International Journal of Instruction
e-ISSN: 1308-1470 ● www.e-iji.net

April 2026 ● Vol.19, No.2
p-ISSN: 1694-609X
pp. 299-316

Article submission code: 20250715160007

Received: 15/07/2025
Revision: 17/10/2025

Accepted: 30/10/2025
OnlineFirst: 03/01/2026

Effects of an Integrated ARCS-Flipped Model on Technology-Enhanced Chinese Listening and Motivation

Jing Yu
King Mongkut's Institute of Technology Ladkrabang, Thailand, *tina871014@126.com*

Sirirat Petsangsri
Corresponding author, King Mongkut's Institute of Technology Ladkrabang, Thailand, *sirirat.pe@kmitl.ac.th*

Jirarat Sitthiworachart
King Mongkut's Institute of Technology Ladkrabang, Thailand, *jirarat.si@kmitl.ac.th*

This quasi-experimental study, grounded in the need to explore effective pedagogical models in Teaching Chinese as a Foreign Language (TCFL), examined the impact of integrating the ARCS motivation model with a flipped classroom approach on international students' Chinese listening proficiency and motivation. 49 undergraduates from a medical program were assigned to either an experimental group (ARCS-flipped model, n = 24) or a control group (traditional instruction, n = 25). Both groups completed HSK Level 3 listening pre- and post-tests and a post-intervention ARCS motivation questionnaire. MANOVA results showed that the experimental group significantly outperformed the control group in listening scores, confirming the effectiveness of the integrated model. Regarding motivation, the experimental group showed slightly higher means in confidence and attention; however, compared to expectations, ARCS overall motivation was not significantly different, possibly due to high initial motivation and ceiling effects. Correlation analyses revealed positive links between motivation and listening performance in both groups, varying by dimension and instructional context. The findings support the value of combining ARCS motivational design with flipped learning in Teaching Chinese as a Foreign Language (TCFL) and emphasize the need for adaptive, learner-centered strategies to sustain motivation.

Keywords: ARCS motivational model, flipped classroom, L2 Chinese learners, Chinese listening instruction, listening proficiency, technology-enhanced language learning

INTRODUCTION

In recent years, the integration of technology into language education has drawn increasing attention, especially in response to the demand for more flexible and engaging instructional models. The COVID-19 pandemic further accelerated the adoption of online and hybrid teaching, particularly for international students with

Citation: Yu, J., Petsangsri, S., & Sitthiworachart, J. (2026). Effects of an integrated ARCS-Flipped model on technology-enhanced Chinese listening and motivation. *International Journal of Instruction*, *19*(2), 299-316. https://doi.org/10.29333/iji.2026.19216a

limited access to in-person courses in host countries like China. These shifts present both opportunities and challenges in Teaching Chinese as a Foreign Language (TCFL), especially in developing listening proficiency and skills—widely recognized as foundational and among the most difficult in foreign language acquisition (Flowerdew & Miller, 2013; Vandergrift, 2007). Although technology-enhanced language learning (TELL) continues to evolve, instructors often struggle to select appropriate tools and design effective pedagogy. In many cases, technology is superficially applied without meaningfully enhancing learner engagement or outcomes (Bezus et al., 2021; Kozbakova, 2021). Moreover, traditional TCFL listening instruction still relies heavily on teacher-centered methods and decontextualized comprehension questions, which have limited motivational or proficiency gains (Kurita, 2012; Vandergrift & Goh, 2012). The common "Listen → Answer → Correct → Explain" format often fails to promote learner autonomy and participation. Thus, there is a growing need for pedagogically sound, learner-centered instructional designs (Rivera et al., 2021; Zhang, 2015).

The flipped classroom has gained popularity in higher education for promoting engagement and flexible access to resources (Bergmann & Sams, 2012; Etemadfar et al., 2020). However, flipping alone does not guarantee improved outcomes—effective motivational design is essential. The ARCS model (Keller, 1987), emphasizing Attention, Relevance, Confidence, and Satisfaction, provides a well-established framework to support motivation in technology-mediated environments. Despite its success in other domains, its integration with flipped instruction remains underexplored in TCFL listening contexts, especially for online international learners.

To address this gap, this study examines the effects of an integrated model combining the ARCS framework with flipped pedagogy in an online Chinese listening course. This ARCS-flipped model was developed based on a needs analysis and refined through expert consultation. Instructional videos were drawn from high-quality sources such as Chinese University MOOC or created by the instructor to suit learners' interests and proficiency levels. Activities focused on interaction and collaboration, such as peer-led dialogues and group-based comprehension tasks, to enhance learners' real-time processing and listening awareness. This model was implemented via the Superstar Learning Platform, a widely used LMS in China but still underutilized in foreign language education. Several successful cases have demonstrated its robust functionalities in supporting online language teaching and flipped classroom delivery (e.g., Liao & Phongsatha, 2023; Xiao, 2023). The platform also offers a practical solution for students from under-resourced regions (e.g., Belt and Road countries), enabling asynchronous access to pre-recorded content and task-based activities despite connectivity challenges. Ultimately, the model seeks to promote learner autonomy and motivation in post-pandemic educational settings.

Research Objectives and Questions

The purpose of this study is to evaluate the impact of the ARCS-flipped model on international students' Chinese listening proficiency and motivational scales. Specifically, it examines the following objectives:

RO1. To examine whether the ARCS-flipped model leads to greater improvement in students' listening skills, as measured by the listening section of the Hanyu Shuiping

Kaoshi (HSK), compared to traditional instruction.
RO2. To assess whether this instructional model more effectively enhances students' motivation in learning Chinese listening.
RO3. To investigate the extent to which students' motivational profiles predict their post-intervention listening performance within each instructional group.

The research questions are as follows:
RQ1. What are the effects of the ARCS-flipped model on students' HSK listening scores compared to traditional instruction?
RQ2. To what extent does the instructional model influence students' motivation in learning Chinese listening?
RQ3. To what extent do students' motivation scales based on ARCS framework predict their HSK listening performance within each instructional group?

Literature Review

Flipped classroom instruction, which shifts content delivery outside the classroom and reserves class time for active learning, has been increasingly adopted in language education due to its capacity to promote learner autonomy and maximize interaction (e.g., Pratiwi et al., 2022; Zhang & AlSaqqaf, 2025). At the same time, motivational design has been increasingly emphasized as a core factor in language learning success. Theories such as Self-Determination Theory (Deci & Ryan, 1985), Expectancy-Value Theory (Eccles & Wigfield, 2002), and Dörnyei's L2 Motivational Self System (Dörnyei, 2009) highlight that learners' motivation and learning intention play decisive roles in sustaining effort and achieving long-term goals. Keller's ARCS motivation model (Keller, 2010) provides a systematic and practice-oriented framework for sustaining learners' engagement through four components: Attention, Relevance, Confidence, and Satisfaction (Table 1). While each model has been widely studied individually, few studies have investigated them together (Asiksoy & Özdamli, 2016), especially in the context of foreign language learning. This underscores the need to consider how broader motivational theories and practical design models like ARCS can be integrated into innovative approaches such as flipped learning.

Table 1
ARCS motivation model with sub-categories by John Keller (2010)

Attention	Relevance	Confidence	Satisfaction
Perceptional Arousal	Goal Orientation	Learning Requirements	Natural Consequences
Inquiry Arousal	Motive Matching	Personal Control	Positive Consequences
Variability	Familiarity	Success Opportunities	Equity

A growing body of research has attempted to synthesize motivational frameworks with flipped classroom pedagogy, yielding encouraging outcomes in language education. Jia et al. (2023) reported improved decoding skills, listening proficiency, and learner attitudes through a flipped SEF-ARCS model in English listening courses. Fu et al. (2020) developed an ARCS-based flipped model for Business English, identifying limited interaction and classroom time as major motivational barriers. Piriyasurawong (2019) found that Spanish learners using an ARCS-based flipped model on a social cloud platform significantly enhanced their communication skills, with most surpassing

the 80% performance benchmark. Zhao (2017) combined ARCS, Bloom's taxonomy, and the Learning Pyramid in a task-driven flipped model, improving students' speaking, listening, and motivation. Wu (2015) applied ARCS to pre-class task design in a flipped English course via U-MOOC, demonstrating that different ARCS components influenced motivation in distinct ways.

Together, these findings align with Rahman et al. (2022), highlighting that motivational factors strongly predict language learning intentions and outcomes and underscoring the need to integrate general motivational theories (e.g., self-determination, expectancy-value, and L2 motivational self system) with practical models such as ARCS in flipped classroom environments. These studies informed the instructional design of the current research, which integrates the ARCS motivation model into a flipped classroom to improve listening proficiency in TCFL. As illustrated in Figure 1, each ARCS component is strategically embedded within different stages of the flipped learning cycle to promote sustained learner engagement.

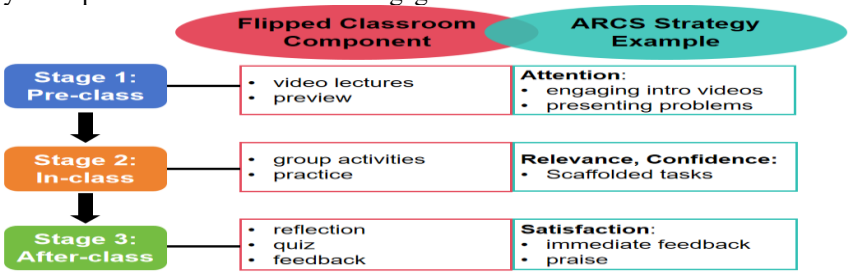

Figure 1
Instructional design integrating ARCS motivation model in a flipped classroom

Furthermore, methodological guidance was drawn from Mirzaei et al. (2022), who examined ARCS-based flipped instruction in EFL writing. Adopting a similar pre-/post-test experimental design, the present study further explores the integration of the ARCS motivation model into a flipped learning context for teaching Chinese listening as a foreign language. Specifically, it aims to examine whether this approach enhances learners' listening proficiency and how the total and different sub-dimensions of learning motivation—based on the ARCS model—relate to listening outcomes. By doing so, this study seeks to provide deeper insights into the role of ARCS-based motivation and flipped classroom approach in L2 listening instruction and offer practical implications for improving instructional strategies in this area.

METHOD

Research Design

This study adopted a quasi-experimental design to investigate the effects of the ARCS-flipped model on learners' Chinese listening proficiency and motivation, as well as the relationship between the two. Participants were 49 international students from the 2021 MBBS (Bachelor of Medicine and Bachelor of Surgery) cohort at a key university in Southwest China, selected from a pool of 314 students and placed into the same Chinese class based on placement test results. Three students with over ten years of Chinese learning experience were evenly assigned to the experimental (n = 24) and

control (n = 25) groups due to institutional requirements; the rest were randomly assigned. The experimental group received ARCS-flipped instruction, while the control group followed a traditional lecture-based approach.

The majority of overall participants were from South and West Asian countries, including India, Sri Lanka, and Iran, with a few participants from Morocco, the United States, South Korea, and Australia. The experimental group (n = 24) consisted of 58.3% female students, with an average age of 22.0 years (SD = 1.7). The majority had studied Chinese for 2 to 5 years (91.7%), and none had less than 1 year of learning experience. The control group (n = 25) included 56.0% female students, with an average age of 22.3 years (SD = 1.3). Most participants (76.0%) had 2 to 5 years of experience, and 16.0% had studied for 1 year or less. Participant demographics are summarized in Table 2.

Table 2
Demographic characteristics of participants by group

Participant Characteristic	Category	Experimental Group (N = 24)	Control Group (N = 25)
Gender	Female	14 (58.3%)	14 (56.0%)
	Male	10 (41.7%)	11 (44.0%)
Age (years)	20-22	12 (50.0%)	16 (64.0%)
	23-25	12 (50.0%)	9 (36.0%)
Duration of Chinese Learning	≤ 1 year	0 (0.0%)	4 (16.0%)
	2–5 years	22 (91.7%)	19 (76.0%)
	6–9 years	1 (4.2%)	1 (4.0%)
	≥ 10 years	1 (4.2%)	1 (4.0%)

Instruments

This study employed two primary instruments for data collection: (1) HSK listening tests and (2) a post-course motivation questionnaire adapted from the ARCS-based Course Interest Survey (CIS).

(1) HSK Listening Tests

To assess participants' listening proficiency before and after the 8-week intervention, two standardized HSK Level 3 listening tests were administered online via the Superstar Learning Platform. The Hanyu Shuiping Kaoshi (HSK), a widely recognized Chinese proficiency assessment aligned with the CEFR (Common European Framework of Reference for Languages) B1 level, served as the test framework. The pre-test (Sample Paper H31327) and post-test (Sample Paper H31328), developed by the Center for Language Education and Cooperation, each included 40 items (10 true/false, 30 multiple-choice) with a total score of 100. The tests reflected B1-level content, based on 600 core vocabulary items and common grammar patterns, and focused on everyday conversational contexts. These official tests were chosen for their high reliability and validity. Internal consistency was evaluated due to the use of different test forms, with Cronbach's α values of 0.81 (pre-test) and 0.85 (post-test), indicating strong reliability.

(2) ARCS-based Course Interest Survey (CIS) on Motivation

The motivation survey was adapted from Keller's original Course Interest Survey (CIS), grounded in the ARCS model, which demonstrated high internal consistency

(Cronbach's alpha ranging from 0.81 to 0.88 across sub-scales and 0.95 overall; Keller, 2010). Recent studies in L2 learning contexts have also employed CIS questionnaire to validate its suitability: for example, Kurt & Keçik (2023) used the full CIS in a university prep class and found significant increases in all ARCS sub-scales; Mirzaei et al. (2022) applied CIS in a flipped expository writing context. The adapted CIS used in this study comprised 38 items: 4 demographic questions (age, gender, nationality, and Chinese learning experience) and 34 core items evenly measuring Attention, Relevance, Confidence, and Satisfaction, all positively phrased and rated on a 5-point Likert scale (1 = "Not true" to 5 = "Very true"). In this study, the CIS showed excellent reliability with an overall alpha of 0.987, with sub-scale values of 0.960 for Attention, 0.955 for Relevance, 0.948 for Confidence, and 0.955 for Satisfaction. Construct validity was supported by a Kaiser-Meyer-Olkin (KMO) measure of 0.772 and Bartlett's Test of Sphericity ($\chi^2 = 2479.65$, $df = 561$, $p < 0.001$), indicating suitability for factor analysis.

Procedure

The research followed four key phases to guide the development and implementation of the instructional model:

(1) Theoretical foundation and needs analysis: A literature review on L2 listening instruction, the ARCS motivation model, and flipped learning was conducted, alongside a needs analysis to identify instructional gaps and learner profiles, laying the groundwork for model design.

(2) Instructional model design: An integrated ARCS-flipped instructional model was developed, aligning each ARCS dimension with strategies across three learning stages—Before-class, In-class, and After-class.

(3) Experimental implementation: The model was implemented over eight weeks in an online Chinese course (Chinese II-2) for the experimental group (n = 24), delivered via the Superstar Learning Platform. The control group (n = 25) received traditional instruction ("lecture → practice → correction") through the same platform. Both groups used *HSK Standard Course 3* (Jiang, 2014) and completed identical pre-/post-tests (HSK Level 3 listening) and a post-motivation ARCS-based questionnaire (CIS). Instruction covered Lessons 1–6. Each unit spanned two weeks and included about 50 vocabulary items, 6–8 grammar points, and 4–5 dialogues.

The ARCS-flipped model emphasized task-based learning and autonomous engagement. Pre-class activities involved instructional videos and warm-up tasks. In-class sessions focused on peer interaction and feedback. After-class, student pairs created original listening dialogues using target content, designed related comprehension questions, and submitted recordings and scripts for feedback. In the second week, recordings were played in class for peer evaluation and open discussion, followed by teacher-facilitated reflection. This cycle fostered learner autonomy, critical listening, and collaboration—enhancing Attention, Confidence, and Satisfaction in line with ARCS principles.

(4) Expert review and model refinement: Following implementation, the model was reviewed by a panel of seven experts in language education and instructional design. Their feedback informed refinements for future use and scalability.

To ensure comparability, both groups shared the same instructor, schedule, materials, and assessment structure. All activities and assessments were conducted online through the Superstar platform. A summary of this instructional model is presented in Table 3.

Table 3
ARCS-flipped model through Superstar platform for one instructional unit

Phases (2-week)	Teacher	Students	ARCS Model used in learning process
1st week 1. Before the class	·Upload weekly lesson content to the platform. ·Provide short video clips on key vocabulary and grammar (sourced from U-MOOC, YouTube, etc.), enriched with PowerPoint slides, images, and embedded exercises or quizzes; assign corresponding task points. Select materials grounded in everyday contexts or connected to students' prior knowledge. ·Assign warm-up tasks such as vocabulary games, multiple-choice questions, or short dictation activities. Monitor students' progress on video viewing, embedded exercises, and completion of warm-up tasks.	·Preview all the materials that teacher posted, and can take notes into the videos while watching, to complete all the task points. ·Complete the inserted exercises/quizzes, and can get the correct answers and Comments after submission. ·Do the assigned warm-up activities, and can the results and comments right after submission. ·Find questions (if any).	☑Attention ☑Relevance ☐Confidence ☐Satisfaction
2. In the class	·Guide students to summarize, discuss, and analyze key questions, offering support as needed. ·Play textbook dialogue audios, check comprehension, and provide immediate corrective and attributional feedback. ·Use multimedia or inquiry-based scenarios to contextualize grammar instruction. ·Conduct diverse listening exercises (e.g., true/false, multiple choice, quick response, quiz games) and reward top performers with praise or extra credit. ·Use both verbal and non-verbal cues effectively, and maintain a sense of humor and curiosity to keep students engaged.	·Raise the prepared questions / problems. ·Listen to the dialogues, conclude the main idea of the dialogues, and answer the questions for details. ·Learn and practice grammar points with the simulated situations. ·Do Listening Exercises in various types. Students can think independently or discuss in pairs/groups, which may depends on teacher's requirements.	☑Attention ☐Relevance ☑Confidence ☑Satisfaction
3. After the class	·Assign HSK-style listening homework and preview tasks for the next class: conversation or statement creation. ·In pairs, students record a short dialogue or passage (≤100 characters) using new vocabulary and grammar, and design 2–3 related questions. ·Evaluate recordings based on pronunciation, fluency, content, grammar, and structure, and provide feedback.	·Complete homework online and review results with explanations immediately. For questions, students can start discussions on Superstar's class Message Board. ·Work with a randomly assigned partner to complete assignments and upload audio recordings to the teacher.	☐Attention ☑Relevance ☑Confidence ☑Satisfaction
2nd week 1. Before the class	·The preview is similar to the Before the Class phase of Week 1. ·Prepare and post the in-class activity on Superstar.	·The preview is similar to the Before the Class phase of Week 1.	☑Attention ☑Relevance ☐Confidence ☐Satisfaction
2. In the class	·Pair Task: teacher plays students' week 1 audio assignments for pair tasks. ·Conduct varied listening exercises (e.g., true/false, multiple choice, quick answers, quiz games) with praise and extra credit rewards. ·Use verbal and non-verbal cues, maintaining humor and engagement throughout class.	·Pair Task: other pairs listen, answer questions, evaluate recordings; the pair with most correct answers earns extra credits. ·Do Listening Exercises in various types. Students can think independently or discuss in pairs/groups, which may depends on teacher's requirements.	☑Attention ☑Relevance ☑Confidence ☑Satisfaction
3. After the class	·Post summaries of key points, difficult concepts, and listening strategies for review. ·Assign homework with HSK-format listening practice.	·Review teacher's summary. · Submit homework online, check results immediately, and discuss questions on Superstar's class Message Board.	☐Attention ☑Relevance ☑Confidence ☑Satisfaction

Data Analysis

All quantitative data were analyzed using IBM SPSS Statistics 28. Descriptive statistics summarized HSK listening scores and ARCS motivation scales. An independent-samples t-test confirmed no significant HSK pre-test difference between the experimental ($M = 63.23$, $SD = 16.69$) and control groups ($M = 65.30$, $SD = 16.26$), $t(46.78) = –0.44$, $p = 0.662$, indicating comparable baseline proficiency. Subsequently, multivariate analyses of variance (MANOVA) examined group differences on HSK post-test scores and overall ARCS motivation, with a follow-up MANOVA testing the four ARCS sub-dimensions; all assumptions were met, and effect sizes and observed power were reported. Pearson correlations were conducted separately for each group to explore relationships between listening proficiency and motivation, interpreting effect sizes per Cohen's (1988) guidelines ($r = 0.10, 0.30, 0.50$ for small, medium, large). Statistical significance was set at $p < 0.05$.

FINDINGS

Descriptive Statistics

Descriptive results indicated that the experimental group outperformed the control group in both listening performance and motivational level. Specifically, the experimental group achieved a higher mean score on the HSK post-test ($M = 83.96$, $SD = 8.47$) compared to the control group ($M = 67.50$, $SD = 12.89$). Similarly, the ARCS motivation total score was also higher in the experimental group ($M = 3.38$, $SD = 1.02$) than in the control group ($M = 3.00$, $SD = 1.01$).

Table 4
Descriptive statistics of HSK post-test and ARCS total scale by group

	Experimental Group (N = 24)		Control Group (N = 25)	
	Mean	Std. Deviation	Mean	Std. Deviation
HSK post-test	83.96	8.47	67.50	12.89
ARCS Total Scale	3.38	1.02	3.00	1.10
Attention	3.50	1.03	3.00	1.13
Relevance	3.46	1.05	3.08	1.06
Confidence	3.30	1.02	2.98	1.19
Satisfaction	3.26	1.11	2.97	1.14

Note. HSK test scores are out of 100 points. ARCS scales are based on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Multivariate Analysis of Variance (MANOVA)

Before conducting the MANOVA, several statistical assumptions were tested. Multivariate normality was assessed using the Shapiro-Wilk test, and the results indicated that all dependent variables were approximately normally distributed across both groups (all $p > 0.05$) (Cohen, 1988). Homogeneity of variance-covariance matrices was confirmed by Box's M test, which was not significant ($p = 0.210$), indicating that the assumption was satisfied. Equality of error variances was assessed using Levene's tests for each dependent variable. The test was not significant for either ARCS total

motivation scores (p = 0.885) or HSK post-test scores (p = 0.055), further supporting the validity of proceeding with MANOVA.

Table 5
Assumption testing results for MANOVA

Test	Variable(s)	Group	Statistic / Value	df	Sig. (p)	Interpretation
Shapiro-Wilk Test (Normality)	ARCS Total Scale	Exp (n=24)	W=0.960	24	0.443	Normality met
		Ctrl (n=25)	W=0.971	25	0.661	Normality met
	HSK Post-test	Exp (n=24)	W=0.921	24	0.060	Normality met
		Ctrl (n=25)	W=0.965	25	0.515	Normality met
Levene's Test (Equality of Error Variance)	ARCS Total Scale	—	F=0.021	1, 47	0.885	Homogeneity of variance met
	HSK Post-test	—	F=3.859	1, 47	0.055	Borderline; met
Box's M Test (Homogeneity of Covariance Matrices)	ARCS Total Scale + HSK Post-test	—	Box's M=4.740 F=1.507	3, 421556.136	0.210	Homogeneity of covariance matrices met

Note. Exp = Experimental group; Ctrl = Control group.

A one-way MANOVA was then conducted to examine the effect of instructional group (experimental vs. control) on participants' HSK post-test scores and ARCS total motivation scores. The results revealed a statistically significant multivariate effect of group, Wilks' $\Lambda = 0.577$, $F(2, 46) = 16.89$, $p < 0.001$, partial $\eta^2 = 0.423$, indicating that the type of instruction had a significant overall effect on the combined dependent variables. This finding aligns with prior research demonstrating that instructional approaches integrating the ARCS motivation model and flipped classroom strategies can significantly affect learners' academic performance and engagement (Asiksoy & Özdamli, 2016; Jia et al., 2023; Kurt & Keçik, 2017).

Table 6
Multivariate test for the effect of group on HSK post-test and ARCS total scale

Effect	Test	Value	F	Hypothesis df	Error df	Sig. (p)	Partial η^2	Observed Power
Group (Exp vs. Ctrl)	Pillai's Trace	0.423	16.89	2	46	< 0.001	0.423	1.000
	Wilks' Lambda	0.577	16.89	2	46	< 0.001	0.423	1.000
	Hotelling's Trace	0.734	16.89	2	46	< 0.001	0.423	1.000
	Roy's Largest Root	0.734	16.89	2	46	< 0.001	0.423	1.000

Note. Exp = Experimental group; Ctrl = Control group. Group refers to instructional condition (1 = experimental, 2 = control). Computed using alpha = 0.05.

Follow-up analyses showed that the experimental group outperformed the control group on the HSK post-test, $F(1, 47) = 27.66$, $p < 0.001$, partial $\eta^2 = 0.370$. This result is consistent with studies indicating that the flipped classroom combined with ARCS motivational strategies can enhance L2 listening proficiency (Jia et al., 2023; Zhang, 2015; Wu, 2015). However, no statistically significant difference was found between

the two groups in ARCS total motivation scale, $F(1, 47) = 1.52$, $p = 0.224$, partial $\eta^2 = 0.031$(see Table 7), suggesting that while performance improved, overall motivation may not have changed significantly over the intervention period—a pattern also observed in previous studies of motivational interventions in language learning (Kurt & Keçik, 2017; Karabatak & Polat, 2020).

Table 7
Tests of between-subjects effects for ARCS total motivation and HSK post-test scores

Dependent Variable	Source	Type III SS	df	MS	F	p	Partial η^2	Observed Power
ARCS Total Scale	Group	1.712	1	1.712	1.517	0.224	0.031	0.226
	Error	53.040	47	1.129				
HSK Post-test	Group	3316.858	1	3316.858	27.658	< 0.001	0.370	0.999
	Error	5636.458	47	119.925				

Note. Group refers to instructional condition (1 = experimental, 2 = control). Partial η^2 indicates effect size.

To further examine the relationship between instructional condition and specific motivational components, a follow-up MANOVA was conducted with the four ARCS sub-dimensions and HSK post-test scores as dependent variables. All MANOVA assumptions were met: Shapiro-Wilk and Levene's tests indicated normality and homogeneity of variances (all $p > 0.05$), and Box's M test confirmed equality of covariance matrices, Box's $M = 23.590$, $p = 0.141$. The MANOVA revealed a significant multivariate effect of group membership on the combined outcomes, Wilks' $\Lambda = 0.535$, $F(5, 43) = 7.48$, $p < 0.001$, partial $\eta^2 = 0.465$, indicating a moderate to large effect size (see Table 8), consistent with prior findings (Keller, 1987; Asiksoy & Özdamli, 2016).

Table 8
Multivariate tests of group effects on ARCS sub-scales and HSK post-test scores

Effect	Test	Value	F	Hypothesis df	Error df	Sig. (p)	Partial η^2	Observed Power
Group (Exp vs. Ctrl)	Pillai's Trace	0.465	7.48	5	43	< 0.001	0.465	0.998
	Wilks' Lambda	0.535	7.48	5	43	< 0.001	0.465	0.998
	Hotelling's Trace	0.870	7.48	5	43	< 0.001	0.465	0.998
	Roy's Largest Root	0.870	7.48	5	43	< 0.001	0.465	0.998

Note. Exp = Experimental group; Ctrl = Control group. Group refers to instructional condition (1 = experimental, 2 = control). Computed using alpha = 0.05.

Follow-up univariate tests revealed that the two groups differed significantly in their HSK post-test scores, $F(1, 47) = 27.66$, $p < 0.001$, partial $\eta^2 = 0.370$, confirming that L2 performance benefits were primarily driven by the ARCS-Flipped instructional method (Jia et al., 2023; Zhang, 2015).However, there were no statistically significant group differences for the four ARCS sub-dimensions:

- Attention: $F(1, 47) = 2.67$, $p = 0.109$, partial $\eta^2 = 0.054$

- Relevance: $F(1, 47) = 1.61$, $p = 0.210$, partial $\eta^2 = 0.033$
- Confidence: $F(1, 47) = 1.03$, $p = 0.315$, partial $\eta^2 = 0.021$
- Satisfaction: $F(1, 47) = 0.79$, $p = 0.379$, partial $\eta^2 = 0.016$

This pattern is consistent with previous studies indicating that short-term interventions may not always produce significant changes in learners' motivational sub-components (Kurt & Keçik, 2017; Karabatak & Polat, 2020).

Correlation between HSK Listening Scores and ARCS Motivation

To examine the relationship between participants' motivation and their HSK listening post-test performance, Pearson correlation analyses were conducted separately for both the experimental and control group. As shown in Table 9, all ARCS motivation variables were positively correlated with HSK post-test scores in both groups, though the strength of the correlations varied. In the experimental group (n = 24), HSK scores showed medium correlations with ARCS Total ($r = 0.472$, $p = 0.020$), Attention ($r = 0.465$, $p = 0.022$), and Satisfaction ($r = 0.440$, $p = 0.031$), and a large correlation with Confidence ($r = 0.562$, $p = 0.004$). The correlation with Relevance was weaker and did not reach significance ($r = 0.366$, $p = 0.079$). In contrast, in the control group (n = 25), all ARCS variables were strongly correlated with HSK scores, with significant r values ranging from 0.686 to 0.729 ($p < 0.001$ for all). This suggests a consistently stronger association between motivation and listening performance among students in the control group compared to those in the experimental group. According to Cohen's (1988) guidelines, correlation coefficients between 0.10–0.29 are considered small, 0.30–0.49 medium, and 0.50 or above large. These results are consistent with previous studies linking ARCS motivational components to language learning performance (Kurt & Keçik, 2017; Karabatak & Polat, 2020; Jia et al., 2023).

Table 9
Correlations between HSK post-test scores and ARCS motivation variables by group with Cohen's interpretation

HSK Post-test Scores vs. Motivation Variable	Experimental Group (n = 24)			Control Group (n = 25)		
	Pearson correlation (r)	Sig. (2-tailed)	Strength (Cohen, 1988)	Pearson correlation (r)	Sig. (2-tailed)	Strength (Cohen, 1988)
ARCS Total Scale	0.472*	0.020	Medium	0.726**	<0.001	Large
Attention	0.465*	0.022	Medium	0.686**	<0.001	Large
Relevance	0.366	0.079	Small-Medium (ns)	0.694**	<0.001	Large
Confidence	0.562**	0.004	Large	0.716**	<0.001	Large
Satisfaction	0.440*	0.031	Medium	0.729**	<0.001	Large

Note. * $p < 0.05$; ** $p < 0.01$. "ns" = not significant.

DISCUSSION

This study investigated the effects of the ARCS-flipped instructional model on Chinese language learners' listening proficiency and motivation. Three key findings emerged from the analysis. To provide a visual summary of the study's overall results, Figure 2

presents the main findings across the three research questions, highlighting key variables, effect sizes, and correlations.

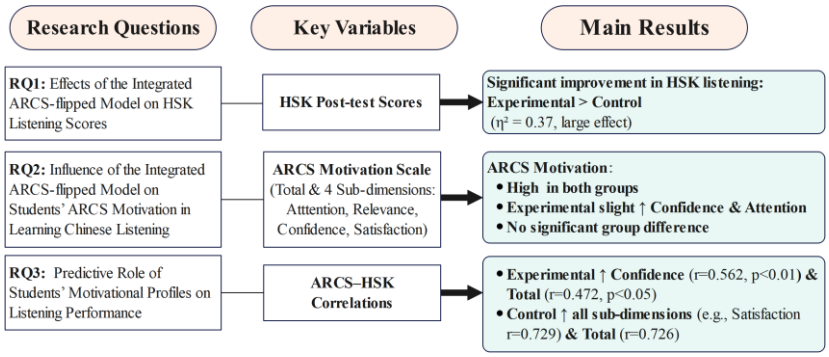

Figure 2
Visual summary of study findings

RQ1: Effects of the Integrated ARCS-flipped Model on HSK Listening Scores

The findings demonstrated that the students in the experimental group significantly outperformed those in the control group on the HSK listening post-test, with a large effect size (partial $\eta^2 = 0.370$). This supports the effectiveness of the ARCS-flipped model to enhance listening proficiency in TCFL, especially in the online settings. These findings are consistent with previous studies demonstrating the benefits of ARCS motivationally informed flipped instruction (e.g., Keller, 2010; Wu, 2015; Piriyasurawong, 2019). The flipped format's flexibility, coupled with active in-class engagement and innovative teaching designs, likely contributed to improved performance by supporting personalized pacing and deeper interaction.

RQ2: Influence of the Integrated ARCS-flipped Model on Students' ARCS Motivation in Learning Chinese Listening

Contrary to expectations, no significant group differences were found in ARCS total or sub-dimension scales, although both groups reported high levels of ARCS motivation, with the experimental group showing slightly higher means in Confidence and Attention. These results suggest that the intervention did not significantly alter students' self-reported motivation, nor diminish their intrinsic engagement—possibly due to high baseline motivation levels, leading to a ceiling effect. Additionally, the 8-week duration may have been too short to yield measurable motivational shifts.

Motivation is influenced by complex personal and contextual factors. Although overall motivational scores did not differ, the observed positive correlations between ARCS dimensions and listening outcomes highlight the importance of motivational design. Even without significant group-level changes, targeting sub-dimensions like Confidence and Satisfaction remains pedagogically valuable. Future research should consider extended interventions and more tailored motivational scaffolding to better sustain and enhance learner engagement in L2 listening contexts.

RQ3: Predictive Role of Students' Motivational Profiles on Listening Performance

Correlation analyses revealed moderate to strong positive relationships between ARCS motivation and HSK post-test listening scores, especially in the control group. In the experimental group, significant correlations were found for Confidence ($r = 0.562$, $p < 0.01$) and Total Motivation ($r = 0.472$, $p < 0.05$), while the control group showed stronger correlations across all sub-dimensions (e.g., Satisfaction: $r = 0.729$, $p < 0.01$). These findings suggest that motivation, as conceptualized by the ARCS model, plays a key role in listening development, though its influence may vary by instructional context.

The stronger motivation-performance link in the control group may reflect differences in engagement, feedback mechanisms, or how motivational elements were activated. This highlights the need to consider learners' motivational profiles when designing instruction. Strengthening specific components—such as confidence or satisfaction—may enhance outcomes. These results align with self-determination and expectancy-value theories (Dörnyei, 2005), underscoring motivation's role in second language success. Future research could employ regression or path analysis to clarify causal links and explore how instructional design interacts with individual motivation over time.

Drawing on the findings and expert feedback from a seven-member focus group, the instructional model was revised to better meet learners' motivational needs and enhance listening outcomes. While the ARCS-flipped model improved listening proficiency, its limited effect on motivation highlighted the need for refinements. Figure 3 illustrates the experts' recommendations for an improved ARCS-flipped instructional model for future research, showing adjustments such as more time for pre-class preparation, interest-driven in-class tasks, and differentiated support to strengthen confidence and satisfaction. It places greater emphasis on learner autonomy and self-reflection to address ceiling effects and sustain long-term motivation.

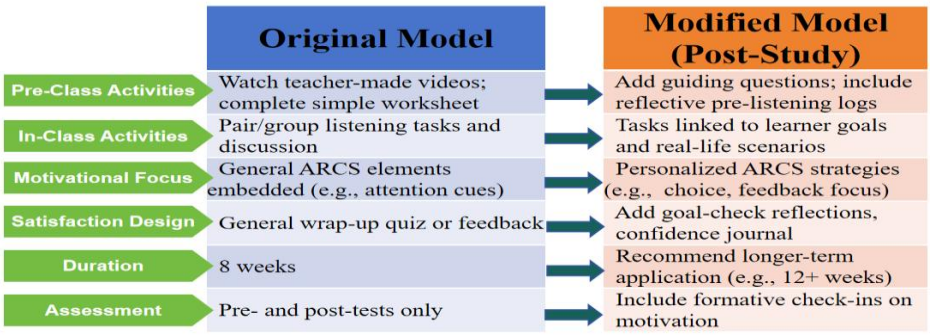

Figure 3
Improvised ARCS flipped instructional model by experts for future research

CONCLUSION

This study examined the effects of the ARCS-flipped model on Chinese language learners' listening proficiency and motivation. Results showed that the experimental

group significantly outperformed the control group on the HSK listening post-test, affirming the model's effectiveness in improving listening proficiency. However, no significant group differences emerged in overall motivation scores, suggesting that short-term exposure may be insufficient to produce measurable motivational gains. Still, correlations between motivation—particularly Confidence and Satisfaction—and listening performance point to its important role in language learning, especially under traditional instruction.

These findings offer several pedagogical implications. First, integrating ARCS principles into flipped instruction can enhance listening learning outcomes, but motivational design must be personalized and sustained to be effective. Second, motivation is a complex, multidimensional construct; simply adding motivational elements is not enough—instruction must align with students' baseline levels and individual differences. Third, this study demonstrates how combining flipped pedagogy with digital tools like the Superstar platform can foster structured pre-class learning, peer collaboration, and formative feedback, all of which contribute to listening improvement.

The study's limitations include its short duration (8 weeks), small sample size, and reliance on self-reported motivation measures, which may limit generalizability. Future research should adopt longer-term designs, larger and more diverse samples, and mixed-methods approaches to better capture motivational change. Advanced analyses, such as structural equation modeling, could also help clarify causal pathways between motivation and learning outcomes.

In conclusion, while the ARCS-flipped model shows promise in enhancing listening proficiency, further refinement and longitudinal validation are needed to fully leverage its motivational potential in L2 instruction.

REFERENCES

Asiksoy, G., & Özdamli, F. (2016). Flipped classroom adapted to the arcs model of motivation and applied to a physics course. *Eurasia Journal of Mathematics, Science and Technology Education, 12*(6), 1589-1603.

Bergmann, J., & Sams, A. (2012). Flip your classroom: Talk to every student in every class every day. Washington, DC: International Society for Technology in Education.

Bezus, S., Akbilek, E., & Mekeko, N. (2021). Web Technologies in Distance Learning: Student Perception on the Advantages and Disadvantages. *Proceedings of 2021 IEEE International Conference on Educational Technology (ICET)*, 85-89.

Bloom, B. S. (1968). Learning for mastery. *Evaluation Comment, 1*(2), 1-12. Retrieved from http://ruby.fgcu.edu/courses/ikohn/summer/PDFfiles/LearnMastery2.pdf

Chu, Y. (2017). Instructional Design of Online Pre-class Tasks of the flipped classroom on the Basis of ARCS Model. *DEStech Transactions on Social Science*, *Education and Human Science*.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences (2nd ed.)*. Routledge.

Dörnyei, Z. (2005). *The psychology of the language learner: Individual differences in second language acquisition.* Mahwah, NJ: Lawrence Erlbaum.

Dörnyei, Z. (2009). The L2 motivational self system. In Z. Dörnyei & E. Ushioda (Eds.), *Motivation, language identity and the L2 self* (pp. 9-42). Bristol, UK: Multilingual Matters.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Berlin: Springer Science & Business Media.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology, 53*(1), 109-132.

Etemadfar, P., Soozandehfar, S. M. A., & Namaziandost, E. (2020). An account of EFL learners' listening comprehension and critical thinking in the flipped classroom model. *Cogent Education,*7.

Flowerdew, J., & Miller, L. (2010). Listening in a second language. In A. F. D. L. Green (Ed.), *Listening and human communication in the 21st century* (pp. 158-177). Wiley-Blackwell.

Fu, S.Q., Zhou, Y.W., & Zhu, Q.X. (2020). Research on curriculum design of flipped classroom based on ARCS motivation model. *Overseas English*, *4*, 11-13.

Jia, C.Y., Hew, K., & Li, M.T. (2023). Towards a flipped SEF-ARCS decoding model to improve foreign language listening proficiency. *Computer Assisted Language Learning*, 1-28.

Jiang, L.P. (2014). *HSK Standard Course 3*. Beijing Language and Culture University Press.

Karabatak, S., & Polat, H. (2020). The effects of the flipped classroom model designed according to the ARCS motivation strategies on the students' motivation and academic achievement levels. *Education and Information Technologies,* 25.

Keller, J. M. (1987). Development and use of the ARCS model of instructional design. *Journal of Instructional Development 10*, 2.

Keller, J. M. (2010). Motivational Design for Learning and Performance: The ARCS Model Approach. Springer, New York, NY, USA.

Kozbakova, K. (2021). Learning a foreign language online: advantages and disadvantages. *Proceedings of International Research Conference on Technology, Science, Engineering & Management,* 58-60.

Kurita, T. (2012). Issues in second language listening comprehension and the pedagogical implications. *Accents Asia, 5*(1), 30-44.

Kurt, P. Y., & Keçik, İ. (2017). The effects of ARCS motivational model on student motivation to learn English. *European Journal of Foreign Language Teaching, 2*(1), 22–44.

Liao, X., & Phongsatha, S. (2023). Research on the Application of Flipped Classroom in University Furniture Design Course-Taking Leshan Normal University as an

Example. *International Journal of Sociologies and Anthropologies Science Review*s, *3*(6), 211-228.

Mirzaei, A., Shafiee Rad, H., & Rahimi, E. (2022). Integrating ARCS motivational model and flipped teaching in L2 classrooms: a case of EFL expository writing. *Computer Assisted Language Learning*, *37*(5–6), 1136–1165.

Pratiwi, D. I., Ubaedillah, U., Puspitasari, A., & Arifianto, T. (2022). Flipped classroom in online speaking class at Indonesian university context. *International Journal of Instruction, 15*(2), 697-714.

Piriyasurawong, P. (2019). Active Learning Using ARCS Motivation on Social Cloud Model to Enhance Communication Skills in Foreign Language. *TEM Journa*l, *8*(1), 290-297.

Rahman, F., Mahmud, I., Jiang, B., & Sarker, K. (2022). Extending the theory of planned behavior: A case of learning Chinese as a third language. *International Journal of Instruction, 15*(1), 945–964.

Rivera, C. K., Eckstein, G., Eddington, David E., & McMurry, Benjamin L. (2021). The effects of metacognitive listening strategy instruction on ESL learners' listening motivation. *Research Papers in Language Teaching and Learning, 11*(1), 251-267.

Vandergrift, L. (2007). Recent Developments in Second and Foreign Language Listening Comprehension Research. *Language Teaching*, *40*, 191-210.

Vandergrift, L., & Goh, C. (2012). *Teaching and learning second language listening: Metacognition in action*. London: Routledge.

Wang, F.L.(2015). Analysis on the Current Listening Test Mode Based on HSK Listening Test. *The Science Education Article Collects*, *27*, 34-35.

Wu, X.Y. (2015). Instructional design of online pre-tasks for flipped English speaking and listening course on the basis of ARCS motivation model. *Journal of Higher Education*, *8*, 12-13.

Xiao, X. (2023). Research on Blending Teaching of College English Based on Superstar Learning App. *The Educational Review, USA*, *7*(8), 1184-1188.

Zhang, X., & AlSaqqaf, A. (2025). Improving EFL Non-English majors' pronunciation via a Flipped classroom: A modular approach. *International Journal of Instruction, 18*(2), 517-532.

Zhang, J.F. (2015). Improving English Listening Proficiency: The Application of ARCS Learning-motivational Model. *English Language Teaching*, 8.

Zhao, J.H. (2017). Study of Pre-class To-do List of Flipped Classroom based on ARCS Motivation Model. *China Educational Technology & Equipment, 12*, 85-87.

APPENDIX A

QUESTIONNAIRE ON ARCS MOTIVATION SCALE

Dear students,

Thank you for taking your time to answer this questionnaire. This survey is being run by a doctoral research project and aims to measure your learning motivation of the listening section (HSK-Level3) of our online course Chinese II-2. Your assistance will be of great significance to the research and future teaching. Please answer the survey with the most accurate information possible based on your personal experiences. All personal information will only be used for research purposes and will be kept strictly confidential.

Part I Personal Information

1. Gender: ☐Male ☐Female 2.Age: _____ years old

3. Nationality: _____ 4. Time of learning Chinese language: _____ years

Part II Course Interest Survey (CIS)

Please answer the following questions by checking (☑), and rate yourself based on your real experiences and opinions on given the statements using the following 5-level scales:
1 - Not true; 2 - Slightly true; 3 - Moderately true; 4 - Mostly true; 5 - Very true

		Not true	Sligh-tly true	Mode-rately true	Mos-tly true	Very true
1	The instructor knows how to make us feel enthusiastic about the subject matter of this course.	☐	☐	☐	☐	☐
2	The things I am learning in this course will be useful to me.	☐	☐	☐	☐	☐
3	I feel confident that I will do well in this course.	☐	☐	☐	☐	☐
4	This class has very much in it that captures my attention.	☐	☐	☐	☐	☐
5	The instructor makes the subject matter of this course seem important.	☐	☐	☐	☐	☐
6	You do NOT have to be lucky to get good grades in this course.	☐	☐	☐	☐	☐
7	I do NOT have to work too hard to succeed in this course.	☐	☐	☐	☐	☐
8	I see how the content of this course relates to anything I already know.	☐	☐	☐	☐	☐
9	Whether or not I succeed in this course is up to me.	☐	☐	☐	☐	☐
10	The instructor creates suspense when building up to a point.	☐	☐	☐	☐	☐
11	The subject matter of this course is quite manageable for me.	☐	☐	☐	☐	☐
12	I feel that this course gives me a lot of satisfaction.	☐	☐	☐	☐	☐
13	In this class, I try to set and achieve high standards of excellence.	☐	☐	☐	☐	☐
14	I feel that the grades or other recognition I receive are fair compared to other students.	☐	☐	☐	☐	☐
15	The students in this class seem curious about the subject matter.	☐	☐	☐	☐	☐
16	I enjoy working for this course.	☐	☐	☐	☐	☐
17	It is NOT difficult to predict what grade the instructor will give my assignments.	☐	☐	☐	☐	☐

18	I am pleased with the instructor's evaluations of my work compared to how well I think I have done.	☐	☐	☐	☐	☐
19	I feel satisfied with what I am getting from this course.	☐	☐	☐	☐	☐
20	The content of this course relates to my expectations and goals.	☐	☐	☐	☐	☐
21	The instructor does unusual or surprising things that are interesting.	☐	☐	☐	☐	☐
22	The students actively participate in this class.	☐	☐	☐	☐	☐
23	To accomplish my goals, it is important that I do well in this course.	☐	☐	☐	☐	☐
24	The instructor uses an interesting variety of teaching techniques.	☐	☐	☐	☐	☐
25	I do NOT think I will benefit much from this course.	☐	☐	☐	☐	☐
26	I rarely daydream while in this class.	☐	☐	☐	☐	☐
27	As I am taking this class, I believe that I can succeed if I try hard enough.	☐	☐	☐	☐	☐
28	The personal benefits of this course are clear to me.	☐	☐	☐	☐	☐
29	My curiosity is often stimulated by the questions asked or the problems given on the subject matter in this class.	☐	☐	☐	☐	☐
30	I find the challenge level in this course to be about right: neither too easy not too hard.	☐	☐	☐	☐	☐
31	I feel quite satisfied with this course.	☐	☐	☐	☐	☐
32	I feel that I get enough recognition of my work in this course by means of grades, comments, or other feedback.	☐	☐	☐	☐	☐
33	The amount of work I have to do is appropriate for this type of course.	☐	☐	☐	☐	☐
34	I get enough feedback to know how well I am doing.	☐	☐	☐	☐	☐