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Fostering Cognitive Flexibility and Metacognitive Awareness Via Authentic Task-Based Instruction in French

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Abstract: This study examined the impact of authentic task-based instruction on the development of cognitive flexibility and metacognition among French language learners. Thirty undergraduate students enrolled in an intermediate French course participated in a quasi-experimental pre-post study with control and experimental groups. The experimental group engaged in three multistep, problem-solving projects based on real-world scenarios over two months, while the control group received traditional instruction. Quantitative data were collected using validated assessments of cognitive flexibility and metacognition administered before and after the intervention. Qualitative data from reflective journals provided insights into students' experiences. Results from paired samples t-tests indicated significant gains in cognitive flexibility and metacognitive awareness for the experimental group compared to the control. The findings suggest task-based pedagogies hold the potential for fostering higher-order thinking skills transferable beyond language acquisition when authentic contexts necessitate adaptability, perspective-taking, and self-regulation of learning processes.

Keywords: French language education, task-based instruction, project-based learning, cognitive flexibility, metacognition, higher-order thinking skills.

INTRODUCTION

In today's rapidly changing world, the ability to think flexibly, adapt to new situations, entertain multiple perspectives and monitor one's learning processes has become indispensable for navigating complex challenges on both academic and professional fronts. While foreign language education has traditionally focused on developing communicative competence, there is a growing recognition of the need to cultivate important cognitive skills that extend beyond linguistic competencies alone. As universities and employers increasingly emphasize competencies like problem-solving, critical analysis, digital literacy and self-directed lifelong learning, foreign language pedagogy must evolve to integrate the development of these higher-order thinking abilities that have widespread real-world applicability. Among the cognitive traits gaining prominence, cognitive flexibility and metacognition have attracted interest from educators and researchers interested in supporting transformative, transferable learning [15]. Cognitive

flexibility refers to an individual's capacity to restructure one's knowledge in adaptive response to varied contextual demands, perspectives or associated rules [6]. It encapsulates skills such as perspective taking, transitioning between conceptual categories and representing concepts at varied levels of abstraction—all important for effectively navigating unscripted, rapidly shifting situations typifying today's world. Metacognition broadly encompasses the ability to monitor one's thoughts, learning processes, strategies, and performance to enhance self-regulation and achievement of goals [11]. Heightened metacognitive competence confers awareness of what one does and does not comprehend, allowing for self-correction and adapting study methods to optimize outcomes. While cognitive flexibility and metacognition appear key for supporting learning transfer and lifelong self-direction, current foreign language pedagogies may not sufficiently develop these higher-order abilities. Traditional instruction centred on rote memorization of grammatical concepts and vocabulary tends to emphasize surface-level knowledge over deeper conceptual understanding or applicability of learning to novel circumstances [19]. Studies indicate authentic, experiential learning experiences stimulating real-world problem-solving more effectively foster cognitive flexibility and metacognitive competence compared to conventional teacher-directed approaches [3]. Task-based language teaching (TBLT) has emerged as one instructional model focused on integrating linguistic and cognitive development through meaningful language use. TBLT positions students as active participants engaged in completing multi-step tasks based on simulated real-world scenarios to co-construct knowledge and hone communication skills [20]. While research supports TBLT for boosting communicative abilities, its impact on fostering skills like cognitive flexibility and metacognition has received less empirical examination [21]. This study aimed to address this research gap by investigating the effect of authentic, problem-based TBLT on cognitive flexibility and metacognitive awareness among undergraduate French learners through a mixed-methods quasi-experimental design incorporating quantitative pre-post surveys and qualitative reflective journals.

The following chapter will review relevant literature concerning cognitive flexibility, metacognition and task-based approaches in foreign language education, identifying evidence and gaps to contextualize the present inquiry. Subsequent sections will detail the study's methodology, quantitative and qualitative findings, discussion linking results back to theory, and conclusions alongside limitations and implications for pedagogy and future research. By exploring the higher-level cognitive benefits of authentic task-based instruction, this investigation sought to contribute empirical data supporting evolving frameworks of foreign language learning outcomes encompassing transferable competencies essential for lifelong success in diverse contexts.

MATERIAL AND METHODS

Research Design

A quasi-experimental pre-post-research design was employed to examine the effects of task-based instruction on cognitive flexibility and metacognition. The study involved one independent variable (task-based instruction approach) and two dependent variables (cognitive flexibility and metacognitive awareness). Participants were assigned to either the control or experimental group based on their scheduled class section to avoid crossover effects, with one section serving as the control and the other as the experimental group. Both groups completed identical pre-assessments of cognitive flexibility and metacognition before starting the study. Over eight weeks, the experimental group received task-based instruction while the control experienced traditional instruction. Afterwards, both groups were administered the same post-assessments, and the experimental group also completed reflective journals.

Participants and Setting

The sample consisted of 30 undergraduate students (n = 30) enrolled in intermediate French courses at a public university in the United States. Both courses were taught by the same

instructor to control for teacher effects. Participants ranged in age from 18-22 years (M = 19.2, SD = 1.1) and included sophomores, juniors and seniors with 2-4 semesters of prior French study. All provided informed consent and none had extensive experience living in a French-speaking country. The courses were held in regular classroom spaces equipped with projectors to facilitate the use of multimedia during task simulations.

Materials

Cognitive flexibility was assessed using the Cognitive Flexibility Inventory [9], a 20-item self-report survey scoring flexibility across behaviors, thoughts and emotions on a 5-point Likert scale. Metacognition was measured via the Meta-Cognitive Awareness Inventory, a 52-item self-report survey evaluating knowledge and regulation of cognition on a 5-point scale. Both instruments have demonstrated validity and reliability in educational research contexts. Authentic tasks involving problem-based scenarios were adapted from the Common European Framework of Reference for Languages and grouped into three multi-step projects completed over 8 weeks by the experimental group. Examples included planning a campaign addressing environmental issues or organizing a local cultural event. Reflective journals prompted open-ended responses on experiences completing tasks and perceived impacts on language abilities and thinking.

Procedure

Before instruction, all participants completed informed consent forms and pre-assessments (CFI and MAI) in paper format during regular class time. For the next 8 weeks, the control group received traditional grammar-focused instruction from the teacher while the experimental section engaged in the three sequenced tasks incorporating research, collaboration, presentations and written reflections. At the conclusion, post-assessments were administered under identical conditions. Experimental students also submitted reflective journals. Quantitative scores were analyzed using paired t-tests while qualitative data underwent thematic coding in Dedoose. This mixed-method methodology allowed for the convergence of statistical results with contextual insights to legitimize any conclusions regarding task-based pedagogy's impact on cognitive flexibility and metacognitive awareness among intermediate French learners. Care was taken to observe ethical guidelines, and debriefing explained the study's purpose. The following chapter will present quantitative and qualitative findings illuminated through triangulation.

RESULTS

Quantitative Findings

Cognitive Flexibility. A paired samples t-test was conducted to evaluate the impact of task-based instruction on cognitive flexibility as assessed by the CFI. For the experimental group (n=15), the pre-test mean score was 2.94 (SD=0.42) while the post-test mean increased significantly to 3.48 (SD=0.31), $t(14) = -5.10$, $p < .001$, indicating enhanced flexibility. In comparison, the control group's (n=15) mean pre-test (M=3.01, SD=0.38) and post-test scores (M=3.07, SD=0.31) were not significantly different, $t(14) = -0.79$, $p = 0.44$. Metacognitive Awareness. Analysis of MAI scores similarly revealed that task-based instruction significantly improved metacognitive awareness for the experimental group. Their pre-test mean of 3.12 (SD=0.36) increased to 3.78 (SD=0.25) on the post-test, representing a statistically significant gain, $t(14) = -6.67$, $p < 0.001$. In contrast, no substantial difference emerged between the control group's pre (M=3.16, SD=0.31) and post-tests (M=3.23, SD=0.28), $t(14) = -0.89$, $p = 0.39$. Overall, results indicated engagement in authentic tasks had large positive effects on both dependent variables based on Cohen's d effect sizes of 1.32 for cognitive flexibility and 1.73 for metacognition. The control group demonstrated negligible change, suggesting impacts were specifically related to the task-based intervention rather than general language instruction.

Qualitative Themes

Deductive and inductive coding of reflective journals surfaced three overarching themes characterizing students' experiences with task-based pedagogy and perceived impacts. Perspective Taking. Participants frequently described activities requiring researching diverse viewpoints and negotiating solutions, shaping their ability to understand issues from varied angles. One wrote, "The environmental campaign challenged me to see the problem not just from my perspective but from different communities affected". Strategic Adaptability. Comments referenced iterative processes of planning, revising approaches and creatively problem-solving through uncertainties inherent in open-ended challenges. A student explained, "We had to rethink our cultural event a few times as new difficulties arose, helping me learn to adapt my strategies". Metacognitive Development. Reflections commonly noted heightened self-awareness, monitoring learning and identifying effective study habits from learning cycles involved in projects. As one stated, "By reflecting in my journal, I noticed what steps I take when I don't understand something—and that will help me in the future".

Triangulated Findings

Corroborating quantitative pre-post increases, qualitative themes substantiated task-based instruction's positive impacts on cognitive flexibility through enhancing skills like perspective-taking and strategic adaptability. They similarly supported impacts on metacognition by fostering self-awareness of comprehension, strategy use and regulation of learning processes. No discrepancies emerged across methods, suggesting strong convergence regarding higher-order competency development attributable specifically to authentic, problem-based pedagogies versus traditional approaches. Overall, results provided preliminary evidence that engagement in multi-step, simulation-based tasks may offer an effective means for not only improving communicative proficiency but cultivating important cognitive traits shown important for academic achievement, career success and lifelong self-direction. The following discussion will contextualize these findings about existing literature and theoretical frameworks.

DISCUSSION

The present study investigated the effects of authentic task-based instruction on developing cognitive flexibility and metacognitive awareness among intermediate French learners. Quantitative pre-post assessments demonstrated the approach significantly enhanced both dependent variables compared to no significant changes with traditional instruction. Qualitative reflections further corroborated perceived impacts attributable specifically to engaging in experiential, problem-based learning cycles. In this section, key findings will be interpreted in light of prior research, theoretical models, implications, and limitations suggesting directions for future work. The quantitative results align with limited prior examinations reporting the cognitive benefits of task-based methodologies. For example, Zyzik and Polio (2022) found problem-solving tasks improved ESL students' ability to adapt perspectives and regulate self-monitoring. Song and Zhang's (2021) meta-analysis also concluded task-based pedagogy positively affected cognitive skills transferable to new contexts. The current findings expand such work by evaluating impacts using validated measures of cognitive flexibility and metacognition among French learners, indicating wider generalizability. Results correspond with sociocultural theories emphasizing how authentic contexts foster cognitive growth through participation in problem-solving communities of practice [16]. Scaffolding provided through stepwise task simulation may have structured knowledge building from simple to complex levels of understanding, supporting flexible thinking development [24]. Additionally, cognitively demanding tasks necessitating exploration from multiple perspectives tie to situated learning perspectives where self-regulation emerges from realistic social scenarios negotiating diverse interpretations [5]. Findings resonate with recent empirical comparisons showing problem/project-based models superior to traditional approaches for cultivating higher-order competence applicable to new domains [14]. Qualitative reflections from the present study aligning cognitive impacts with experiential learning cycles

correspond to frameworks positing metacognition emerges through iterative self-reflection on realistic experiences [22]. Given present societal focus on real-world-ready graduates, these performance-based pedagogies warrant consideration for foreign language programs. A novel contribution was examining French learning context effects addressing limitations of past research constrained to English education. Results suggest cognitive benefits generalize cross-linguistically with appropriate task design. Contextualization using socio-cultural theoretical frameworks also responded to calls to situate such work more cohesively within overarching perspectives on learning) [17]. This study has implications for French pedagogy. Findings lend empirical support for integrating project-centered, collaborative approaches within traditional curricula to foster transferable skills critical for diverse learners [18]. Guidance regarding task sequencing, challenge levels and reflective cycles provides praxis-oriented considerations. Assessment frameworks could broaden to include cognitive dimensions of proficiency beyond grammar/lexis [7]. Despite progress, limitations persist warranting future study. Generalizability remains limited to one context. The inclusion of longitudinal measures could establish how impacts persist over time. Additional learner variables like motivation and digital literacy are worth consideration. Future mixed-methods methodology could incorporate measurements of creative/critical thinking and interviews to deepen understanding of lived cognitive experiences. In conclusion, results suggest authentic task-based pedagogies hold promise for language education seeking to nurture not just communicative competence but transformative cognitive abilities driving academic success and career-readiness. Engaging learners through scaffolded problem-solving cycles around realistic scenarios shows potential for developing flexible, self-regulated thinkers well-equipped for lifelong learning challenges in an ever-changing world. Continued theorization and rigorous, diverse inquiries are nonetheless needed to optimize these impactful, learner-centered pedagogies fully realizing such aims.

CONCLUSION

The goal of this mixed-methods study was to investigate the potential of task-based instruction for developing cognitive flexibility and metacognitive awareness among intermediate French learners. Quantitative results demonstrated significant gains on validated measures of these cognitive constructs for students engaged in an 8-week series of experiential, project-oriented tasks compared to those receiving traditional grammar instruction. Qualitative reflections from participants further underscored perceived impacts and aligned with quantitative findings. By triangulating pre-post assessments with reflective journal insights, this research was able to substantiate positive effects specifically attributable to an authentic, problem-based pedagogical approach rather than language study alone. It thereby adds to the limited literature empirically examining higher-order benefits of TBLT beyond linguistic outcomes. Findings also expand previous work constrained primarily to English contexts by contextualizing cognitive competency development within a foreign language learning milieu. Theoretical grounding situated results cohesively within socio-cultural, situated, and experiential perspectives highlighting how cognitive skills emerge through scaffolded participation in realistic learning communities. Methodological rigour incorporated validated measures, a control condition and mixed qualitative-quantitative techniques to establish the legitimacy of interpretations. Contextual relevance is reflected by targeting competencies of widespread career significance identified as 21st-century priorities by professional bodies and employers. Nonetheless, certain limitations circumscribe full generalization and warrant consideration in future research. The quasi-experimental design precludes causal conclusions, and one university setting constrained population diversity. The inclusion of longitudinal components could assess if impacts endure beyond the short term. The lack of measures capturing other cognitive constructs restricts the scope of conceptualizations examined. To address these limitations, studies incorporating true experiments assessing longer-term durability with diverse samples in multiple sociocultural contexts would help bolster ecological validity. Pairing objective assessments with in-depth

interviews exploring nuanced lived experiences could offer deeper qualitative insights supplementing the present self-report focus. Expanding dependent variables to incorporate creativity, critical thinking and digital problem-solving using both performance tasks and self-report would broaden the conceptual and practical scope. This notwithstanding, current findings pragmatically suggest value in pedagogical considerations. Curricular integration of open-ended, collaborative projects engaging linguistic and cognitive development through iterative learning cycle simulations of authentic problem-solving holds promise. Broader evaluations of foreign language proficiency could likewise encompass transferable cognitive dimensions beyond traditional grammar/lexis parameters. Future research should continue optimizing and validating task designs across languages and proficiency levels. Additional learner characteristics such as digital literacy, prior experiences and motivation warrant examination as potential moderators. Cross-cultural investigations offer perspectives on universality versus cultural specificity of impacts. Comparative studies of face-to-face versus blended implementations could explore technology's role in realizing cognitive benefits at scale. As undergraduate curricula evolve emphasizing competencies driving workplace and societal contributions, task-based approaches may offer means for foreign language programs to nurture adaptable, self-directed thinkers. Though requiring ongoing refinement, this pedagogy shows early potential aligning linguistic education purposefully with developing cognitive traits empowering diverse learners' lifelong success. Continued theoretical and applied inquiry seems warranted to fully realize foreign language learning's potential as a transformative cognitive exercise.

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