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The Effect of Flipped Classroom on Foreign Language Anxiety and Grammatical Competence of Iranian EFL Students: A Comparison between Elementary and Advanced Language Proficiency Levels

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Abstract: This quasi-experimental study examined whether a flipped classroom model reduces foreign language anxiety (FLA) and improves grammatical competence (GC) among Iranian learners of English at elementary and advanced proficiency levels. Twenty Persian L1 students (A1–A2; B2–C1; n=10 per level) at a private institute in Gonbad-e Kavus were allocated by intact class to flipped or traditional instruction (n=5 per cell) over 10 weeks (20 sessions). The flipped condition received pre-class micro-lectures, guided worksheets, and readiness quizzes via Telegram, with class time devoted to coached practice and feedback; control classes followed teacher-fronted lessons with homework. FLA was measured with the Foreign Language Classroom Anxiety Scale (FLCAS) and GC with level-specific parallel grammar tests. Two-way ANCOVAs controlling pretest scores showed large advantages for the flipped approach on both outcomes. Relative to traditional instruction, flipping substantially reduced anxiety, $F(1,35)=184.367$, $p<.001$, partial $\eta^2=.840$, and enhanced grammatical competence, $F(1,35)=24.504$, $p<.001$, partial $\eta^2=.412$. Proficiency exhibited significant main effects (advanced < elementary FLA; advanced > elementary GC), $F(1,35)=53.461$, $p<.001$, partial $\eta^2=.604$; $F(1,35)=7.097$, $p=.012$, partial $\eta^2=.169$, respectively. Group × Proficiency interactions were not significant for either outcome (ps>.10), indicating comparable flipped benefits at both proficiency levels. Assumption checks and reliability indices were satisfactory. Findings suggest that reallocating input to pre-class preparation and dedicating class time to scaffolded practice can meaningfully lower FLA while strengthening grammar across proficiency bands. The small, single-site sample and cluster allocation warrant cautious generalization; larger multi-site replications with delayed outcomes and skill-specific anxiety measures are recommended.

Keywords: Advanced-level Students, Elementary-level Students, Flipped Classroom, Foreign Language Anxiety (FLA), Grammatical Competence (GC)

Introduction

Foreign language (FL) learning has long been recognized as uniquely anxiety-provoking, with early and sustained work documenting its pervasive, multi-faceted effects on cognition, behavior, and performance (Aydın, 2008; Cheng, 2004; Dewaele et al., 2019; Sahoo & Sinha, 2020; Tallon, 2009). Horwitz et al. (1986) famously conceptualized FL classroom anxiety (FLCA) as "self-perceptions, beliefs, feelings and behaviors related to classroom language learning arising from the uniqueness of the language learning process" (p. 128), a situation-specific form that differs from trait and transient

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state anxieties (Horwitz, 2001; MacIntyre & Gardner, 1989; Spielberger, 1983; Zheng, 2008). Subsequent theorizing emphasized its psychophysiological signature and domain specificity: FL use entails "the feeling of tension and apprehension specifically associated with second language context, including speaking, listening and learning" (MacIntyre & Gardner, 1989, p. 35), and—critically for pedagogy—"it can interfere with the acquisition, retention, and production of the new language'' (MacIntyre & Gardner, 1991, p. 86). Empirical evidence converges on a robust negative association between FLCA and achievement across skills and settings (Gardner & MacIntyre, 1993; Tallon, 2009; Teimouri et al., 2019; Zhang, 2019), with learners reporting avoidance, silence, and self-protective strategies even when motivated (Baez-Holley, 2014; Von Worde, 2003). Although speaking has often been identified as the most anxiety-inducing modality, reading and listening also elicit considerable apprehension, underpinned by linguistic, cognitive, and affective constraints (Kern, 1988; Kuru-Gonen, 2009; MacIntyre & Gardner, 1989; Saito et al., 1999). In particular, gaps in background knowledge and metacognitive control compromise comprehension and confidence, thereby reinforcing anxiety cycles (Carrell, 1983; Kuru-Gonen, 2009). Within contemporary EFL contexts, these affective dynamics intersect with technology-mediated learning in complex ways: while digital tools can amplify autonomy and access, technology anxiety and low readiness may dampen engagement and outcomes (Aydın, 2018; Hao, 2016; Magen-Nagar & Shonfeld, 2018; Saadé & Kira, 2009; Venkatesh & Davis, 2000; Yilmaz, 2017). Responding to these tensions, the flipped classroom has been proposed as a structurally student-centered architecture that redistributes cognitive load and reconfigures classroom discourse toward collaborative meaning-making grounded in social constructivist and sociocultural principles (Brandt, 1997; Cannella & Reiff, 1994; Vygotsky, 1978; Wood et al., 1976). In its canonical formulation, "which is traditionally done in class is now done at home, and that which is traditionally done as homework is now completed in class" (Bergmann & Sams, 2012, p. 13), typically via pre-class video/text input and in-class coached practice and interaction (Novak, 2011; Talbert, 2012). Anchored in self-determination theory, flipping is hypothesized to satisfy learners' basic needs for autonomy, competence, and relatedness, thereby enhancing motivation and attenuating anxiety (Cheon & Reeve, 2015; Deci & Ryan, 1985; Ryan & Deci, 2024). Evidence from language classrooms suggests benefits for engagement, confidence, and skill development (Adnan, 2017; Chen Hsieh et al., 2017; Hung, 2015; Jiang et al., 2022; Wang et al., 2018; Webb & Doman, 2016), including reductions in general FLCA in online-flipped conditions. Yet the literature remains methodologically heterogeneous and occasionally equivocal—some studies report stable grades despite positive perceptions—highlighting the need for targeted, context-sensitive tests of affective outcomes in flipped designs (Davies et al., 2013; Goodwin & Miller, 2013; McLaughlin et al., 2016). In Iran, where EFL education is high-stakes and often lecture-dominant, reports of anxiety are common, and learners' digital literacies are uneven (Jafarigohar et al., 2019; Maleki & Zangani, 2007; Namaziandost et al., 2019), sharpening the pedagogical imperative to examine whether flipped instruction can systematically lower FLCA while sustaining linguistic development across proficiency bands.

A particularly underexplored site for such inquiry concerns grammatical competence, a foundational component of communicative ability that supports comprehension and production across modalities, but is frequently taught as decontextualized rule memorization, with limited opportunity for guided application and feedback (Larsen-Freeman, 2003; Richards et al., 1985). Complementing this line of argument, recent quasi-experimental evidence from Iraqi EFL grammar classes shows that integrating learners' interests into instructional materials can enhance grammar achievement while simultaneously increasing interest and reducing anxiety (Esmeil Sakran Alkemi et al., 2024), highlighting the potential of affectively responsive grammar pedagogy to address both cognitive and emotional dimensions of learning. Iranian EFL learners often struggle to integrate form-function mappings and transfer declarative knowledge to proceduralized use, especially under evaluative pressure—conditions that are likely to exacerbate anxiety (Graus & Coppen, 2015; Maleki & Zangani, 2007). Flipped pedagogy offers a principled alternative: by shifting lower-level cognitive work (remembering/understanding) to pre-class preparation and dedicating class time to scaffolded practice at higher levels (applying/creating), it aligns with revised Bloom's taxonomy and affords sustained mediation within learners' zones of proximal development (Anderson & Krathwohl, 2001; O'Flaherty & Phillips, 2015; Vygotsky, 1978). Empirical studies in L2 contexts have documented gains in

grammar-related outcomes, perceived comfort, and confidence when explicit form-focused input is delivered out of class and communicative tasks are coached in class (Liu et al., 2019; Moranski & Kim, 2016; Webb & Doman, 2016), as well as improvements in writing complexity/accuracy/fluency in flipped designs that integrate metacognitive supports (Fathi & Rahimi, 2020; Leis et al., 2015). Nevertheless, success is not guaranteed: benefits appear contingent on pre-class task regularity and quality (Jovanović et al., 2019), students' readiness and technology literacy (Chuang et al., 2018; Hao, 2016; Yilmaz, 2017), and informed teacher orchestration (Kong, 2014). Critically, virtually few works have jointly modelled the affective (FLCA) and linguistic (grammatical competence) consequences of flipping within a single EFL program in Iran while explicitly comparing proficiency bands. Prior reviews of flipped language learning emphasize gaps around (a) affective mechanisms and outcomes, particularly anxiety reduction beyond speaking; (b) grammar-focused implementations in authentic EFL classrooms; and (c) differential effects by learner proficiency and digital readiness (Jiang et al., 2022; Webb & Doman, 2016). Moreover, the Iranian tertiary context—with its blend of exam-oriented syllabi, variability in learners' background knowledge, and ongoing digitization—provides a theoretically rich and practically urgent setting to test whether flipped instruction can rebalance cognitive load, heighten perceived competence, and normalize error-tolerant practice that mitigates anxiety while consolidating grammatical schemata (Bergmann & Sams, 2012; Garrison & Kanuka, 2004; Leu, 2013; Roehl et al., 2013). By systematically comparing elementary and advanced EFL learners under flipped versus non-flipped conditions, the present study addresses these intertwined gaps and offers an evidence-based account of when, for whom, and how flipped classrooms can simultaneously reduce FLCA and strengthen grammatical competence in Iranian higher education.

Literature Review

Framing the Problem: Flipping, Anxiety, and Grammar

Flipped learning—sometimes called the inverted classroom, rearranges where and when instruction occurs by moving direct explanations to pre-class spaces (e.g., short videos, annotated slides, guided readings) and reserving in-class time for coached practice, collaboration, and feedback (Lage et al., 2000; Tucker, 2012). Conceptually, flipping is a specific form of blended learning whose promise lies less in technology per se than in a deliberate reallocation of attention across the learning cycle (Bozkurt & Sharma, 2021; O'Flaherty & Phillips, 2015). In second language education, that reallocation is not pedagogical window dressing; it changes the timing and density of input, interaction, and feedback—the three levers most tightly coupled with affective variables such as FLA and with linguistic development, including grammatical competence. Foreign Language Classroom Anxiety is a situation-specific construct comprising communication apprehension, test anxiety, and fear of negative evaluation (Horwitz et al., 1986; Horwitz, 2001). Meta-analytic work consistently links higher FLA with poorer performance (MacIntyre & Gardner, 1989; Teimouri et al., 2019; Zhang, 2019), and grammar instruction—central to form–meaning mapping—often suffers under lecture-heavy formats that leave little time for application and feedback (Graus & Coppen, 2015). These constraints are acute in many Iranian EFL settings where large classes, exam pressure, and limited opportunities for authentic interaction compress practice opportunities (Maleki & Zangani, 2007). A flipped design, in principle, can reduce FLA by increasing predictability and learner control while simultaneously raising grammatical attainment by freeing class time for coached, higher-order practice. That promise, however, is contingent: benefits may vary with learners' proficiency, self-regulatory capacity, and technology readiness (Hao, 2016; Yilmaz, 2017), and the very features that lower anxiety for some learners (e.g., autonomy) can raise it for others if supports are thin. The present review therefore develops a theoretically integrated account of how flipping might influence FLA and grammar and of when those effects are most and least likely to appear.

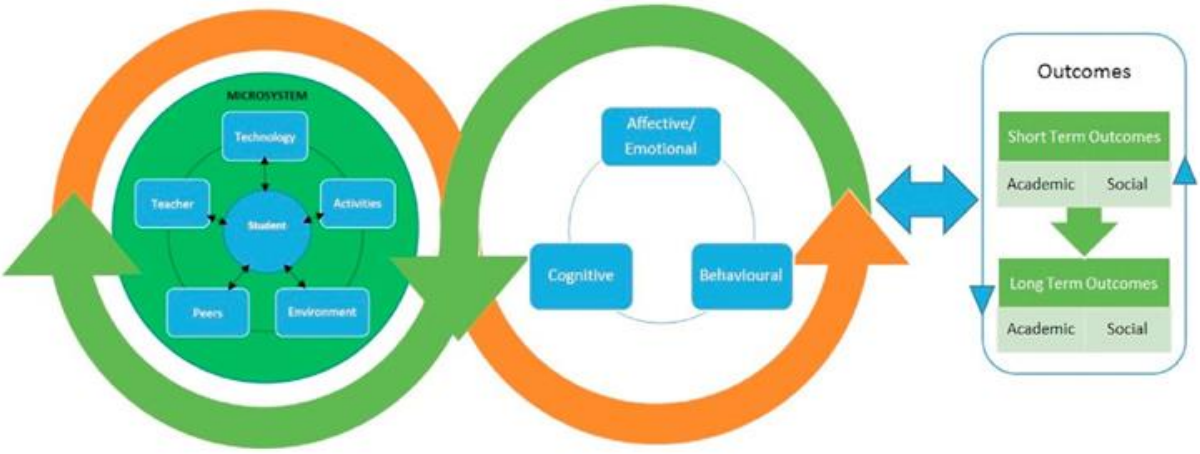
Design Lenses for the Flipped Intervention

Bond's (2020) learner engagement framework (Figure 1) offers a first lens by foregrounding the "microsystem" of technology, teacher, tasks, peers, and environment that shapes cognitive, behavioral, and affective engagement. In a flipped EFL class, each element becomes highly tractable. Pre-class

media position technology and content design as soft scaffolds; collaborative, problem-focused in-class work renders teacher moves and peer dynamics central; and the local climate signals whether error is treated as data or as deficiency. From this perspective, flipping functions not as a one-size method but as a reconfiguration of engagement drivers that can, if designed well, dampen FLA (by normalizing risk and increasing teacher proximity) and enhance grammar learning (by intensifying time-on-form-and-use). Crucially, the framework also clarifies where implementation fails: poorly produced or excessively long pre-class materials can overload cognition and depress motivation; misaligned in-class tasks can squander newly available time; and inflexible classroom norms can nullify the anxiety-reducing potential of collaborative work.

Figure 1

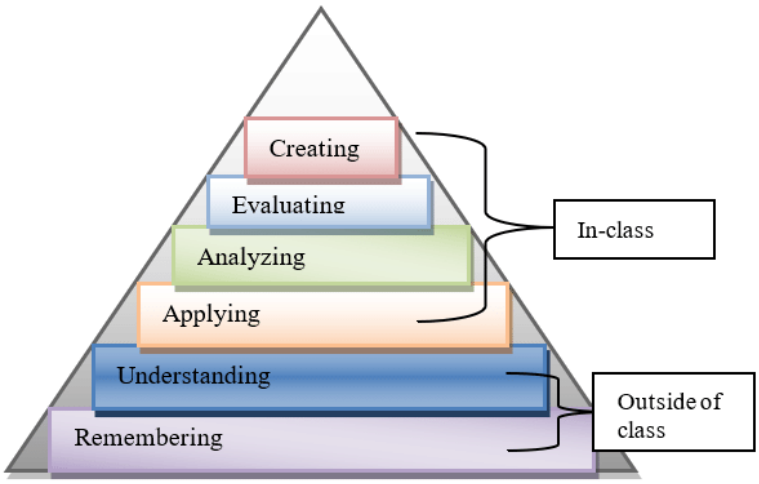
Learner Engagement Framework in Flipped Learning (Bond, 2020)



A second lens is the redistribution of cognitive work across Bloom's taxonomy (Figure 2). The canonical claim is that lower-order processes—remembering and understanding—are more efficiently tackled at home, while valuable face-to-face time is spent on applying, analyzing, evaluating, and creating (Faculty Focus, 2016; Zainuddin & Halili, 2016). In grammar instruction, this means moving rule exposition and initial noticing out of class and using class time for constrained production, guided problem solving, and feedback-rich tasks that surface and repair interlanguage hypotheses (Moranski & Kim, 2016). The logic is attractive but requires careful orchestration. If pre-class materials do not sufficiently prepare learners to apply rules, in-class activities will backslide into re-lecturing; if in-class tasks do not reliably elicit target forms, students may be busy but not productive with respect to grammar. Thus, Bloom's redistribution is not merely about location; it is an alignment problem among content, assessment, and scaffolding, with cognitive load and pacing as critical boundary conditions.

Figure 2

Bloom's Taxonomy in the Flipped Learning (Zainuddin & Halili, 2016, p.316)



Core Theoretical Foundations

Constructivism provides a foundation by emphasizing active meaning-making and hypothesis testing. Flipped classrooms instantiate constructivist principles by relocating time toward problem solving, discussion, and project work while giving learners control over the pace and sequence of initial input (G. Akçayır & Akçayır, 2018; Bishop & Verleger, 2013). For grammar, this supports consciousness-raising and input-processing tasks in which learners induce patterns and check them against feedback. The critical caveat is that discovery does not guarantee accuracy; left unguided, learners may entrench misconceptions. Constructivist flipping, therefore, rises or falls with the quality of scaffolds and the granularity of feedback, which must be fine enough to catch rule overgeneralizations yet light enough to preserve autonomy.

Sociocultural theory deepens the account by situating learning in socially mediated activity within the Zone of Proximal Development (John-Steiner & Mahn, 1996; Vygotsky, 1978). In a flipped design, pre-class media operate as advance organizers that prime attention and lower uncertainty; in-class interaction supplies contingent, "hard" scaffolding—modeling, prompting, recasting—that is gradually faded (Wette, 2015; Wood et al., 1976). This mapping is compelling for both outcomes of interest: anxiety is tempered by predictable supports and distributed performance, and grammar benefits from dialogic negotiation that exposes learners to negative evidence and metalinguistic cues. Yet the very sociality that fuels learning can also amplify fear of negative evaluation if group norms are competitive or if teacher feedback is evaluative rather than facilitative. Sociocultural fidelity thus demands deliberate community building and explicit norms around error and risk.

Bandura's social learning theory contributes mechanisms of modeling, guided reproduction, and reinforcement (Bandura, 1977). High-quality micro-lectures and think-aloud demonstrations furnish attentional anchors and mental models; in-class coached practice enables reproduction with immediate, diagnostic feedback (Alvarez, 2012; Fulton, 2012). Observing competent peers can be particularly anxiety-reducing for less proficient learners while providing advanced learners with aspirational targets. However, modeling can backfire if exemplars are too distant from learners' current capability, producing discouragement, or if models rely on implicit knowledge that novices cannot unpack. The instructional implication is to layer models from simple to complex and to externalize expert decision processes to avoid "stealth expertise."

Kolb's experiential learning cycle—concrete experience, reflective observation, abstract conceptualization, active experimentation—maps naturally onto a flipped sequence (Kolb & Kolb, 2005). Pre-class encounters deliver experience and reflection at a self-regulated pace; in-class

workshops consolidate concepts and test them in production. For grammar, iterative cycling normalizes error as informational, reducing performance pressure while fostering durable control. The risk, again, is pacing: if cycles are rushed, reflection is the first casualty, and learners retain brittle rules that fail under communicative load.

Self-Determination Theory (SDT) provides a motivational backbone by positing that autonomy, competence, and relatedness catalyze engagement (Deci & Ryan, 1985; Ryan & Deci, 2024). Flipped designs can support autonomy through self-paced pre-class work, competence through mastery-oriented feedback and replayable resources, and relatedness through structured collaboration. These same features are the levers through which flipping might depress FLA and sustain persistence in cognitively demanding grammatical work. SDT also clarifies pitfalls: "autonomy" without structure is abandonment; "competence" without credible evidence is empty praise; and "relatedness" without safety is conformity pressure. Designing for SDT thus requires calibrated structure, honest feedback, and intentional community norms.

Finally, the Flipped Learning Network's FLIP pillars—Flexible environment, Learning culture, Intentional content, Professional educator—codify enactment principles (Network FLN, 2014). In the present context, flexibility concerns not only room layouts and groupings but also multimodal access (e.g., transcripts, low-bandwidth alternatives) that matter in bandwidth-constrained settings. A learning culture reframes class time as a workshop where interaction and feedback are routine rather than exceptional (Baepler et al., 2014). Intentional content means making principled decisions about which grammatical knowledge is best encountered at home and which requires social mediation and feedback. The professional educator component underscores that flipping is not a teacher-light approach; it is teacher-intensive in design and moment-to-moment pedagogy. Read through this lens, flipping is less a technique to adopt than a set of design choices to justify.

Why Flipping Should Reduce FLA and Strengthen Grammar

The anxiety argument turns on predictability, control, and proximity. Replayable pre-class materials reduce ambiguity—one of the strongest triggers of state anxiety in language tasks (Chen Hsieh et al., 2017; Ellis, 1994). When learners arrive having previewed key forms and expectations, the sense of "surprise evaluation" declines. In-class time, reallocated away from monologic lecturing, permits smaller performance units in supportive groups, reducing the salience of public error and fear of negative evaluation (Horwitz et al., 1986). Peer modeling and graduated challenges further bolster self-efficacy (Bandura, 1977), which is inversely related to anxiety. Teacher proximity during practice enables immediate corrective feedback and affective coaching that transform errors into opportunities rather than verdicts (O'Flaherty & Phillips, 2015). The same technologies that enable flipping can introduce their own anxieties, particularly for learners with low digital self-efficacy (Saadé & Kira, 2009). Here, the design remedy is not to abandon technology but to simplify interactions, offer just-in-time support, and leverage collaborative structures that diffuse individual tech burdens (Magen-Nagar & Shonfeld, 2018; Yilmaz, 2017). A critical caveat is the risk of selection effects and novelty: early reductions in reported anxiety may reflect enthusiasm for a new format or the relief of escaping lecture rather than deeper, durable changes in self-concept. Robust evaluation must therefore look for persistence of effects after the novelty window and examine whether reductions in FLA generalize beyond the flipped course.

The grammar argument is complementary but not identical. Moving explanation and input enhancement out of class increases the time available for noticing-the-gap, output, and feedback—activities strongly associated with durable form learning (Moranski & Kim, 2016). Properly aligned with Bloom's levels, class time can be used to press learners beyond recall toward application and analysis, yielding improvements in accuracy and complexity (Fathi & Rahimi, 2020; Liu et al., 2022). Iterative experiential cycles strengthen control under communicative pressure, while low-stakes, frequent checks transform assessment into a learning tool that accelerates uptake and repair (Hung, 2015; Schultz et al., 2014). The most serious threat to this causal story is misalignment: if pre-class materials are too thin or cognitively overloaded, class time devolves into re-teaching; if in-class tasks are communicatively glossy but form-indifferent, learners may produce a lot of language with little

impact on the targeted grammatical subsystem. A second threat is measurement. "Grammatical competence" is often operationalized with discrete-point tests that are sensitive to rule recall but less so to control in spontaneous use; studies that rely solely on such measures may overestimate gains. Mixed assessment that includes controlled production, elicited imitation, and task-based performance is necessary to verify that flipping improves not only knowledge about grammar but grammar-in-use.

Proficiency as a Moderator: Elementary Versus Advanced

Proficiency is plausibly a first-order moderator because it covaries with self-regulation, metalinguistic awareness, and tolerance for ambiguity. Elementary learners, who typically report higher FLA and weaker self-regulation, stand to benefit from dense scaffolding in both phases. Pre-class materials should be short, highly segmented, and supported by captions and visual cues; in-class work should emphasize controlled production and tightly guided practice that stabilizes accuracy before fluency. For these learners, the anxiety-reducing features of predictability, peer support, and small performance units are not auxiliary; they are prerequisites for participation. Gains in grammar may first appear as improved rule retrieval and fewer overt errors, with later spillover into controlled fluency. Advanced learners often report lower baseline anxiety but higher performance standards, and they benefit from autonomy-supportive designs that offer complex, meaningful tasks. For them, flipping opens space for analytic discussion, problem-based grammar, and creative output that stretch complexity and control under real-time conditions (Chenoweth & Hayes, 2003; Fathi & Rahimi, 2020). The same design, however, can frustrate advanced learners if pre-class materials feel remedial or if in-class tasks are insufficiently demanding. Proficiency is also entangled with technology readiness: learners who are linguistically advanced but digitally fragile may be hampered in the pre-class phase, while elementary learners who are digitally fluent may thrive despite linguistic limitations (Chuang et al., 2018; Yilmaz, 2017). This heterogeneity suggests that "proficiency" should not be treated as a coarse grouping variable alone; tiered scaffolding and branching tasks within classes may better address within-level variation than splitting cohorts.

A Synthesized Conceptual Framework for the Present Study

Taken together, the theoretical strands justify a composite model in which a flipped design redistributes cognitive processes across Bloom's levels, orchestrates the microsystem levers of engagement, and satisfies SDT needs for autonomy, competence, and relatedness. In this model, pre-class media operate as advance organizers and soft scaffolds that reduce ambiguity and prime attention; in-class interaction supplies contingent support and diagnostic feedback that drive both affective and cognitive change. The proximal mediator is multidimensional engagement: affective engagement lowers FLA as learners experience predictability, social safety, and incremental mastery; cognitive and behavioral engagement increase time-on-form-and-use and the likelihood of productive practice. Proficiency moderates the density and type of scaffolding needed, the optimal balance of control versus challenge, and the mapping from engagement to outcomes. The model also foregrounds potential "dark side" contingencies: poorly designed media can raise cognitive and technological anxiety; misaligned tasks can increase public error without adequate support; and teacher workload can spike in ways that degrade feedback quality. These risks are not arguments against flipping but design constraints that a theory-guided intervention must respect. Framed in this way, the present study's focus on Iranian EFL learners and on dual outcomes—FLA and grammar—follows not from fashion but from a clear causal hypothesis: by reallocating instructional time and social support, flipping can depress anxiety and improve grammatical competence, provided that scaffolding, alignment, and cultural–institutional constraints are addressed. The comparative analysis of elementary versus advanced cohorts is not merely descriptive but tests a core moderation claim: that the same structural design exerts different effects depending on learners' readiness profiles.

Empirical Studies

A cumulative reading of the flipped-learning literature on anxiety shows a trend toward reduced FL anxiety (FLA), but with important exceptions that help explain when flipping helps and when it does not. The earliest study in this set, Goda et al. (2016), paired flipped delivery with a jigsaw structure and

detected selective gains on FLCAS items tied to course preparation, implying that the combination did not uniformly lower anxiety but most clearly helped where the design directly increased predictability and readiness. Hsu (2017) broadened the lens with a large Taiwanese survey, reporting lower anxiety when instructors used flipped practices and identifying "poor grade" and public responding as salient anxiety drivers; the study's correlational nature makes it suggestive rather than causal, but its diagnostics foreshadow the mechanisms later experiments would leverage. Two Iranian quasi-experiments then tightened causal claims: Parvaneh et al. (2020) found that flipped classes suppressed anxiety alongside gains in learner autonomy, while Hosseini et al. (2021)—notably focusing on listening and distributing materials via WhatsApp—reported no between-group difference on classroom anxiety despite superior listening scores for the flipped cohort. That divergence is pivotal. It signals that flipped exposure alone is insufficient to depress global FLA when in-class time is not explicitly engineered to alter the social evaluation climate or when the outcome is a general anxiety scale rather than a skill-specific one. Subsequent studies align with this interpretation. Abdullah et al. (2021) tracked Omani undergraduates across twelve weeks and observed substantial declines in speaking anxiety, with multivariate analyses indicating improvements across all AESPQ dimensions; unlike Hosseini et al., the focal skill and the anxiety instrument were matched, and the in-class work emphasized coached production—precisely the conditions under which fear of negative evaluation is most malleable. Pan et al. (2022) contrasted MOOC-based and flipped instruction with a face-to-face control and found both technology-mediated treatments outperformed control on speaking anxiety and motivation, underscoring that structured pre-exposure plus guided interaction—whether flipped or MOOC—can relieve performance pressure when practice opportunities are abundant. Parvaneh et al. (2022) added a valuable moderation test across elementary to advanced levels, showing immediate and longer-term anxiety reduction under flipping but no differential effect by proficiency; that finding runs against common assumptions about proficiency sensitivity, yet the university context and intact classes may have narrowed variance in self-regulation. Evidence continued to accumulate across skills: Zhao and Yang (2023) reported lower writing anxiety with social-media-supported flipping; Gök et al. (2023) showed decreases in both classroom and reading anxieties among Turkish pre-service teachers in an online flipped course; and Siahpoosh and Bagherin (2024) documented FLA reduction when vocabulary was taught via flipping. Across this trajectory, a consistent pattern emerges: when flipped designs align the targeted skill, the in-class interactional script, and the anxiety construct being measured, anxiety tends to fall; when the construct is broad and instruction does not explicitly reshape evaluation dynamics, the effect can wash out, as in Hosseini et al. (2021). Two auxiliary studies help contextualize mechanism and outcomes: Amini et al. (2022) combined grammar instruction with qualitative probes of FLA sources and coping, reinforcing that design features which normalize formative error and provide rapid feedback matter most; Amirian et al. (2022) reaffirmed the strong negative link between FLA and willingness to communicate, implying that any anxiety reductions achieved by flipping are likely to have communicative spillovers.

Empirical work on grammar under flipped designs is more uniformly positive, though it varies in internal validity and in what "grammar" means operationally. Early practice-oriented and perception studies set the stage: Bakar et al. (2018) reported teachers' enthusiasm for flipping grammar, and Bezzazi (2019) showed large test-score gains ($d \approx 1$) for Algerian freshmen after ten weeks, suggesting a strong treatment signal in intact classes. In the Gulf, Al-Naabi (2020) found pre-post gains in Omani learners' grammar with a one-group design—useful but confounded by history and maturation. Stronger quasi-experiments from Iran and Turkey, typically using matched pre-/post-tests and ANCOVA, converged on significant advantages for flipped groups: Noroozi et al. (2021) demonstrated not only higher post-test performance on conditional sentences but also better delayed retention, highlighting the value of feedback-rich in-class phases; Dincer and Polat (2022) replicated grammar gains at a Turkish university and documented higher engagement; Fardin et al. (2022) extended benefits to reading plus grammar; and Amini et al. (2022) confirmed gains among Iranian high-schoolers with researcher-made parallel tests and thematic analysis that traced how design elements mitigated anxiety triggers during grammar practice. More recent school-level studies reinforce generalizability to younger learners and digital platforms: Khasawneh (2022) reported advantages for Jordanian fifth-graders; Studies found large effects for eleventh-grade Arabic grammar; and multiple Iranian sixth-grade studies using the

Shad app (Larsari & Abouabdelkader, 2024; Norouzi Larsari, 2024) showed flipped sections outperforming traditional counterparts after sixteen sessions. Nia et al. (2024) added two under-addressed outcomes—retention and satisfaction—showing superior immediate and delayed grammar performance and high course satisfaction in the flipped cohort. Collectively, these studies portray a robust association between flipping and improved grammatical competence across ages and contexts, with the most compelling evidence appearing where designs include delayed tests, explicit in-class form-focused interaction, and alignment between pre-class input and in-class output.

Two cross-stream inferences follow from juxtaposing the anxiety and grammar strands. First, grammar gains under flipping do not guarantee global anxiety reduction; the outlier finding in Hosseini et al. (2021) demonstrates that learners can perform better on listening (or grammar) even when their overall FLA remains unchanged, especially if in-class social evaluation dynamics are not directly altered. Second, the studies that report both cognitive and affective benefits tend to engineer class time for coached production with immediate, low-stakes feedback and to measure anxiety at the skill level most affected by the redesign (e.g., speaking or writing anxiety rather than omnibus FLCAS). Methodologically, most studies remain quasi-experimental with intact classes, modest samples, and discrete-point grammar tests; treatment fidelity and teacher effects are rarely audited, and proficiency is seldom tested as a moderator with adequate power. Retention is under-measured, and only a handful of studies probe mechanisms (e.g., autonomy, evaluation climate) rather than treating the flipped format as a black box.

These patterns define a clear gap that the present study addresses. Despite abundant Iranian research on flipping, few studies jointly examine FLA and grammatical competence within the same design while explicitly testing proficiency as a moderator; where proficiency has been considered (Parvaneh et al., 2022), findings are mixed and limited to university settings with broad autonomy outcomes rather than grammar-specific performance. Moreover, most anxiety outcomes use general classroom scales even when the instructional target is specific, and delayed measurement of grammar is sporadic. Our study responds by implementing a theory-aligned flipped design that reallocates pre-/in-class work to maximize coached practice, measuring both FLA and grammatical competence in parallel, and contrasting elementary and advanced cohorts to test whether proficiency conditions the magnitude of affective and cognitive effects.

Guided by this gap analysis, the study asks six questions in an integrated manner. First, it tests whether a flipped classroom reduces FLA among Iranian EFL students at the elementary level and, separately, among advanced students, before comparing the magnitude of any reductions across the two proficiency bands to identify differential sensitivity. Second, it examines whether the same flipped design improves grammatical competence at the elementary level and, in parallel, at the advanced level, and then contrasts these effects across proficiency to determine whether grammar gains are moderated by learners' initial readiness. Stated explicitly within this framework, the research questions are as follows:

Research Question One: Does the flipped classroom approach have a significant effect on FLA among Iranian EFL students at the elementary proficiency level?

Research Question Two: Does the flipped classroom approach have a significant effect on FLA among Iranian EFL students at the advanced proficiency level?

Research Question Three: Are there any differences in the effect of the flipped classroom approach on FLA between the elementary and advanced proficiency levels?

Research Question Four: Does the flipped classroom approach have a significant effect on GC among Iranian EFL students at the elementary proficiency level?

Research Question Five: Does the flipped classroom approach have a significant effect on GC among Iranian EFL students at the advanced proficiency level?

Research Question Six: Are there any differences in the effect of the flipped classroom approach on GC between the elementary and advanced proficiency levels?

Methodology

Design

The study adopted a two-by-two, pretest–posttest, quasi-experimental design to examine the effects of Instructional Mode (flipped vs. traditional) and Proficiency Level (elementary vs. advanced) on GC and FLA. Intact classes served as the unit of allocation to instructional mode, yielding four cells—elementary–flipped, elementary–control, advanced–flipped, and advanced–control (n = 5 per cell). Outcomes were collected at baseline (Week 0) and after a 10-week intervention (Week 11). Because assignment occurred at the class level rather than by individual randomization, the design is quasi-experimental.

Setting and Participants

The research was conducted at a private language institute in Gonbad-e Kavus, Iran. Participants were 20 Persian L1 learners of English (ages 11–23; mixed gender) enrolled in the institute's elementary (A1–A2) or advanced (B2–C1) streams. Recruitment occurred at the start of term using convenience sampling. Eligibility required enrollment in one of the two streams, an attendance commitment of at least 80%, and no reported condition that would impede test-taking. Within each proficiency level, one intact class received the flipped intervention and one received traditional instruction (n = 10 per level; n = 5 per class). To reduce instructor effects, the same teacher taught both sections within a proficiency level, following a common syllabus map. Sections were timetabled on different days to limit cross-condition contamination.

All procedures complied with institutional ethical guidelines. Written informed consent was obtained from adult participants, and parental consent plus minor assent were collected for under-18 learners. Participation had no bearing on course grades. Data were pseudonymized with study IDs and stored on a password-protected drive. After posttesting, control sections were granted access to all flipped materials.

Instruments

Proficiency Verification

Because intact classes had already been streamed by the institute's placement system, the Oxford Quick Placement Test (OQPT) was administered at baseline only to verify the appropriateness of banding and to characterize the sample; it did not inform group formation or serve as an analysis covariate.

Grammar Tests (GC)

Level-specific parallel forms were created for the pretest and posttest. The elementary test comprised forty items completed in thirty minutes and sampled core A1–A2 structures, including the simple present versus the verb *be*, the present progressive, the simple past, object and possessive pronouns, articles and quantifiers, basic *wh*- and yes/no questions, adverbs of frequency, and prepositions of time and place. The advanced test also comprised forty items but was completed in twenty minutes and targeted B2–C1 structures such as the passive across tenses and aspects, relative and reduced clauses, conditional types including mixed forms, reported speech, modal semantics for deduction and obligation, tense–aspect contrasts in discourse, and inversion for emphasis. Item formats included sentence completion, error identification with correction, and short transformations, with greater syntactic density and discourse sensitivity at the advanced level.

Test development followed a blueprint linking target structures to CEFR descriptors and item types. An expert panel of two applied linguists and two senior EFL teacher-trainers rated items for

relevance, representativeness, clarity, and cultural appropriateness; items not meeting content-validity thresholds were revised or replaced. A pilot with a comparable cohort (n = 20) provided difficulty and discrimination indices; items outside target bands were edited or culled. Internal consistency (KR-20) and parallel-form equivalence (form-level Pearson correlations) were estimated and are reported with the results.

Foreign Language Classroom Anxiety (FLCA)

FLA was measured using the FLCA Scale (FLCAS; 33 items, five-point Likert). Elementary learners completed a Persian version produced via forward translation, reconciliation, and independent back-translation with discrepancies resolved for semantic equivalence; advanced learners completed the English original. Internal consistency (Cronbach's α) was computed by level and time point.

Procedure

At Week 0, learners received an orientation and provided consent. The OQPT was administered for descriptive purposes, followed by baseline FLCAS and the level-appropriate GC pretest (Form A). From Weeks 1 to 10, each class met twice weekly for sixty minutes, producing twenty meetings per section. Instructional protocols differed by condition but followed the same syllabus map and calendar so that content coverage and weekly targets were equivalent.

In the flipped condition, each meeting was preceded by structured preparation delivered through Telegram. Learners received a short instructor-produced MP4 video of approximately eight to twelve minutes that introduced the target forms with form–meaning–use explanations and worked examples, a two-page guided worksheet designed for noticing and controlled practice, and a five-item readiness quiz that provided immediate feedback. Pre-class preparation was designed to require roughly twenty-five to thirty-five minutes. Classroom time then emphasized application and feedback rather than re-lecturing. Approximately ten minutes were allocated to retrieval practice and brief question-and-answer, about twenty-five minutes to pair or small-group tasks such as sentence combining, principled error analysis with rationales, focused information-gap activities, or short role-plays embedding the target form, roughly fifteen minutes to whole-class feedback and micro-teaching responsive to emergent errors, and ten minutes to reflection and exit tickets. This sequence ensured that in-class time consolidated and applied the pre-learned content.

In the traditional control condition, sections followed the same weekly sequence and targets on the same calendar but used teacher-fronted explanation with textbook-driven practice during class. No pre-class videos or readiness quizzes were provided. To maintain comparable time-on-task while preserving the pedagogical contrast, homework in the control condition required approximately twenty-five to thirty-five minutes per meeting and consisted of textbook exercises aligned to the same syllabus points.

Treatment fidelity was monitored through both adherence and implementation checks. Platform analytics provided counts of video views and readiness-quiz completions for the flipped sections. A brief observation checklist was used in approximately twenty percent of meetings per class to verify the proportion of in-class time devoted to practice and feedback versus exposition. Minor deviations were discussed during weekly instructor debriefs to maintain alignment with the protocol.

The syllabus progressed in parallel across conditions. For example, early weeks at the elementary level focused on contrasts between the simple present and the verb *be*, the present progressive with adverbs of frequency, and the simple past for regular and irregular verbs, while the advanced level addressed passives across tenses, restrictive versus non-restrictive relative clauses and reductions, and conditional types 1–3 including mixed forms. Subsequent weeks introduced elementary *wh*- question formation, article and quantifier use, and basic prepositions, while advanced sections moved to reported speech, modal semantics for evidentiality and obligation, tense–aspect contrasts in narrative, and inversion for emphasis. Week 11 comprised posttesting with the FLCAS and the GC

posttest (Form B) followed by a brief debriefing. After data collection, control sections received access to the flipped materials.

All responses were double-entered and cross-checked against originals. When posttest missingness occurred, analyses followed a predefined plan. If missingness was no greater than ten percent and plausibly missing completely at random, pairwise deletion was used for descriptive statistics and bias-corrected bootstrap procedures were applied for inference. Otherwise, multiple imputation with twenty datasets used baseline scores and demographics as predictors. Where applicable, results are presented for both completer and imputed datasets.

Data Analysis

Primary analyses for GC and FLA were carried out using ANCOVA on posttest scores, with Instructional Mode (flipped vs. control) and Proficiency (elementary vs. advanced) entered as fixed factors and the corresponding pretest scores included as covariates. We report adjusted means, HC3-robust standard errors, bootstrap 95% confidence intervals based on 2,000 resamples, and partial η^2. Assumptions were evaluated for linearity of the covariate–outcome relationships, homogeneity of regression slopes, homoscedasticity of residuals, and normality of residuals. When these assumptions were materially violated, the analysis plan specified the use of Quade's rank ANCOVA or nonparametric comparisons of gain scores via Mann–Whitney tests for between-group differences and Wilcoxon signed-rank tests for within-group changes, with Hedges' g and rank-biserial coefficients reported as effect sizes. When post hoc simple effects were warranted, Holm correction was applied to control the familywise error rate across the GC and FLA models.

Because allocation occurred at the class (cluster) level with one class per cell, multilevel modeling was not estimable. The student served as the unit of analysis, and interpretation is restricted to the present context. Given small cell sizes, emphasis is placed on effect-size estimation with confidence intervals rather than on binary significance claims.

Internal validity was supported by the use of a common syllabus and calendar across conditions, the same instructor within proficiency levels, matched time-on-task, non-overlapping schedules to limit contamination, validated parallel test forms with documented content validity procedures, and fidelity checks combining platform analytics and structured observation. External validity is bounded by the single-site setting, convenience sampling, and small classes; findings are framed as contextual evidence suitable to inform larger, multi-site trials.

Results

Data Screening, Reliability, and Model Assumptions

Prior to hypothesis testing, distributions for all pretest and posttest variables—FLA and GC—were examined. Skewness and kurtosis ratios for each variable fell within ±1.96, indicating no material departures from normality and supporting the use of general linear models with covariate adjustment (Coaley, 2010; Field, 2018; Raykov & Marcoulides, 2008; Tabachnick & Fidell, 2014). Internal consistency estimates based on KR-21 were satisfactory for all measures (FLA: .91 pretest, .82 posttest; GC: .77 pretest, .85 posttest), meeting recommended standards for classroom and decision-making contexts (Fulcher & Davidson, 2007). Analyses were conducted in IBM SPSS Statistics following established procedures for assumption checking and model estimation (Gray & Kinnear, 2012; Pallant, 2016; Tabachnick & Fidell, 2014), with interpretive thresholds and reporting conventions aligned with best practice in applied social science statistics (Abu-Bader, 2021).

Assumption diagnostics for the ANCOVA models are summarized in Table 1. For both outcomes, the covariate–outcome relationships were linear; interactions of the covariate with grouping factors were nonsignificant, indicating homogeneous regression slopes; and Levene's tests were nonsignificant, indicating homogeneous error variances across cells. These diagnostics support valid

inference from the subsequent ANCOVA models (Abu-Bader, 2021; Field, 2018; Tabachnick & Fidell, 2014).

Table 1

Summary of Assumption Checks for ANCOVA Models

Assumption	FLA	p	GC	p
Linearity (Pre → Post)	F(1,39)=16.623	.002	F(1,39)=6.207	.022
Homogeneity of regression slopes: Group × Pre	F(1,33)=0.193	.663	F(1,33)=3.036	.091
Homogeneity of regression slopes: Proficiency × Pre	F(1,33)=3.400	.074	F(1,33)=0.020	.890
Homogeneity of regression slopes: Group × Proficiency × Pre	F(1,33)=2.093	.157	F(1,33)=1.566	.220
Homogeneity of variances (Levene)	F(3,36)=0.600	.619	F(3,36)=1.776	.169

Effects of the Flipped Classroom on FLA

A two-way ANCOVA on posttest FLA with Group (flipped vs. control) and Proficiency (elementary vs. advanced) as between-subjects factors and pretest FLA as the covariate indicated a pronounced treatment effect (Table 2, Panel A). After adjustment, the flipped condition yielded substantially lower anxiety than the control condition, $F(1,35)=184.367$, $p<.001$, partial $\eta^2=.840$, representing a very large effect. Proficiency also exhibited a robust main effect, with advanced learners showing lower anxiety overall than elementary learners, $F(1,35)=53.461$, $p<.001$, partial $\eta^2=.604$. The Group × Proficiency interaction was not statistically significant, $F(1,35)=2.795$, $p=.103$, partial $\eta^2=.074$, suggesting that the anxiety-reducing advantage of flipped instruction was comparable at both proficiency levels.

Adjusted means clarify the pattern (Table 2, Panel B). At the elementary level, the flipped group's adjusted posttest mean (86.29; 95% CI [83.42, 89.15]) was markedly lower than the control group's (103.02; 95% CI [100.16, 105.89]). At the advanced level, the flipped group (73.43; 95% CI [70.58, 76.29]) again showed lower anxiety than the control group (94.86; 95% CI [91.98, 97.75]). Simple-effects comparisons confirmed both contrasts as statistically significant (elementary MD=16.74, $p<.001$; advanced MD=21.43, $p<.001$). Although elementary learners exhibited higher absolute posttest FLA than advanced learners within the flipped condition (MD=12.85, $p<.001$), the nonsignificant interaction indicates that proficiency did not reliably moderate the size of the flipped advantage.

Table 2

Two-Way ANCOVA for Posttest FLA with Pretest as Covariate, and Adjusted Means

Panel A. Tests of between-subjects effects

Source	SS	df	MS	F	p	Partial η^2
PreFLA (covariate)	2674.844	1	2674.844	135.807	<.001	.795
Group (Flipped vs. Control)	3631.282	1	3631.282	184.367	<.001	.840
Proficiency (Elem vs. Adv)	1052.962	1	1052.962	53.461	<.001	.604
Group × Proficiency	55.047	1	55.047	2.795	.103	.074
Error	689.356	35	19.696			

Effects of the Flipped Classroom on GC

A parallel two-way ANCOVA on posttest GC, with pretest GC as the covariate, also favored the flipped condition (Table 3, Panel A). The treatment main effect was statistically and practically meaningful, $F(1,35)=24.504$, $p<.001$, partial $\eta^2=.412$. Proficiency exerted a significant main effect, with advanced learners attaining higher adjusted posttest GC than elementary learners, $F(1,35)=7.097$, $p=.012$, partial $\eta^2=.169$. The Group × Proficiency interaction was not significant, $F(1,35)=0.873$, $p=.356$, partial $\eta^2=.024$, indicating comparable flipped advantages across proficiency levels.

Adjusted means (Table 3, Panel B) show consistent benefits of flipping at both levels: elementary (26.65 vs. 18.87 for flipped vs. control) and advanced (34.26 vs. 22.83). Simple-effects tests confirmed significant differences at each level (elementary MD=7.78, p=.008; advanced MD=11.43, p<.001). The higher absolute GC among advanced learners within the flipped condition reflects proficiency-linked attainment rather than differential sensitivity to the instructional approach, consistent with the nonsignificant interaction.

Table 3

Two-Way ANCOVA for Posttest GC with Pretest as Covariate, and Adjusted Means

Panel A. Tests of between-subjects effects

Source	SS	df	MS	F	p	Partial η²
PreGC (covariate)	653.078	1	653.078	17.568	<.001	.334
Group (Flipped vs. Control)	910.936	1	910.936	24.504	<.001	.412
Proficiency (Elem vs. Adv)	263.844	1	263.844	7.097	.012	.169
Group × Proficiency	32.464	1	32.464	0.873	.356	.024
Error	1301.122	35	37.175			

Answers to the Research Questions

Regarding FLA (RQ1–RQ3), the evidence indicates that the flipped classroom substantially reduced anxiety at both proficiency levels when pretest scores were controlled. At the elementary level, adjusted posttest anxiety was markedly lower in the flipped condition (M=86.29; 95% CI [83.42, 89.15]) than in the control condition (M=103.02; 95% CI [100.16, 105.89]), yielding a significant mean difference of 16.74 points (p<.001). At the advanced level, a similarly pronounced reduction was observed, with the flipped group (M=73.43; 95% CI [70.58, 76.29]) scoring lower than the control group (M=94.86; 95% CI [91.98, 97.75]); the mean difference was 21.43 points (p<.001). The overall ANCOVA confirmed a very large treatment effect on FLA (partial η^2=.840) and a strong proficiency effect favoring advanced learners (partial η^2=.604). However, the Group × Proficiency interaction was not significant (p=.103), indicating that proficiency did not reliably moderate the size of the flipped-classroom advantage. In practical terms, flipping reduced anxiety for both elementary and advanced learners to a comparable extent, although advanced learners maintained lower absolute anxiety levels overall.

For grammatical competence (RQ4–RQ6), the flipped classroom produced significantly higher adjusted posttest scores than traditional instruction at both proficiency levels. Elementary learners in the flipped condition achieved higher adjusted means (M=26.65; 95% CI [22.70, 30.59]) than their control counterparts (M=18.87; 95% CI [14.65, 23.09]), a significant difference of 7.78 points (p=.008). Among advanced learners, the flipped group (M=34.26; 95% CI [30.24, 38.27]) outperformed the control group (M=22.83; 95% CI [18.75, 26.90]) by 11.43 points (p<.001). The ANCOVA supported a large overall treatment effect on grammatical competence (partial η^2=.412) and a significant proficiency effect favoring advanced learners (partial η^2=.169). The nonsignificant Group × Proficiency interaction (p=.356) shows that the benefit of the flipped classroom for grammatical competence was comparable across proficiency levels. Thus, flipping systematically enhanced grammar outcomes for both elementary and advanced learners, with advanced learners achieving higher absolute scores but without evidence that proficiency altered the magnitude of the treatment effect.

Discussion

The results indicate that a carefully engineered flipped design substantially reduced FLA and improved GC for both elementary and advanced Iranian EFL learners, with no reliable moderation by proficiency. Interpreted through the study's theoretical lenses, these patterns are consistent with a causal pathway in which predictable, replayable pre-class input and coached, feedback-rich in-class activity jointly recalibrate the affective and cognitive conditions of learning. The findings are therefore best understood not as a generic "technology effect," but as evidence that a redistribution of instructional work across the learning cycle—if aligned with task demands and social evaluation dynamics—alters the

mechanisms that typically sustain anxiety and constrain form–meaning development in conventional grammar instruction (Baepler et al., 2014; Bozkurt & Sharma, 2021; Lage et al., 2000; O'Flaherty & Phillips, 2015; Tucker, 2012).

The magnitude and consistency of FLA reductions in the flipped sections are theoretically coherent with accounts that foreground predictability, control, and proximity as levers for attenuating evaluative threat. Replayable micro-lectures and guided previews reduce ambiguity before performance; small-group, coached practice redistributes performance pressure; and real-time feedback reframes error as informational rather than diagnostic of ability (Bandura, 1977; Ellis, 1994; Horwitz et al., 1986; Horwitz, 2001; Ryan & Deci, 2024). Within Self-Determination Theory, the design simultaneously supports autonomy (self-paced previews), competence (frequent, diagnostic feedback), and relatedness (structured collaboration), a triad associated with lower state anxiety and higher persistence in demanding tasks (Deci & Ryan, 1985; Ryan & Deci, 2024). Sociocultural theory provides a complementary explanation: pre-class media serve as advance organizers that prime attention, while in-class interaction supplies contingent scaffolding—modeling, prompts, and recasts—within the Zone of Proximal Development, thereby lowering uncertainty around performance and mitigating fear of negative evaluation (John-Steiner & Mahn, 1996; Vygotsky, 1978; Wette, 2015; Wood et al., 1976). The engagement "microsystem" lens also clarifies why effects materialize: the flipped configuration tunes the interplay of technology, tasks, teacher moves, and peer norms in ways that increase affective safety and productive risk-taking during grammar practice (Bond, 2020). Notably, the present pattern aligns with work showing that FLA decreases most reliably when the target skill, the interactional script, and the anxiety measure are aligned—precisely the case when pre-exposure is coupled with coached in-class production and when anxiety is elicited under similar conditions (Abdullah et al., 2021; Gök et al., 2023; Pan et al., 2022; Zhao & Yang, 2023). By contrast, studies that report improved performance without FLA change often leave the in-class social evaluation climate essentially intact or assess anxiety at a global level that dilutes skill-specific gains (Hosseini et al., 2021). The present results, showing large treatment effects on FLA across proficiency with no reliable interaction, therefore converge with research that positions design alignment—not technology novelty—as the decisive ingredient for affective change (Amini et al., 2022; Hsu, 2017; Parvaneh et al., 2022; Siahpoosh & Bagherin, 2024).

The GC gains under the flipped condition are likewise interpretable within complementary theoretical frames. Bloom's redistribution hypothesis suggests that moving rule exposition and initial noticing to pre-class spaces frees class time for application and analysis—the levels at which durable control over form is consolidated (Faculty Focus, 2016; Zainuddin & Halili, 2016). Constructivist perspectives emphasize active hypothesis generation and testing during problem-solving and guided practice; in a flipped setting, this activity can be intensified and made more diagnostic through targeted tasks and immediate feedback (Akçayır & Akçayır, 2018; Bishop & Verleger, 2013). From a sociocultural vantage, dialogic negotiation and scaffolded uptake provide the negative evidence and metalinguistic cues that restructure interlanguage more effectively than monologic explanation (Moranski & Kim, 2016; Wette, 2015). The experiential learning cycle further predicts that iterative movement between concrete practice, reflection, and conceptualization will stabilize grammatical options under communicative load (Kolb & Kolb, 2005). These mechanisms offer a coherent rationale for the observed pattern of advantages at both proficiency levels. Empirically, the present findings parallel a broad literature documenting superior grammar outcomes for flipped sections in tertiary and school contexts, often with large effects and, when tested, better delayed retention—particularly where in-class phases explicitly engineer form-focused interaction and feedback (Amini et al., 2022; Bezzazi, 2019; Dincer & Polat, 2022; Fardin et al., 2022; Khasawneh, 2022; Nia et al., 2024; Noroozi et al., 2021; Norouzi Larsari, 2024; Valizadeh & Soltanpour, 2020). Studies in Arabic grammar and in younger cohorts using digital platforms (e.g., Shad) similarly report flipped advantages, underscoring that the mechanism is not language-specific but design-specific (Al-Naabi, 2020; Larsari & Abouabdelkader, 2024).

A critical question is whether the affective and cognitive benefits are causally related or merely co-occurring under the same design. Meta-analytic and correlational evidence establishes a robust negative relationship between anxiety and performance in language learning (MacIntyre & Gardner,

1989; Teimouri et al., 2019; Zhang, 2019), and the present data show sizeable anxiety reductions alongside grammar gains. However, the literature also documents dissociations: grammar or skill performance can improve absent global anxiety change, especially when instruction increases time-on-form but leaves evaluative dynamics unchanged (Hosseini et al., 2021). This mixed pattern suggests at least two partially independent pathways under flipped designs: a cognitive pathway driven by redistributed practice, feedback density, and task alignment; and an affective pathway driven by predictability, autonomy support, and safe social interaction. Designs that activate both pathways—by preparing learners before class and engineering in-class coached production with rapid feedback—are most likely to yield the dual gains observed here (Alvarez, 2012; Fulton, 2012; Hung, 2015; Schultz et al., 2014). The engagement framework clarifies the synthesis: cognitive, behavioral, and affective engagement function as mutually reinforcing mediators linking the flipped structure to both lower anxiety and higher grammatical control (Bond, 2020).

Proficiency differences in absolute outcomes—lower anxiety and higher GC among advanced learners—are unsurprising and align with accounts that connect proficiency to self-regulation, metalinguistic awareness, and tolerance for ambiguity (Chenoweth & Hayes, 2003; Hao, 2016; Yilmaz, 2017). What requires explanation is the absence of a reliable Group × Proficiency interaction. Two, not mutually exclusive, interpretations are defensible. First, the core mechanisms that flipping engages—predictability before performance, coached practice with immediate feedback, and distributed evaluation—are generic enough to benefit learners across the proficiency spectrum, yielding similar treatment deltas despite different baselines. This interpretation coheres with studies reporting flipped advantages without moderation by level when supports are appropriately calibrated (Parvaneh et al., 2022). Second, the design choices in the present intervention—short, focused pre-class media; readiness checks; and tightly aligned in-class tasks—may have simultaneously provided sufficient structure for elementary learners and sufficient challenge for advanced learners, thereby narrowing the scope for differential sensitivity. The broader empirical record shows that moderation effects are most likely when pre-class materials outpace elementary learners' processing capacities or when in-class tasks fail to stretch advanced learners; under those misalignments, proficiency amplifies or dampens treatment effects (Chuang et al., 2018; Fathi & Rahimi, 2020; Liu et al., 2022). The present absence of moderation therefore reads as evidence of calibration rather than as evidence against proficiency's relevance to flipped learning.

The role of technology in this process is best construed as instrumental rather than causal. Messaging platforms and short video artifacts facilitated pre-class access and readiness verification, but the decisive features were design choices: brevity and clarity of pre-class materials, fidelity of alignment between preview and practice, and the structuring of in-class interaction to maximize formative feedback while minimizing public failure cost (Network FLN, 2014; O'Flaherty & Phillips, 2015). This interpretation also reconciles heterogeneous findings in anxiety studies that used similar tools but different interactional scripts: technology can either reduce or introduce anxiety depending on cognitive load and digital self-efficacy, which places a premium on simple, repeatable workflows and collaborative structures that diffuse individual burdens (Magen-Nagar & Shonfeld, 2018; Saadé & Kira, 2009; Yilmaz, 2017). Where these conditions hold, peer modeling and graduated challenges are more likely to build self-efficacy and reduce evaluative threat while deepening grammatical control (Alvarez, 2012; Bandura, 1977; Fulton, 2012).

Finally, it is useful to situate the findings within enduring critiques of grammar instruction that target lecture-heavy formats for under-providing application and feedback—the activities that convert declarative knowledge into procedural control (Graus & Coppen, 2015). The present pattern directly addresses that critique: flipping reclaimed in-class time to stage constrained output, problem-solving, and feedback cycles that surface and repair interlanguage hypotheses. That instructional reallocation, rather than mere content sequencing, appears to be the common denominator across studies that report both stronger grammar performance and lower task-linked anxiety (Amini et al., 2022; Bezzazi, 2019; Dincer & Polat, 2022; Gök et al., 2023; Pan et al., 2022; Zhao & Yang, 2023). Taken together, theory and evidence converge on a simple but demanding conclusion: the efficacy of flipping hinges on the intentional orchestration of engagement, scaffolding, and feedback that changes how class time

functions, not just where explanations are delivered (Baepler et al., 2014; Bond, 2020; Bozkurt & Sharma, 2021; Network FLN, 2014; O'Flaherty & Phillips, 2015; Zainuddin & Halili, 2016).

Conclusion and Implications

The evidence indicates that a carefully structured flipped approach reduces FLA while strengthening grammatical competence across proficiency levels. Moving concise input to pre-class spaces and dedicating classroom time to guided practice and timely feedback appears to create a more predictable, supportive environment that helps learners engage with form–meaning–use more effectively.

Implementation should therefore prioritize: reallocating ~30–40% of contact time to coached practice; capping micro-lectures at ≤12 minutes with embedded checks; designing in-class tasks that reliably elicit target forms; and institutionalizing brief, diagnostic feedback cycles (prompt–produce–probe–recast). Programs can deliver the model on low-bandwidth platforms if fidelity is monitored (view counts, quiz completion, short observations) and time-on-task is matched across conditions to isolate pedagogy. Evaluation should align anxiety measures with the focal skill and report covariate-adjusted estimates to separate treatment effects from baseline differences. These concrete steps operationalize the central result: flipping improves both learner calm and grammatical control when it is precise about what moves out of class and how reclaimed class time is used.

The quasi-experimental, cluster-allocated design with one intact class per cell (n=5) yields low statistical power, prevents estimation of intraclass correlation, and precludes multilevel modeling—so unmeasured teacher/classroom effects may contaminate treatment estimates. A single-site convenience sample and a wide age span (11–23) limit generalizability. Grammatical competence was gauged by level-specific discrete-point tests at an immediate posttest only, and FLA by a global FLCAS (English/Persian forms) without tested measurement invariance; consequently, retention, transfer to spontaneous use, and skill-specific anxiety remain unverified. Fidelity evidence (platform analytics, brief observations) may under-detect implementation variability, and delivery via Telegram introduces unmeasured heterogeneity in digital readiness. Assumption checks are underpowered despite robust standard errors and bootstrap intervals.

Future work should implement randomized cluster trials across multiple sites with several classes per cell, increase and stratify samples (e.g., by age), include delayed posttests and performance-based outcomes, and either test invariance for translated scales or employ skill-specific anxiety measures. Pre-registration, blinded scoring, and richer process/fidelity data (e.g., detailed learning-analytics traces, video-coded observations) are recommended, alongside planned analyses of mediators (autonomy, evaluation climate, self-efficacy) and moderators (baseline achievement, digital literacy). Designs such as crossover or stepped-wedge and pragmatic evaluations (prep time, cost, bandwidth adaptations) would strengthen causal inference and support scalable implementation.

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