the body of flipped language education. Only a small number of studies (6, 11, 13, 96, 134) research into programs teaching English for specific purposes and other FL/L2, such as Chinese (1, 37, 205, 226), Spanish (16, 45), French (237), Japanese (15), and Korean (19). Comparatively, the amount of studies on flipped courses of English as a first language (L1) and English and language arts (ELA) are even more limited (64, 148).

The present study categorized the 33 studies into two broad sub-sets, namely empirical (31 articles) and non-empirical studies (2 articles). Empirical studies were further divided into studies conducted from

**Table 4.** Coding scheme of the scoping study.

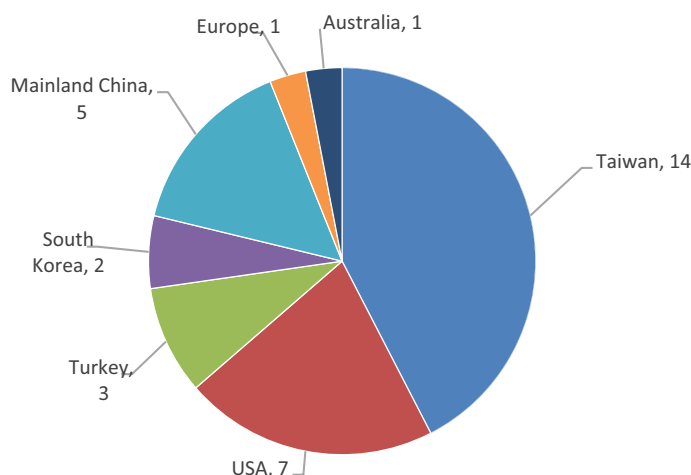
Category	Coding parameter
General info	paper ID, author(s), origin, study in, year, title, journal, topic
Literature review	flipped classroom definition, variables reviewed, technology reviewed, research gap(s) identified
Course description	theoretical framework, duration, language/course taught, off-task(s) before class, in-class activities
Research design	approach, research question(s), research method(s), treatment group manipulation, control group manipulation, dependent variables (DVs), independent variables (IVs), data collection method(s), learner preparedness assessment, participant(s), sample size, consent form, instrument(s), instrument validation, statistical technique(s)
Results and conclusions	statistical findings and reported/observed change(s)
Limitations	limitations identified by the author(s), limitations identified by the present study
Remarks	essential comment on the study reviewed

learners' (30 articles) and teachers' perspectives (1 article). Clearly, the majority of the studies reviewed were empirical ones conducted from the learners' perspective (90.9%). Furthermore, 26 studies (78.8%) were carried out among undergraduates, 3 in secondary schools (i.e. 18, 92, and 205), and only 1 among postgraduates, which disclosed an evident bias toward undergraduate students.

Since most of the studies employed a quantitative design, sample size is another key feature due to its influence on effect size. When samples are not sufficiently large, the effect size may be overestimated, causing researchers and language education practitioners to overly emphasize the independent variables (Cheung & Slavin, 2016). Six reviewed articles (i.e. 3, 10, 11, 14, 92, 134) reported the effect sizes estimated by Cohen's  $d$  and/or  $\eta^2$  in their interventions, most of which reported large effect sizes, except for one (92) reporting small and medium values. Table 5 shows that 36.3% of the studies are small-sized studies (sample size  $\leq 50$ ) which generated a very large effect size of Cohen's  $d$  without an exception. Small-sized studies may yield twice to three times an effect size as those with a sample size of more than 200 participants (Slavin & Smith, 2009), which could lead to an overemphasis on the effect of the independent variables by language teachers and researchers.

#### **4.2. What are the research foci in flipped language education?**

The present study extracted variables (independent, dependent, and covariate variables) from all research questions formulated by all the empirical studies, and visualized a network. Gephi (0.9.2) was employed to conduct the network analysis and generated a brief output (Figure 3). Each node denotes a variable/concept, the size of which represents its centrality in the network. Recurring variables across different research questions were calculated as weighted nodes (the weight is denoted by node/font size), meaning that each time a given node recurred, its weight



**Figure 2.** Number of journal articles published by region.

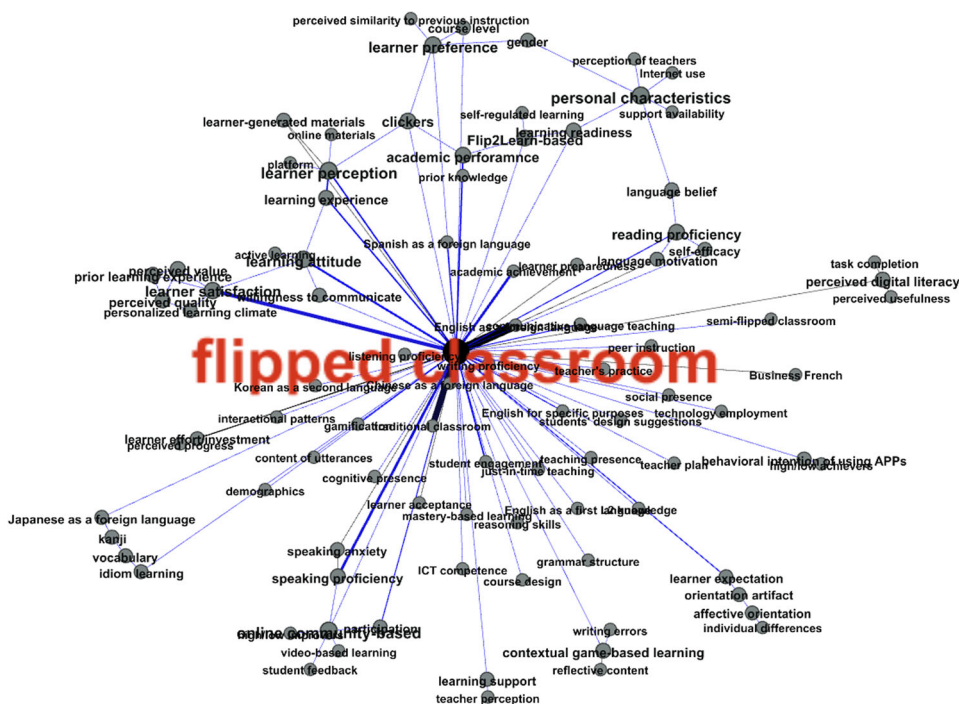
was increased by one unit. The layout algorithm was Force Atlas 2 which can easily identify communities of nodes. Overall, the output shows that most of the sub-nodes and end-nodes are similarly small. One single largest node of highest centrality is ‘flipped classroom (approach)’, because it is the most important independent variable. A group of sub-nodes, such as ‘personal characteristics’, ‘learner preference’, ‘learner perception’, ‘learning attitude’, ‘learner satisfaction’, ‘online community-based’ as well as ‘Flip2learn-based’ are considered as second layer nodes, through which other sub- and end-nodes are connected to ‘flipped classroom’. These second layer nodes connect FCA with a wider circle of related variables/concepts. Besides, a larger proportion of end-nodes are directly linked with ‘flipped classroom’, indicating that most of the studies investigated the direct relationships with FCA. Studies examining more complex relationships (e.g. mediating and/or moderating effects) are yet to be conducted in flipped language education.

The edges between the nodes represent the ties between the variables/concepts. The weight of each edge denotes the strength of the between-node relationship. The edge weight was calculated in the same fashion as the node weight, meaning that each time a given between-node connection recurred, its corresponding weight was increased by one unit. According to the findings in RQ 1, the edges of the greatest weight are FCA implemented in EFL settings (denoted by the edge between ‘flipped classroom’ and ‘EFL’, weight = 17) and comparative studies between flipped and traditional classrooms (denoted by the edge between ‘flipped classroom’ and ‘traditional classroom’, weight = 12). Some other variables/concepts having relatively close ties with FCA ( $3 \leq \text{weight} \leq 7$ ) include: ‘learner satisfaction’, ‘academic achievement/performance’,

**Table 5.** Descriptive statistics of sample size ( $n$ ) and effect size.

Sample size range	$n \leq 30$	$30 < n \leq 50$	$50 < n \leq 100$	$100 < n \leq 200$	$n > 200$
No. of studies (percentage)	1 (3.0%)	11 (33.3%)	12 (36.4%)	3 (9.1%)	3 (9.1%)
Effect size of $\eta^2$ (range)	–	–	Small to large (0.05–0.43)	–	–
Effect size of Cohen's $d$ (range)	–	Large (0.857–1.967)	Small to large (0.49–0.83)	–	–

Notes: Effect sizes of  $\eta^2$ : small = 0.0099, medium = 0.0588, large = 0.1379; Cohen's d: small = 0.2, medium = 0.5, large = 0.8 (Cohen, 1988). '—' indicates no studies in the cell reported effect size.



**Figure 3.** Network analysis output of the variables in flipped language education. Each node denotes a variable/concept examined in flipped language education and the size of the node represents its centrality in the network. The edges between nodes represent the ties between the variables/concepts, and the weight of each edge denotes the strength of the between-node relationship.

‘learning attitude’, ‘student engagement’, ‘learning experience’, ‘learner perception’, ‘writing proficiency’, ‘speaking proficiency’, ‘Chinese as a foreign language’, etc. Compared with other edges (weight  $\leq 2$ ), more studies examined the relationships between those variables and FCA, implying possible research gaps regarding other under-researched ties in this field. These findings are generally consistent with other review studies (Akçayır & Akçayır, 2018; Karabulut-İlgu et al., 2018; Lin & Hwang, 2019).

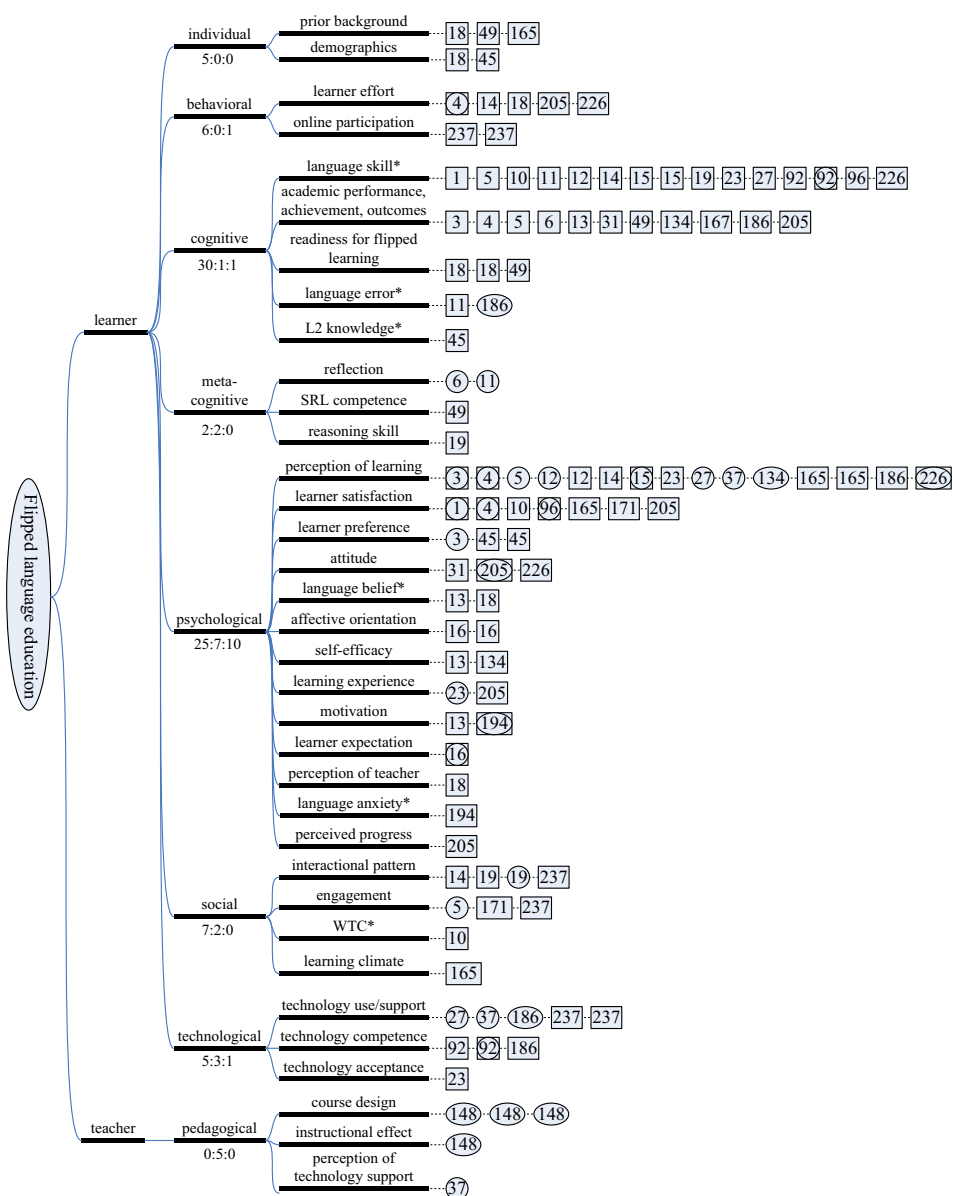
Furthermore, by open coding of each research question/hypothesis in each study, eight categories (individual, behavioral, cognitive,

metacognitive, affective, social, technological, and pedagogical) under two perspectives (learners and teachers) were established to elaborate different research foci in this field (Figure 4). For further clarity, Table 6 provides brief explanations of each corresponding sub-category/sub-variable in Figure 4. The coding process was conducted by two of the co-authors of the present work and the inter-coder reliability was estimated via Krippendorff's  $\alpha$  (Hayes & Krippendorff, 2007). With a macro (i.e. KALPHA) implemented in SPSS, the Krippendorff's  $\alpha$  was ideally acceptable ( $\alpha = 0.8263$ ), indicating the two coders agreed with each other to a great degree on coding each item.

Under each sub-category are studies that formulated research questions concerning the corresponding variables. The duplicate numbers under one sub-category (e.g. two 92s under 'language skill') indicate that within one single study two research questions were articulated to investigate the same variable. Clearly, the most researched dimensions in flipped language education are 'cognitive' and 'psychological' because most of the studies fall under these two categories. In contrast, studies concerning the other dimensions are comparatively under-researched. For example, few studies examined the variables under 'metacognitive' and 'social' dimensions. This disproportionate divide may reflect an outcome-oriented tradition in conducting classroom-based research. In other words, most studies tend to show the effectiveness of FCA in terms of cognitive and affective variables (e.g. 1, 3, 4, 10, 23).

Meanwhile, the research methods of the studies were categorized into quantitative, qualitative, and mixed methods. The frequencies were calculated, respectively, in terms of a ratio under each category. For instance, the frequency ratio under the 'cognitive' dimension is 30:1:1, meaning under this category, 30 research questions were answered with quantitative techniques, and the other two answered with qualitative and mixed-method techniques, respectively. Methodologically, 70.8% of the research questions (denoted by squares in Figure 4) were answered with quantitative techniques while 17.7% were answered with qualitative techniques (denoted by circles), and 11.5% used mixed methods (denoted by square-circles). A further calculation revealed that 93.8% of the research questions under the 'cognitive' category and 59.5% of those under the 'psychological' category were purely answered statistically, which echoed the outcome-oriented trend concerning summative assessment on FCA effectiveness.

Compared with the dominance of quantitative research, the lack of qualitative studies in flipped language education is obvious. There was one sole qualitative study (i.e. 148), and the other qualitative queries were mostly embedded into 'QUANTITATIVE + qualitative' studies (i.e. mixed method studies with a focus on their quantitative investigation



**Figure 4.** Research foci and research methods in flipped language education. Each RQ examining a given sub-variable is denoted by its study number enclosed by a square, circle or square-circle, which represent a quantitative, qualitative, and mixed method in answering the research question, respectively. The frequency ratio of the three research methods is calculated and shown below each category. The sub-categories with asterisks are variables normally confined to language education and those without are variables also in non-language FCA settings. SLR=self-regulated learning, WTC=willingness to communicate.

rather than qualitative interpretation). The themes those qualitative RQs explored from learners' perspective mainly included learners' reflection on and perception of FCA, their learning satisfaction, experience and

**Table 6.** Description of sub-variables in Figure 5.

Category	Sub-category	Description
Learner: individual	Prior background	Learners' prior knowledge or experience, for example, prior learning experience
	Demographics	Demographic variables such as gender, ethnicity, group membership
Learner: behavioral	Learner effort	Time/effort spent on flipped learning, such as estimated time in minutes, number of times students watch related videos and self-reported completion rates of assignment
	Online participation	Students online learning behavior measured by learning management system (LMS)
Learner: cognitive	Language skill*	Language skills assessed in terms of speaking, reading, writing and listening, such as a placement test (Post-intervention) achievement test scores, such as an end-of-semester test
	Academic performance, achievement, outcomes	Learners' being capable of or accustomed to taking responsibility for their learning
	Readiness for flipped learning	Errors concerning language use, for example, error condition, error percentage
	Language error*	Learners' L2 knowledge in terms of metalinguistic, explicit and production knowledge
Learner: metacognitive	L2 knowledge*	
	Reflection	Students' reflections on their flipped learning experience
	Self-regulated learning competence	Students' awareness of their knowledge and control of their own cognition.
Learner: psychological	Reasoning skill	Reasoning skills in terms of elementary clarification, in-depth clarification, inference, judgment, and application of strategies
	Perception of learning	Learners' perception of flipped learning experience
	Learner satisfaction	Learners' satisfaction of FCA
	Learner preference	Learners' preference for flipped classroom or traditional classroom
	Attitude	Students' attitude towards FCA
	Language belief*	Students' belief about language learning
	Affective orientation	Learners' affective responses to FCA
	Self-efficacy	Learners' self-efficacy for flipped language learning
	Learning experience	Learners' experiences of FCA
	Motivation	Motivation towards flipped language learning, such as integrative motivation, instrumental motivation.
	Learner expectation	Students' expectations regarding aspects that are reimagined in flipped classrooms
	Perception of teacher	Students' perceptions of their language teachers, such as teacher competency and teacher appearance
Learner: social	Language anxiety*	Students' anxiety in using the target language
	Perceived progress	Students' perceptions of improvement in language skills such as speaking and writing
Learner: technological	Interactional pattern	Students' interactional patterns in class, such as classroom discussion
	Engagement	Students' engagement in flipped learning
	Willingness to communicate*	Predisposition to interact with members of the learning community in the flipped classroom
Learner: technological	Learning climate	Personalized learning climate regarding FCA
	Technology use/support	Learners' use of or support by technology for flipped learning
	Technology competence	Students' competence in using ICT for flipped learning
Teacher: pedagogical	Technology acceptance	Learners' perceptions on technology use for flipped learning
	Course design	Teachers' instructional design and planning, such as which content to flip out of class, which technology tools to use
	Instructional effect	Effects of implementing FCA on teachers' future practices in teaching
Teacher: pedagogical	Perception of technology support	Teachers' perception of providing technology support for flipped learning, such as perceived challenges

*Note:* The sub-categories with asterisks are variables normally confined to language education and those without are variables also in non-language FCA settings.



perception of technology use/support concerning FCA (see [Figure 4](#) for specific studies under each theme). A closer look at those qualitative findings revealed that most of them were employed to triangulate quantitative results (e.g. 1, 3, 4, 96, 194), and/or to explain quantitative findings (e.g. 3, 5, 6, 15, 134). Moreover, there are also some qualitative RQs (e.g. 23, 27) that were loosely connected to quantitative RQs. Nonetheless, the ‘qualitative’ parts in most mixed-method studies generally complemented their corresponding ‘QUANTITATIVE’ parts rather than contradicted them.

### ***4.3. What is the role of technology in flipped language education?***

We noticed that technology was mainly integrated in pre-class activities, while the in-class activities primarily involved technology-free face-to-face interactions (see [Table 7](#)). To be specific, the technology harnessed in the pre-class activities was twofold: one was for facilitating self-learning at the ‘remembering’ and ‘understanding’ levels of the Bloom’s taxonomy (Anderson & Krathwohl, 2001; Jong, 2019), and the other was for evaluating students’ mastery of the basic content as preparation for class. We found that 22 out of the 31 empirical studies reviewed (71.0%) explicitly reported uses of online video clips for content delivery, which aimed to facilitate students’ remembering- and understanding-oriented study. For example, in a Japanese kanji program (15), a set of introductory videos were created to deliver the content, providing basic information about new kanji characters and words (e.g. their meanings, pronunciations, stroke order and etymological stories). The instructional objectives of these videos are helping students remember and understand the lecture content. In another English program example (12), the participants were required to preview the video clips on useful English idioms and to read texts covered in the paper-based book. After they mastered the basic content in the videos, they then completed their personal story writing task in English in a collaborative manner.

Several studies (e.g. 1, 3, 10, 12, 14, 27, 226) incorporated a preparedness-checking mechanism for teachers and/or peers to provide feedback on how well learners were prepared. The implementation of such mechanism differed from context to context but mostly resorted to diverse educational technologies, such as clickers, LMS, online forum, etc. Over 60% of the studies reported numerous ways to assess students’ preparedness, among which various online quizzes and/or clickers (e.g. Quizlet, Kahoot!) were most commonly adopted (e.g. 1, 3, 4, 19, 37, 45, 49, 134, 226). More diverse uses reported included computer-based story/dialog



**Table 7.** Pre-class and in-class learning activities.

	Pre-class activities	In-class activities
Technology-enhanced	Online video (vodcast, YouTube, TED-Ed), online quiz/exercise, online forum, LMS (Moodle, Iknow, blackboard), social media apps (WeChat, LINE, WhatsApp, Facebook), WebQuest-based inquiry, commenting others, producing guided dialogs, group discussion	Q&A with clickers (e.g. Kahoot!), digital games, presentation
Technology-free	Worksheets, course materials reading, storytelling	Drills, problem-solving, pair/group/whole-class discussion, pair/group work, role play, worksheet/idea sharing, reciprocal questioning, quiz, peer assessment, interactive feedback, storytelling

writing (12, 27, 96), responding to and commenting on the pre-recorded lecture videos (14), and giving feedback to peers (27).

Unlike the relatively technology-rich pre-class tasks, the bulk of in-class activities typically develop students' higher order skills, such as pair work, role play, peer assessment, etc. Nonetheless, some cutting-edge technologies, such as virtual reality (VR) and speech recognition, that are deemed helpful for establishing an immersive environment (Lin & Lan, 2015) are under-leveraged in flipped language classrooms.

**4.4. How do studies integrate theories, models or strategies of language teaching and learning into flipped language education?**

According to the findings in RQ 1, an overwhelming majority of the studies (93.9%) applied FCA in FL/L2 settings. Since the theories, models or strategies of L1 development and FL/L2 acquisition apply quite differently, the fourth research question is set in FL/L2 contexts, excluding two studies (64, 148) in L1 contexts.

It was found that one third of the studies (e.g. 5, 6, 15, 19, 186) did not report teaching or learning theories, models or strategies underpinning their flipped courses or any instructional approach the course teachers employed. The remaining studies that clearly articulated the theoretical foundation of their instructional design mainly fell into three categories shown in Table 8.

The first category involved courses directly applying the F-L-I-P™ model (Flipped Learning Network, 2014) or the revised FLIPPED model (Chen, Wang, & Chen, 2014) in their course design. The F-L-I-P™ model is one of the earliest attempts to identify how many dimensions

**Table 8.** Instructional theories, models and strategies in the implementation of flipped FL/L2 courses.

Category	Instructional design foundation
Flipped teaching & learning	FLIP model (10, 23, 27, 31); FLIPPED model (12, 237)
General teaching & learning	socio-cultural theory (1, 45); gamified/game-based learning (3, 11, 194); active learning theory (4, 226); mastery-based learning (37); self-regulated learning (49); experiential learning theory (165); concept-based instruction (16); cooperative learning (171)
FL/L2-specific teaching & learning	communicative language teaching theory (205)

should be considered in implementing FCA and what the relationships should be among the different dimensions (Chen et al., 2014). By specifying the four pillars of the F-L-I-P<sup>TM</sup> model, four components are defined that engage students in a flipped setting, namely *Flexible environment*, *Learning culture*, *Intentional content*, and *Professional educators*. For example, in a study investigating idioms learning in a flipped EFL classroom, Chen Hsieh, Wu, and Marek (2017) explicitly reported that in their study, the *flexible environment* referred to the online learning community and offline classroom instruction and the *learning culture* was established through a learner-centered approach. With respect to the *intentional content*, the course involved teacher-made video clips, and the researchers of the study were the *professional educators* who ‘observed student progress, provided online and in-person feedback, and assessed the students’ performance’ in a continual manner (Chen Hsieh et al., 2017, p. 2). The integration of such an underpinning framework into a flipped course design reveals that the F-L-I-P<sup>TM</sup> model is quite general and non-discipline based. Therefore in practice, to integrate this framework into a FL/L2 classroom may be quite confusing, as it features no specific element of a language classroom.

Apart from its non-disciplinary basis, the F-L-I-P<sup>TM</sup> model per se is not sufficient for higher education as ‘college students often use advanced technology to complete homework assignments and projects’ (Chen et al., 2014, p. 18). The F-L-I-P<sup>TM</sup> model (1) tends to be more focused on content planning (what to teach) than on activity delivery (how to teach), (2) privileges teachers’ perspective but ignores learners’ perspective, and (3) lacks specifications about individual learning space and learning platforms. In response, a revised FLIPPED model was proposed (Chen et al., 2014) to fill the gaps aforesaid by appending another three components, namely *Progressive networking activities*, *Engaging and effective learning experiences*, and *Diversified and seamless learning platforms*. For example, in a flipped EFL classroom (12), the instructional design involved LINE (a mobile application for instant communications on

electronic devices) to establish an online learning community, which acted as a *diversified and seamless learning platform*. The online learning community provided *progressive networking activities* in which ‘students acquired knowledge, interacted, and collaborated with their partners’ (Wu, Chen Hseih, & Yang, 2017, p. 143). The course teacher in that study not only possessed good instructional skills but also considered the proper combinations of structure, dialog and learner autonomy, which provided *engaging and effective learning experiences*. However, what the two models have in common is that they are both non-discipline based. They do not take into account the differences and characteristics of different academic subjects and may thus raise teachers’ practical concern. For example, a flipped foreign language classroom may differ substantially from a flipped science classroom in terms of providing engaging experience for students. Therefore, it is essential to establish a model for flipped FL/L2 classrooms.

The second category consisted of courses designed based on an assortment of non-flipped, non-discipline based instructional theories, models or strategies, which were not only applicable to traditional language classrooms. Language teachers creatively adopted those theories, models, and strategies as underpinnings of their instructional design, gaining new understanding of FCA in language classrooms. Nonetheless, most of the flipped courses only described very briefly how those theories, models and strategies were connected with the instructional design of the flipped FL/L2 courses. They barely detailed any design of the in-class learning activities. In other words, little was known about how the connections were made between the instructional design and the pedagogical implementation, or how a given teaching or learning theory, model or strategy was integrated into their instructional design. For instance, one study (165) claimed that experiential learning theory guided its course implementation; however, only a vague course description was provided to set up an experiential learning atmosphere, making theory and practice loosely connected. By contrast, domain-specific FL/L2 teaching and learning theories, models or strategies were barely reported to have been incorporated into course design, which to a great degree, overlooked the uniqueness of FL/L2 classrooms.

Only one study (205) fell into the third category that integrated tangible FL/L2-specific instructional approach (i.e. communicative language teaching approaches) to design their courses. In this case of a flipped Chinese classroom, the course was designed based on six specific principles of communicative language teaching approaches with respect to curriculum implementation, learner-centered teaching, comprehensible input for instruction, culture in the target language, material appropriateness, and performance-based assessment. In compliance with these

principles, technological tools (e.g. Zaption for delivering pre-class interactive videos, Quizlet for online quizzes, WizIQ for in-class activities, and Flipgrid for after-class assignments, etc.) were selected for facilitating high levels of learner–learner and learner–instructor interaction. However, this case was a 12-day fully-online program. A typical flipped classroom is usually composed of out-of-class self-learning and in-class learning activities in a regular classroom. It may cause some debate over whether a fully online program can be considered as a flipped classroom as there is no face-to-face interaction. As evident, in a flipped FL/L2 classroom, the repurposing of the valuable in-class time for higher order activities is supposed to elicit authentic language use in students via face-to-face activities, and due to the space restrictions, an online flipped mode may not be as effective as a regular classroom in facilitating peer interaction and interaction between the students and the course teacher. Moreover, since the program lasted for only 12 days, the integration of communicative language teaching and the flipped mode may take much more time to see its effectiveness.

## 5. Discussion

Apart from the overall features of this research field depicted in RQ 1, the most notable findings of the current review were some research niches identified in flipped language education, including (a) the dominance of quantitative studies in the literature that emphasized the outcome of FCA in language education (RQ 2), (b) an evident paucity of studies conducted from teachers' perspective (RQ 2), (c) limited integration of technology that led to inadequate learner preparedness (RQ 3), and (d) a lack of an FCA model that highlighted the uniqueness of FL/L2 education and guided its flipped classroom implementation (RQ 4).

### 5.1. Outcome-oriented research trend

RQ 2 revealed a salient paradigm of the existing studies in flipped language education, that is most of them are outcome-oriented. This could be evidently justified by the massive proportion of the quantitative approaches adopted in all reviewed studies. Overall, 82.3% of the research questions were answered entirely or partially with quantitative techniques. This dominating research design leads to a trend that over-emphasizes the outcome without much research attention to the process. On a class level, many studies have gained the evidence of the increased effectiveness of FCA in language classrooms. Yet, on an individual level, how a single learner reacts to a certain experimental stimulus is beyond

quantitative modeling, and the reasons can be far more complicated than what a post-intervention test or survey can reveal. Therefore, more process-oriented qualitative studies should be performed to answer questions such as how a learner perceives FCA in facilitating his or her language development, and why the perception can make a difference on his or her learning behavior.

The outcome-oriented trend entails a bias toward quantitative research methods. Even though researchers and practitioners have started to adopt more mixed method designs (e.g. 4, 11, 186), the qualitative queries in some mixed-method studies were found to be conveniently designed only to complement the quantitative findings. Some ‘QUANTITATIVE + qualitative’ studies (e.g. 12, 14, 27, 226) gained quantitative evidence that FCA enhanced learners’ oral proficiency, and then interviewed students to elicit reasons why FCA worked effectively. However, with only one-sided interpretation, the studies may overlook the findings of the negative effects of FCA and underexplore why FCA did not work on other students. Therefore, the qualitative findings will be less significant and comprehensive. Clearly, studies following ‘QUANTITATIVE + qualitative’ mixed mode do not allow much flexibility in the ‘qualitative’ part, and its coding process may not respond to the unexpected findings that require new avenues in an inductive manner (Marshall & Rossman, 2011). Therefore, the ‘stories’ generated in those studies might be merely pieces of unprocessed facets, and somewhat biased and inconsistent in the meaning-construction process.

### **5.2. Teachers’ perspectives**

RQ 2 also unveiled a palpable lack of research attention to teachers and their teaching practice in flipped language education. Only 5 out of the 31 empirical studies (16.1%) collected data from language teachers, among which only 2 studies (37, 148) interpreted the findings from the teachers’ perspective. One study (i.e. 37) was partially conducted from the teachers’ view and reported four teachers’ challenges in providing learning support for students learning in a flipped classroom. These challenges included (1) ensuring students’ preparedness before class, (2) dealing with the in-class gap between those prepared and those not, (3) developing proper resources for pre-class self-study, and (4) committing extra time to implementing flipped courses (Wang & Qi, 2018). The other study (i.e. 148) was conducted completely from the teachers’ angle with only qualitative data collection and analysis techniques. It examined the changes in the approaches to planning, and use of technology and in-class time in the context of an ELA teacher designing a flipped

learning unit for the first time. Three studies (i.e. 23, 31, 92) merely transcribed the interviews with the language teachers to discuss their findings from learners' perspective, but not delved into how teachers perceived flipped language education.

What should not be misunderstood in flipped classrooms is that teachers' responsibility does not decrease with the use of pre-recorded materials (Filiz & Kurt, 2015). In fact, it increases because of the need to design more higher order in-class tasks and to interact with students face-to-face and online. Since 'the in-class time can be used for conducting higher order learning and teaching activities that cannot be automated' (Jong, 2017, p. 306), the teacher's role in course design is accentuated. To make a flipped course successful, teachers' expertise and professional awareness are vital when determining which content to be delivered out-of-class and which activities to be held in class. This requires a nuanced understanding that the teachers possess and design, and instructional decisions that are dynamic and most possibly iteratively formed over time. In addition, teachers need to provide in-class facilitation, 'making sure that all students are learning what they need when they need it' (Bergmann & Sams, 2012, p. 54). In a word, teacher's expertise is a critical factor of the success of a flipped classroom. For the scale-up and further development, qualitatively researching into this factor is inevitable for the professional development of the teachers who are unfamiliar with FCA.

### ***5.3. Learner preparedness and design for failure<sup>1</sup>***

FCA is susceptible to ineffectiveness when students are not sufficiently prepared prior to class. As pinpointed by Lin and Hwang (2019), many flipped courses were implemented with a low level of learner preparedness, which led to teachers' practical difficulties in developing students' higher order thinking skills. Sharing the same point of view, Wang and Qi (2018, p. 66) believed that 'the greatest challenge' in FCA was 'ensuring students to learn before class'. On the other hand, FCA is also likely to downgrade to a less-structured lecture when there is a cognition gap between two cohorts of learners in the same classroom where some are well prepared and may find the in-class activities not challenging enough while others may not simply self-study the content before class. For those who are not properly prepared, the higher level in-class activities may even frustrate and disengage them from the class. Therefore, teachers should not only deliver pre-class self-learning content and design in-class higher order activities, but they should also design for failure. This does not suggest that teachers want their teaching design to

fail, but that they acknowledge the reality that instructional failures will happen. Designing for failure in a flipped classroom is an instructional design focused on avoiding the possible ineffectiveness caused by students' lack of preparedness with the aid of technology.

RQ 3 found that all flipped language classrooms were well integrated with technology-aided pre-class learning. The technologies were mostly used for either delivering teaching content (e.g. YouTube) or evaluating learner preparedness prior to class (e.g. WebQuest). However, albeit crucial to the success of FCA, it was revealed that educational technology was not fully harnessed to enhance students' preparedness. Apart from some commonly used technologies such as watching YouTube videos and doing online exercise, some other technologies, such as corpus, VR, self-adaptive systems, automatic scoring, speech recognition, etc. should be leveraged more widely to facilitate students' self-study. For example, speech recognition technology (mobile phone applications such as iFlyrec) can be used to help students improve their oral proficiency. When learning pronunciation in the target language or performing oral tasks, students can use the real-time transcriptions provided by the application as a feedback to evaluate whether their speech is 'acceptable' in terms of accuracy. The greatest advantage of such technology is that it can free the language teacher from the heavy, one-to-many, mechanical work of providing feedback for students' drill practice. Rather, students can interact with the application without time and space constraints until their utterances can be recognized with few errors. For another example, interactive VR technology can provide an immersive and interactive environment for users, and thus can be utilized to present culture-related content to students in an intuitive manner. Having a basic understanding of the cultural background information is usually considered an important part in a language classroom, and with such technology, students can have a directly perceived understanding of the culture-related knowledge before class. Consequently, students can benefit more from each other's enhanced level of preparedness in culture knowledge via in-class peer interaction.

Integrating various technologies in the pre-class self-learning can be perceived as a way of design for failure in flipped language classrooms, and by so doing, learners' preparedness and their subsequent in-class task-performance may be further enhanced. Those emerging technologies could lead the direction toward which technology-enhanced language learning might advance. However, the present review found that some emerging technologies have been rarely explored in the current models of flipped language classrooms (see [Table 7](#)). There are opportunities for educators to leverage on more diverse forms of technologies to address



students' diverse language learning needs. Further use depends much on language educators' pedagogical design effort. Hopefully, such effort will elevate the overreliance of multiple-choice quizzes (e.g. WebQuest, Quizlet) that are apparently dominating the scene. The close-ended nature of multiple-choice quizzes may not be sufficient to provide valid measure for assessing students' preparedness. What is worse, with such convenient use of technology, some students might even 'play' these multiple-choice quizzes and did not focus on the learning content.

#### **5.4. Interaction in flipped FL/L2 classrooms**

RQ 4 unveiled that most of the reviewed studies showed researchers designed their courses based on general learning and teaching theories, models or strategies rather than the FL/L2-specific ones (see Table 8), which disclosed a very loose connection between FCA and language education. In response to this discrepancy, we propose a model that features interaction and is particularly applicable to flipped FL/L2 education. Besides, unlike the two aforementioned FCA frameworks (Chen et al., 2014; Flipped Learning Network, 2014), the proposed model also highlights learner preparedness in flipped classrooms.

##### **5.4.1. Duality of 'interaction' in flipped FL/L2 education**

Interaction is one prominent feature that can distinguish flipped FL/L2 education from other flipped courses (e.g. flipped STEM education). As Canale and Swain (1980) put it, the nature of language learning per se is highly interactive. Unlike other subjects or skills, language learning requires extensive exposure to interactions, that is, the authentic use of the target language (Gass, 1997). While students in non-language classrooms do not have to learn how to interact verbally, students in FL/L2 classrooms are more often engaged in interaction in the target language as it is the essential portion of the curricular content. Hence, in an FL/L2 classroom, the meaning of interaction is twofold: (a) interaction with content (students interacting with the curricular content, i.e., the target language) and (b) interaction via content (students interacting with each other via what they have learned, i.e., the target language). Interaction herein does not only function as a medium for 'meaning/form negotiation' (Pica, 1994), but it also makes one crucial part of the FL/L2 course content. Succinctly, in a flipped FL/L2 classroom, students learn how to interact in the target language by interacting in the target language, which distinguishes flipped FL/L2 education from other flipped courses.

The relationship between 'interaction with content' and 'interaction via content' in a flipped FL/L2 class can be drawn as an analogy of 'means



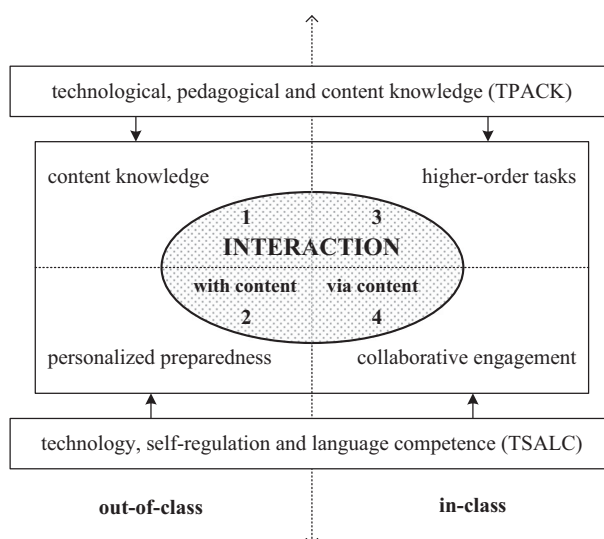
and ends'. The former serves as an indispensable means of achieving the latter, and conversely, the latter can determine how the former is implemented. Socio-cultural constructivist theories maintain that language development occurs as learners use the target language as a means to mediate cognition (Lantolf, 2011; Lantolf & Thorne, 2006). In a flipped FL/L2 classroom, every student's preparedness is individually different, and when 'interaction via content' occurs, their knowledge acquired from the pre-class 'interaction with content' can lead to a unique and dynamic flow of knowledge building at the community/social level. Moreover, through the interactive tasks performed in flipped FL/L2 classrooms, learners can be afforded higher degrees of agency, engaging in activities such as peer-tutoring and debating with one another (Moranski & Kim, 2016).

#### ***5.4.2. An interaction model in flipped FL/L2 education***

To better guide the design and implementation of the flipped FL/L2 courses, the present study proposed an 'interaction model'. As is illustrated in Figure 5, 'interaction' is central to the framework and intersects with four key elements. The duality of 'interaction' in flipped FL/L2 classrooms is illustrated through 'interaction with content' where pre-class content increases learner preparedness before class, and 'interaction via content' where higher order activities elicit students' collaborative engagement in class.

Prior to a flipped FL/L2 session, learners interact with the pre-class content knowledge (e.g. new vocabulary, cultural background information, etc.) through self-learning and assimilate it, establishing connections between the new knowledge and their mental lexicon (denoted by shaded area 1). In this phase, language learners interact with the new content prior to class. When interacting with and evaluated by their teachers and/or peers, learners accommodate the feedback and arrive at new cognitive equilibriums (shaded area 2). In particular, the pre-class self-learning features an outcome of personalized preparedness because (1) students' target language proficiency varies from person to person; (2) each student has their own past experience of FL/L2 learning; and (3) their pre-class learning is self-regulated, self-paced learning aided by different technologies accessible to different individuals.

During the face-to-face meetings in a flipped FL/L2 classroom, language teachers set up various scenarios to engage students in the authentic language use (e.g. role-playing, gamified learning, etc.), and each student will process the tasks based on their respective preparedness gained from pre-class learning. In this phase, language learners interact with the higher order tasks by themselves (shaded area 3). Subsequently,



**Figure 5.** An interaction model in flipped FL/L2 education.

when working in pairs or groups, students are engaged in task-performing or problem-solving activities with their peers in the target language, where ‘interaction via content’ can be triggered on a collaborative basis (shaded area 4). Students’ preparedness from pre-class learning can familiarize them with the content or skills required in accomplishing the higher order tasks, which may promote mutuality. In such a highly collaborative state, they can co-construct new knowledge in the target language (Storch, 2002), which is closely associated with their language development (Moranski & Toth, 2016; Storch, 2002).

In a successful flipped FL/L2 classroom, the skills that a teacher needs to engage students and the competencies that learners need to engage themselves differ from those in a non-flipped setting. The teachers need a set of knowledge and skills with respect to TPACK (technological, pedagogical, and content knowledge, Chai, Koh, & Tsai, 2010, 2013), and as evident, the ‘content’ component in TPACK is ‘language’ due to the FL/L2 context. As illustrated in Figure 5, teachers’ TPACK-related knowledge connects to ‘interaction’ through two entities: the pre-class content knowledge and the in-class higher order tasks. By delivering the pre-class content with TCK- or TPK-related skills, FL/L2 teachers provide a virtual world in which students can interact with the specific content to be learned. Similarly, by designing and implementing higher order language tasks supported with TCK- or TPK-related skills, teachers provide opportunities for students to translate what they have learned into skills to accomplish those tasks. Obviously, the FL/L2 teachers in flipped classrooms should possess adequate expertise in

technological, pedagogical knowledge (TK, PK) apart from being competent in the target language (CK). More importantly, they need to raise their awareness in how to use technology for pre-class content delivery (TPK), and develop target language materials with multimedia technology (TCK), etc. Therefore, the knowledge involved in the TPACK framework may effectively assist language teachers to provide technology-enhanced feedback (e.g. speech recognition applications on smart devices) and guide students to better perform pre-class self-paced study. When language teachers are fully equipped with TPACK-related knowledge/skills, they can be more competent in enhancing the design as well as the implementation of flipped classrooms in a technology-assisted manner.

On the other hand, learners also need to raise their awareness toward and grow competent in a set of counterpart competences pertaining to TSALC (technology, self-regulated learning and language competence). Typically, students from one class vary from person to person in technology competence (TC), self-regulated learning competence (SC) as well as the target language competence (LC). Similar to the way teachers' TPACK is associated with the 'interaction' in the model, students' TSALC-related knowledge also connects to 'interaction' through two entities: the pre-class personalized preparedness and the in-class collaborative engagement. In essence, pre-class learning in a flipped mode is a self-regulated learning aided by technology, and therefore, it can be influenced by many TSALC-related factors, such as the ability to retrieve new information, past experience of language learning, etc. Due to those TSALC-related differences, students' self-learning with the content may result in highly personalized preparedness. When they are engaged in higher order tasks, students collaboratively interact with each other with LC-related skills. Clearly, it is advisable for students in a flipped FL/L2 classroom to foster their TSALC-related competences, such as retrieving language learning-related materials on the Internet (TSC), selecting age-appropriate FL/L2 materials for themselves (SLC). Following Chai et al.'s idea that learners' conceptions of learning 'could provide a check on the effects of teachers' TPACK implementation' (2013, p. 46), we proposed TSALC in this review to guide the future research to focus on the self-regulated learning process in flipped FL/L2 classrooms. Even though more than eighty percent of the studies we reviewed were conducted from the learners' perspective, very few studies explored issues concerning 'flip' learners' self-regulated learning process (e.g. learner preparedness in flipped learning). Most of the studies reviewed merely revolved around students' general or in-class learning while the out-of-class self-regulated learning was under-researched.

## 6. Conclusions and limitations

The present study scoped the discipline of flipped language education based on SSCI journal articles. By answering the four research questions, we arrived at some major conclusions and identified some research gaps, which are (1) flipped language education research started quite recently, and most of the studies concerned the EFL context in Asia; (2) an overwhelming majority of the studies were conducted from the learners' perspective, while teachers' perspective was only adopted in few studies; (3) comparing FCA classrooms with traditional classrooms is a major research focus, and the most commonly examined variables in flipped language education are cognitive and affective variables; (4) quantitative research designs have dominated this research area, and qualitative research methods in most mixed-method studies were used to complement quantitative findings, which undermined the effect of qualitative research methods; (5) technology integrated in flipped language education was mainly for pre-class content delivery and simplistic preparedness checking. To guarantee sufficient learner preparedness, the principle of 'design for failure' was proposed; (6) few studies incorporated FL/L2-specific theories, models or strategies in flipped FL/L2 course design and implementation. In response to this theoretical gap, an 'interaction model' featuring the duality of interaction and learner preparedness was proposed with an emphasis on the uniqueness of FL/L2 education.

With conclusions drawn and research gaps identified, some research limitations have been acknowledged. On the one hand, since the present review is a first attempt to scope this field, the review scope is not set in a wider range of the databases. Rather, we solely focused on SSCI journals. The follow-up reviews can widen the range to cover more databases, such as Scopus, and include more types of articles, such as conference papers to examine whether the conclusions stay consistent in a wider range of studies. On the other hand, the coding scheme in the current study is completely open. Therefore, the coding process was conducted using various variables, from general information to instructional design, from participants to research methodology. Future studies may use for reference some specified theoretical frameworks (e.g. TPACK) such that the coding process can be more specific and robust, and accordingly the findings can pertain to more specific domains in flipped language education.

### Note

1. In systems science and engineering industry (e.g. cloud services), specialists have proposed a critical design principle 'design for failure' in response to today's

increasingly complex distributed systems. It means that engineers and computer scientists anticipate system errors, building software that handles them and is self-healing. It does not suggest people want to fail, but that they acknowledge the reality that failures will happen. This design principle has been borrowed by experts in other disciplines such as urban design. Finding this idea more than inspiring, we would like to introduce it to the field of education and advocate it as a principle of instructional design, esp. in a technology-aided blended learning mode, such as flipped classroom. If our flipped classroom can be designed in a way that it will not easily downgrade to a less-structured lecture when students are not well-prepared, then our flipped classroom would be much more robust and effective. We acknowledge that it is no easy job to even try applying this principle in education, but it is worth discussing it with educational researchers and practitioners. With technologies increasingly integrated into our blended learning classrooms, our flipped course design and implementation should involve more mechanisms based on design for failure.

## Acknowledgement

We are grateful for editors' and reviewers' comments on the earlier versions of this manuscript.

## Disclosure statement

No potential conflict of interest was reported by the author.

## ORCID

Morris Siu-yung Jong  <http://orcid.org/0000-0001-9186-0484>

Moonyoung Park  <http://orcid.org/0000-0001-9174-9743>

## References

- Akçayır, G., & Akçayır, M. (2018). The flipped classroom: A review of its advantages and challenges. *Computers & Education*, 126, 334–345. doi:10.1016/j.compedu.2018.07.021
- Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York, NY: Longman.
- Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, 8(1), 19–32. doi:10.1080/1364557032000119616
- Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. Eugene, OR: International Society for Technology in Education.
- Berrett, D. (2012). How “flipping” the classroom can improve the traditional lecture. *The Chronicle of Higher Education*, 58(25), 16–18.
- Brewer, R., & Movahedazarhouli, S. (2018). Successful stories and conflicts: A literature review on the effectiveness of flipped learning in higher education. *Journal of Computer Assisted Learning*, 34(4), 409–416. doi:10.1111/jcal.12250

- Canale, M., & Swain, M. (1980). Theoretical bases of communicative approaches to second language teaching and testing. *Applied Linguistics*, 1(1), 1–47. doi:[10.1093/applin/1.1.1](https://doi.org/10.1093/applin/1.1.1)
- Chai, C. S., Koh, J. H. L., & Tsai, C. C. (2010). Facilitating preservice teachers' development of technological, pedagogical, and content knowledge (TPACK). *Educational Technology & Society*, 13(4), 63–73.
- Chai, C. S., Koh, J. H. L., & Tsai, C. C. (2013). A review of technological pedagogical content knowledge. *Educational Technology & Society*, 16(2), 31–51.
- Chen, Y. L., Wang, Y., & Chen, N. S. (2014). Is FLIP enough? Or should we use the FLIPPED model instead? *Computers & Education*, 79, 16–27. doi:[10.1016/j.compedu.2014.07.004](https://doi.org/10.1016/j.compedu.2014.07.004)
- Chen Hsieh, J. S., Wu, W. C. V., & Marek, M. W. (2017). Using the flipped classroom to enhance EFL learning. *Computer Assisted Language Learning*, 30(1–2), 1–21. doi:[10.1080/09588221.2015.1111910](https://doi.org/10.1080/09588221.2015.1111910)
- Cheung, A. C. K., & Slavin, R. E. (2016). How methodological features affect effect sizes in education. *Educational Researcher*, 45(5), 283–292. doi:[10.3102/0013189X16656615](https://doi.org/10.3102/0013189X16656615)
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Duman, G., Orhon, G., & Gedik, N. (2015). Research trends in mobile assisted language learning from 2000 to 2012. *ReCALL*, 27(2), 197–216. doi:[10.1017/S0958344014000287](https://doi.org/10.1017/S0958344014000287)
- Filiz, O., & Kurt, A. (2015). Flipped learning: Misunderstandings and the truth. *Journal of Educational Sciences Research*, 5(1), 215–229.
- Flipped Learning Network (2014). *The four pillars of F-L-I-P*. Retrieved from <http://flippedlearning.org/definition-of-flipped-learning/>
- Gass, S. (1997). *Input, interaction, and the second language learner*. Mahwah, NJ: Lawrence Erlbaum.
- Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information and Libraries Journal*, 26(2), 91–108. doi:[10.1111/j.1471-1842.2009.00848.x](https://doi.org/10.1111/j.1471-1842.2009.00848.x)
- Hayes, A. F., & Krippendorff, K. (2007). Answering the call for a standard reliability measure for coding data. *Communication Methods and Measures*, 1(1), 77–89. doi:[10.1080/19312450709336664](https://doi.org/10.1080/19312450709336664)
- Hung, H. T. (2015). Flipping the classroom for English language learners to foster active learning. *Computer Assisted Language Learning*, 28(1), 81–96. doi:[10.1080/09588221.2014.967701](https://doi.org/10.1080/09588221.2014.967701)
- Hung, H. T. (2017a). Clickers in the flipped classroom: Bring your own device (BYOD) to promote student learning. *Interactive Learning Environments*, 25(8), 983–995. doi:[10.1080/10494820.2016.1240090](https://doi.org/10.1080/10494820.2016.1240090)
- Hung, H. T. (2017b). Design-Based research: Redesign of an English language course using a flipped classroom approach. *TESOL Quarterly*, 51(1), 180–192. doi:[10.1002/tesq.328](https://doi.org/10.1002/tesq.328)
- Hung, H. T. (2017c). The integration of a student response system in flipped classrooms. *Language Learning & Technology*, 21(1), 16–27.
- Jong, M. S. Y. (2017). Empowering students in the process of social inquiry learning through flipping the classroom. *Educational Technology & Society*, 20(1), 306–322.
- Jong, M. S. Y. (2019). To flip or not to flip: Social science faculty members' concerns about flipping the classroom. *Journal of Computing in Higher Education*, 31(2), 391–407. doi:[10.1007/s12528-019-09217-y](https://doi.org/10.1007/s12528-019-09217-y)
- Jong, M. S. Y., Chen, G. W., Tam, V., & Chai, C. S. (2019). Adoption of flipped learning in social humanities education: The FIBER experience in secondary schools. *Interactive Learning Environments*, 27(8), 1222–1238. doi:[10.1080/10494820.2018.1561473](https://doi.org/10.1080/10494820.2018.1561473)

- Karabulut-Ilgu, A., Cherrez, N. J., & 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. doi:[10.1111/bjet.12548](https://doi.org/10.1111/bjet.12548)
- Kim, J., Park, H., Jang, M., & Nam, H. (2017). Exploring flipped classroom effects on second language learners' cognitive processing. *Foreign Language Annals*, 50(2), 260–284. doi:[10.1111/flan.12260](https://doi.org/10.1111/flan.12260)
- Lantolf, J. P. (2011). The sociocultural approach to second language acquisition. In D. Atkinson (Ed.), *Alternative approaches to second language acquisition* (pp. 24–47). New York, NY: Routledge/Taylor & Francis.
- Lantolf, J. P., & Thorne, S. L. (2006). *Sociocultural theory and the genesis of second language development*. Oxford: Oxford University Press.
- Lin, C. J., & Hwang, G. J. (2018). A learning analytics approach to investigating factors affecting EFL students' oral performance in a flipped classroom. *Educational Technology & Society*, 21(2), 205–219.
- Lin, H. C., & Hwang, G. J. (2019). Research trends of flipped classroom studies for medical courses: A review of journal publications from 2008 to 2017 based on the technology-enhanced learning model. *Interactive Learning Environments*, 27(8), 1011–1027. doi:[10.1080/10494820.2018.1467462](https://doi.org/10.1080/10494820.2018.1467462)
- Lin, T. J., & Lan, Y. J. (2015). Language learning in virtual reality environments: Past, present, and future. *Educational Technology & Society*, 18(4), 486–497.
- Lundin, M., Rensfeldt, A. B., Hillman, T., Lantz-Andersson, A., & Peterson, L. (2018). Higher education dominance and siloed knowledge: A systematic review of flipped classroom research. *International Journal of Educational Technology in Higher Education*, 15(1), 30. doi:[10.1186/s41239-018-0101-6](https://doi.org/10.1186/s41239-018-0101-6)
- Marshall, C., & Rossman, G. B. (2011). *Designing qualitative research* (5th ed.). London: SAGE.
- Mays, N., Roberts, E., & Popay, J. (2001). Synthesizing research evidence. In N. Fulop, P. Allen, A. Clarke, & N. Black (Eds.), *Studying the organization and delivery of health services: Research methods* (pp. 188–220). London: Routledge.
- Moranski, K., & Kim, F. (2016). Flipping' lessons in a multi-section Spanish course: Implications for assigning explicit grammar instruction outside of the classroom. *The Modern Language Journal*, 100(4), 830–852. doi:[10.1111/modl.12366](https://doi.org/10.1111/modl.12366)
- Moranski, K., & Toth, P. D. (2016). Small-group metanalytic talk and Spanish L2 development. In M. Sato & S. Ballinger (Eds.), *Peer interaction and second language learning: Pedagogical potential and research agenda* (pp. 291–316). Philadelphia: John Benjamins.
- 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. doi:[10.1016/j.iheduc.2015.02.002](https://doi.org/10.1016/j.iheduc.2015.02.002)
- Pica, T. (1994). Research on negotiation: What does it reveal about second-language learning conditions, processes, and outcomes? *Language Learning*, 44(3), 493–527. doi:[10.1111/j.1467-1770.1994.tb01115.x](https://doi.org/10.1111/j.1467-1770.1994.tb01115.x)
- Shyr, W. J., & Chen, C. H. (2018). Designing a technology-enhanced flipped learning system to facilitate students' self-regulation and performance. *Journal of Computer Assisted Learning*, 34(1), 53–62. doi:[10.1111/jcal.12213](https://doi.org/10.1111/jcal.12213)
- Slavin, R. E., & Smith, D. (2009). The relationship between sample sizes and effect sizes in systematic review in education. *Educational Evaluation and Policy Analysis*, 31(4), 500–506. doi:[10.3102/0162373709352369](https://doi.org/10.3102/0162373709352369)
- Storch, N. (2002). Patterns of interaction in ESL pair work. *Language Learning*, 52(1), 119–158. doi:[10.1111/1467-9922.00179](https://doi.org/10.1111/1467-9922.00179)



- Turan, Z., & Akdag-Cimen, B. (2019). Flipped classroom in English language teaching: A systematic review. *Computer Assisted Language Learning*, 1–17. doi:10.1080/09588221.2019.1584117
- Wang, Y. P., & Qi, Y. (2018). Mastery-based language learning outside class: Learning support in flipped classrooms. *Language Learning & Technology*, 22(2), 50–74.
- Wu, W. C. V., Chen Hsieh, J. S., & Yang, J. C. (2017). Creating an online learning community in a flipped classroom to enhance EFL learners' oral proficiency. *Educational Technology & Society*, 20(2), 142–157.
- Zainuddin, Z., & Halili, S. H. (2016). Flipped classroom research and trends from different fields of study. *International Review of Research in Open and Distance Learning*, 17(3), 313–340.

## Appendix

ID	Author(s)	Studied in	Year	Title	Journal
1	Yang, J., et al.	USA	2017	Flipping the classroom in teaching Chinese as a foreign language	<i>Language Learning &amp; Technology</i>
3	Hung, H. T.	Taiwan	2017	Clickers in the flipped classroom: Bring your own device (BYOD) to promote student learning	<i>Interactive Learning Environments</i>
4	Hung, H. T.	Taiwan	2015	Flipping the classroom for English language learners to foster active learning	<i>Computer Assisted Language Learning</i>
5	Lee, G. & Wallace, A.	South Korea	2018	Flipped learning in the English as a foreign language classroom: Outcomes and perceptions	<i>TESOL Quarterly</i>
6	Adnan, M.	Turkey	2017	Perceptions of senior-year ELT students for flipped classroom: A materials development course	<i>Computer Assisted Language Learning</i>
10	Hung, H. T.	Taiwan	2017	The integration of a student response system in flipped classrooms	<i>Language Learning &amp; Technology</i>
11	Lin, C. J., et al.	Taiwan	2018	A flipped contextual game-based learning approach to enhancing EFL students' English business writing performance and reflective behaviors	<i>Educational Technology &amp; Society</i>
12	Wu, W. C., et al.	Taiwan	2017	Creating an online learning community in a flipped classroom to enhance EFL learners' oral proficiency	<i>Educational Technology &amp; Society</i>
13	Chuang, H. H., et al.	Taiwan	2018	Which students benefit most from a flipped classroom approach to language learning?	<i>British Journal of Educational Technology</i>
14	Lin, C. J., & Hwang, G. J.	Taiwan	2018	A learning analytics approach to investigating factors affecting EFL students' oral performance in a flipped classroom	<i>Educational Technology &amp; Society</i>
15	Mori, Y., et al.	USA	2016	The impact of flipped online kanji instruction on written vocabulary learning for introductory and intermediate Japanese language students	<i>Foreign Language Annals</i>
16	Moranski, K. & Henery, A.	USA	2017	Helping learners to orient to the inverted or flipped language classroom: Mediation via informational video	<i>Foreign Language Annals</i>
18	Hao, Y.	Taiwan	2016	Middle school students' flipped learning readiness in foreign language classrooms: Exploring its relationship	<i>Computers in Human Behavior</i>

(continued)



Continued.

ID	Author(s)	Studied in	Year	Title	Journal
19	Kim, J. et al.	South Korea	2017	with personal characteristics and individual circumstances Exploring flipped classroom effects on second language learners' cognitive processing	<i>Foreign Language Annals</i>
23	Chen Hsieh, J., et al.	Taiwan	2016	Using the flipped classroom to enhance EFL learning	<i>Computer Assisted Language Learning</i>
27	Chen Hsieh, J., et al.	Taiwan	2017	Technological acceptance of LINE in flipped EFL oral training	<i>Computers in Human Behavior</i>
31	Hung, H. T.	Taiwan	2017	Design-based research: Redesign of an English language course using a flipped classroom approach	<i>TESOL Quarterly</i>
37	Wang, Y. & Qi, G. Y.	Australia	2018	Mastery-based language learning outside class: Learning support in flipped classrooms	<i>Language Learning &amp; Technology</i>
45	Moranski, K. & Kim, F.	USA	2016	'Flipping' lessons in a multi-section Spanish course: Implications for assigning explicit grammar instruction outside of the classroom	<i>Modern Language Journal</i>
49	Shyr, W. J. & Chen, C. H.	Taiwan	2018	Designing a technology-enhanced flipped learning system to facilitate students' self-regulation and performance	<i>Journal of Computer Assisted Learning</i>
64	Moran, C. M. & Young, C. A.	USA	2015	Questions to consider before flipping	<i>Phi Delta Kappan</i>
92	Huang, Y. N. & Hong, Z. R	Taiwan	2016	The effects of a flipped English classroom intervention on students' information and communication technology and English reading comprehension	<i>Educational Technology Research and Development</i>
96	Yu Z. & Wang G.	Mainland China	2016	Academic achievements and satisfaction of the clicker-aided flipped business English writing class	<i>Educational Technology &amp; Society</i>
134	Kurt, G.	Turkey	2017	Implementing the flipped classroom in teacher education: Evidence from Turkey	<i>Educational Technology &amp; Society</i>
148	Shaffer, S.	USA	2016	One high school English teacher: On his way to a flipped classroom	<i>Journal of Adolescent &amp; Adult Literacy</i>
165	Zhai, X., et al.	Mainland China	2017	An experiential learning perspective on students' satisfaction model in a flipped classroom context	<i>Educational Technology &amp; Society</i>
171	Zhang, L. L.	Mainland China	2018	English flipped classroom teaching model based on cooperative learning	<i>Educational Sciences: Theory &amp; Practice</i>
184	Fan, X. Y.	Mainland China	2018	Research on oral English flipped classroom project-based teaching model based on cooperative learning in China	<i>Educational Sciences: Theory &amp; Practice</i>
186	Bakla, A.	Turkey	2018	Learner-generated materials in a flipped pronunciation class: A sequential explanatory mixed-methods study	<i>Computers &amp; Education</i>
194	Hung, H. T.	Taiwan	2018	Gamifying the flipped classroom using game-based learning materials	<i>ELT Journal</i>
205	Tseng, M. F., et al.	USA	2018	An immersive flipped classroom for learning Mandarin Chinese: Design, implementation, and outcomes	<i>Computer Assisted Language Learning</i>
226	Wang, J., et al.	Mainland China	2018	Enhancing beginner learners' oral proficiency in a flipped Chinese foreign language classroom	<i>Computer Assisted Language Learning</i>
237	Gelan, A., et al.	Europe	2018	Affordances and limitations of learning analytics for computer-assisted language learning: A case study of the VITAL project	<i>Computer Assisted Language Learning</i>