ONLINE METACOGNITIVE SCAFFOLDING IN THE CONTEXT OF ACADEMIC ENGLISH WRITING: A QUALITATIVE STUDY

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DECLARATION OF ORIGINALITY

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ABSTRACT

Metacognitive Interventions in the Context of Academic English Writing: A Qualitative Study

This qualitative study investigated the application of metacognitive skills and strategies among university students throughout the academic writing process. The study aimed to answer three research questions: (1) What metacognitive skills and strategies do participants apply throughout the academic writing process? (2) How did online metacognitive support modules affect the participants' use of metacognitive strategies throughout the academic writing process? (3) How do participants' use of metacognitive skills and strategies throughout the academic writing process contribute to their overall writing achievement? Data were collected through student writing output and artifact-based interviews. Seven themes emerged from the data analysis, including the influence of confidence, prior knowledge, affect, self-concept, audience perception, time allocation, and judgments of sophistication on metacognitive processes. The findings suggest that metacognitive support can help improve writing performance, particularly among students with lower levels of confidence in academic writing. The implications of these findings on instructional design and instruction are discussed. Further research is recommended to test the efficacy of specific metacognitive supports using design-based research and incorporating quantitative data. Overall, this study contributes to a better understanding of metacognitive processes in academic writing and provides insights into effective metacognitive support.

ÖZET

Akademik İngilizce Yazma Bağlamında Üstbilişsel (Metacognitive) Müdahaleler: Bir Vaka Çalışması

Bu vaka çalışma, akademik yazma süreci boyunca üniversite öğrencileri arasında üstbilişsel (metacognitive) becerilerin ve stratejilerin uygulanmasını incelemektedir. Çalışma üç araştırma sorusuna cevap vermeyi amaçlamıştır: (1) Katılımcılar akademik yazma süreci boyunca hangi üstbilişsel beceri ve stratejileri uyguluyorlar? (2) Çevrimiçi üstbilişsel destek modülleri, akademik yazma süreci boyunca katılımcıların üstbilişsel stratejileri kullanmalarını nasıl etkilemiştir? (3) Katılımcıların akademik yazma süreci boyunca üstbilişsel becerileri ve stratejileri kullanmaları genel yazma başarılarına nasıl katkıda bulunmuştur? Veriler, öğrenci yazma çıktıları ve esere dayalı görüşmeler aracılığıyla toplanmıştır. Veri analizinden, güvenin etkisi, ön bilgi, etki, benlik kavramı, izleyici algısı, zaman tahsisi ve karmaşıklık yargılarının üstbilişsel süreçler üzerindeki etkisi dahil olmak üzere yedi tema ortaya çıkmıştır. Bulgular, üstbilişsel desteğin, özellikle akademik yazma konusunda güven düzeyi düşük olan öğrenciler arasında yazma performansını önemli ölçüde artırabileceğini göstermektedir. Bu bulguların öğretim tasarımı ve öğretimi üzerindeki etkileri tartışılmaktadır. Tasarıma dayalı araştırma kullanarak ve nicel verileri birleştirerek belirli üstbilişsel desteğin etkinliğini test etmek için daha fazla araştırma yapılması önerilmektedir. Genel olarak, bu çalışma akademik yazımda üstbilişsel süreçlerin daha iyi anlaşılmasına katkıda bulunur ve etkili üstbilişsel destek hakkında fikir verir.

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CHAPTER 1

INTRODUCTION

Academic writing is one of the most important and transferable skills acquired in higher education. Metacognition – along with metacognitive knowledge, awareness, and strategy use – plays a key role in the academic writing process as a whole and in the subtasks associated with successful academic writing (Wischgoll et al., 2016; Teng , Qin & Wang, 2022; Hacker, Keener & Kircher, 2009; Negretti, 2012). Metacognition can be broadly defined as the knowledge and awareness that one has of their own cognitive processes (Flavell, 1976). Many researchers and practitioners have used this broad explanation to create more specific definitions of metacognition. For instance, studies across several content areas show how when learners apply metacognitive techniques, they are able to better manage their time (Son & Metcalfe, 2000), assess the difficulty of a given cognitive task and adjust accordingly (Koriat, Ma'ayan & Nussinson, 2006), and keep a "running tab" of what they've learned and what hasn't been mastered yet (Bruner, 1957 as cited in Osman & Hannafin, 1992). Metacognitive awareness and strategy use also impacts the learner as a person. Ellis, Denton, and Bond (2014) emphasize how "thinking about learning raises questions of truth, trust, openness, intrinsic worth, and even about how one ought to spend one's time" (p. 4022). These affective traits contribute to learners' interactions with the task, their ability to self-regulate their learning, and ultimately impact their overall learning achievement in that task (Efklides, 2011).

Despite the clear academic and personal benefits of metacognitive awareness and strategy use, learners often rely on explicit external prompts to recall and apply metacognitive skills (Ellis et al., 2014). This pattern can be seen in broad, cross-

curricular contexts, as well as more specifically in the context of academic writing (Hacker, 2018; Negretti, 2021; Ramadhanti, 2019). This highlights the need for robust metacognitive supports that emphasize not only metacognitive awareness, knowledge, and strategy use, but also the automatization and transfer of these skills (Karlen & Compagnoni, 2017).

Metacognitive skills and strategy use can be seen in learning contexts that span every age, stage, and subject; the current study focuses on the role of scaffolded metacognitive supports for an academic writing course. Studying metacognition within the context of academic writing is one of the key ways to gauge learners' self-regulated learning (SRL) and metacognitive knowledge and skill use (Zimmerman & Bandura, 1994). As Hacker (2009, 2018) puts it, "writing is applied metacognition." So, the academic writing classroom is one of the best contexts to observe, parse, and study learners' metacognitive development, both in terms of the underlying metacognitive awareness and the observable metacognitive strategy use. While metacognition plays a key role in academic writing achievement (Karlen, 2016; Negretti, 2012), there is still a need for support from the instructor and/or instructional materials to train and prompt metacognitive knowledge and skill use throughout the academic writing process (Cer, 2019; Goctu, 2017; Negretti, 2009; Ramadhanti, 2019).

Academic writing has been hailed as a unique window into learners' metacognitive knowledge and skill use, since academic writing achievement hinges on the planning, monitoring, and reflection throughout the writing process. (Flower & Hayes, 1981; Hacker, 2018; Negretti, 2021). The academic writing process is also a relevant context to observe the articulatable metacognitive strategies that learners employ (Dahlen, 1999; Karlen, 2016; Negretti, 2021; Teng, Xin & Wang, 2016).

Based on these theoretical underpinnings, the current study explores how metacognitive supports are used in the context of academic writing. Computer-delivered metacognitive scaffolds that include a variety of supports, such as guiding questions to promote calibrated goal orientation, providing prompts to encourage learners to monitor the depth at which they are processing the task, and incorporating affective variables in addition to the cognitive and metacognitive strategy variables of the task (Ellis et al., 2014; Osman & Hannafin, 1992) were presented to participants throughout the academic writing process.

The metacognitive supports in this study are aligned with the metacognitive strategies that can be categorized into the planning, monitoring, and control aspects of self-regulated learning (Karlen, 2016; Zimmerman & Bandura, 1994). The supports are also distributed throughout the pre-writing, while-writing, and post-writing phases of the process (Cer, 2019; Karlen & Campagnoni, 2017). The majority of the metacognitive supports were presented in the form of guiding questions (Teng, 2020), prompts for reflection (Negretti, 2012), and guided self-assessment based on a standardized rubric (Riddell, 2015).

1.1 Research questions

In this qualitative study, data from student writing output and artifact-based interviews was collected in order to address the following research questions:

1. What metacognitive skills and strategies are participants applying throughout the academic writing process?
2. How did the online metacognitive support modules interplay with the participants' use of metacognitive strategies throughout the academic writing process?

3. How do participants' use of metacognitive skills and strategies throughout the academic writing process contribute to their overall writing achievement?

1.2 Significance of the study

The significance of this study is two-fold: it seeks to fill a gap in the literature surrounding metacognitive interventions in academic writing, and it aims to offer theoretically sound and empirically tested materials for novice academic writers at the undergraduate level.

First of all, while many qualitative studies have explored participants' metacognitive awareness, knowledge, and skill use, there is a gap the literature when it to comes to examining the role of metacognitive supports in the context of academic writing. This gap is especially identified in the rhetorical context of academic writing, which inherently requires key metacognitive strategy use such as goal orientation and task conceptualization (Hacker, 2009; Negretti, 2012; Ramadhanti, 2019).

Secondly, the designs presented and tested in this study make a clear contribution to the educational context in which it is offered, as well as to similar contexts. These metacognitive supports are comprised of interventions and instructional elements that are strongly rooted in theory (Hacker, 2018; Zimmerman & Bandura, 1994); they have been tested in empirical studies across different curricula (Dahlin, 1999; Ellis et al., 2014; Osman & Hannafin, 1992) and also in contexts that apply specifically to academic writing (Cer, 2019; Negretti, 2012; Teng, 2020; Teng & Yue, 2022). This study also incorporated instructional design elements, particularly in the description and justification of the metacognitive

support. The explicit description and justification of the metacognitive supports allowed for deeper analysis of the instructional design in this and future studies.

Furthermore, this study focused on the early instruction of academic writing, where most students are still being introduced to "rhetorical consciousness" and constructing their initial mental representations of academic writing as "purposeful communication" (Negretti, 2012, p. 146). Since prior metacognitive knowledge is an effective predictor of metacognitive skill use (Taub et al., 2014; Teng et al., 2022), the context of this study is well-timed in the academic writing learning process. Since the participants are novice writers, they are likely to have little prior metacognitive knowledge in the context of academic writing (Goctu, 2019; Negretti et al., 2009; Veenman, van Hout-Wolters & Afflerback, 2006). The context of this study could present minimal interference from prior metacognitive knowledge and offer a complete view of the development of the participants' metacognitive knowledge and strategy use throughout the intervention.

Overall, this qualitative study incorporated elements of design-based research which allowed the researcher to explore specific aspects of the design of the metacognitive supports while also including detailed descriptions and justifications of the designs themselves. Such explanations fill a gap in the literature, where data is often presented without clear descriptions of the metacognitive supports being tested. This study also provides qualitative evidence that relate to the instructional design implications of existing theoretical models of academic writing instruction, metacognition, and self-regulated learning.

CHAPTER 2

REVIEW OF THE LITERATURE

Two key models lay the theoretical foundation for researching metacognition in the context of academic writing. The first is Efklides's (2011) Motivation and Affect in Self-Regulated Learning (MASRL) model. The second is Hacker's (2018) Metacognitive Model of Writing, which incorporates key aspects of self-regulated learning such as monitoring, goal orientation, calibration, and control. These two theoretical models fit hand-in-hand to demonstrate the important role that metacognition plays in academic writing.

2.1 Metacognition and the MASRL Model

Metacognition falls under the penumbra of SRL, which has been modeled in several different ways over the past few decades. One of the prominent models for describing self-regulated learning and the role of metacognition is Efklides's (2011) MASRL model. In the MASRL model, metacognition, motivation, and affect all interact on the Person level, independently of the task in front of the learner (Efklides, 2011).

In the MASRL Model, the task is independent of the learner and the learner experience, and interfaces with the learner on two different levels: the Person level, and the Person x Task level. On both levels, metacognitive experiences (ME), metacognitive knowledge (MK), metacognitive skills (MS) help the learner plan, monitor, and control their learning throughout their entire interaction with the task.

Metacognitive experiences (ME) are defined as the learner's subjective, conscious awareness of their own cognitive and affective processes while engaging

in learning tasks. ME comprises monitoring and reflecting on one's own thinking, emotions, and motivational states during the learning process. It also involves being aware of the effectiveness of their strategies, recognizing when understanding is lacking, and being able to reflect on and regulate one's cognitive and affective states to enhance learning outcomes (Efklides, 2011). In the context of academic writing, this may mean the learner's awareness of their understanding of the topic and recognition of when further research is needed to continue writing. It also involves noticing feelings of frustration or articulating "writer's block" during the process, and reflecting on the effectiveness of cognitive and metacognitive writing strategies applied throughout the writing process.

Metacognitive knowledge (MK) is described as the learner's understanding of – and often their ability to articulate – their understanding and awareness of their own cognitive processes, strategies, and abilities. It involves knowing what strategies to use, when to use them, and how to monitor and regulate their learning. MK includes knowledge about task characteristics, such as the demands and requirements of the learning task, as well as knowledge about one's own learning strengths and weaknesses (Efklides, 2011). And, it presents as both declarative knowledge and procedural knowledge (Efklides, 2011). In the context of academic writing, MK can involve the knowledge of different writing genres with their specific conventions, recognition of the important organizational and contextual elements of their writing, and understanding of the rhetorical context and goal of their writing (Negretti, 2021).

Metacognitive skills (MS) refer to the ability to apply metacognitive knowledge and use metacognitive strategies effectively during the learning process. MS involves actively planning and selecting appropriate strategies (including self-reflection, evaluation, and regulation strategies), monitoring one's progress and

comprehension, and adjusting when necessary (Efklides, 2011). In the context of academic writing, MS comprises strategy use such as setting specific goals for the writing task, monitoring and evaluating ongoing writing tasks for clarity and coherence, and applying revision strategies and feedback.

Based on the learner's ME, MK, and MS, SRL happens both in relation to and independent of the task, and the learner – here called "Person" – is the intermediary between the task and the learning itself. Observable behaviors that indicate a learner is operating at the Person level can include planning how to deal with a task based on MK and ME or affect, giving instructions or explanations in terms of MK, and recalling and reflecting on previous experiences and/or affect related to the task. A learner is operating at the Person X Task level when they are actively processing the task "rather than deciding on whether (and how) to process the task" (Efklides, 2011, p. 13).

Metacognition takes a key role in each of these levels, as well. In MASRL, metacognition comprises two of the components that make up the model. Metacognition in the form of MK includes a learner's knowledge of themselves and others, understanding of the task and associated goals, beliefs and implicit ideas of intelligence, and epistemic beliefs. Metacognition as MS includes the strategies such as planning, monitoring, and self-evaluation that the learner employs for the express purpose of controlling their cognition and learning (Efklides, 2011).

So, the role of metacognition – in the form of metacognitive experiences, metacognitive knowledge, and metacognitive skills – in this model of SRL is one of intermediation; that is, metacognition is a key component of regulation at the Person level, at the Task x Person Level, and in the interaction between these two levels in

both directions. Metacognition, metacognitive knowledge, and metacognitive skills are a vital part of self-regulation.

The MASRL Model is particularly well-suited as a theoretical framework for this research since it approaches the task as being "objectively defined based on task features such as novelty, complexity, conceptual requirements, [and] mode of presentation" (Efklides, 2011, p. 10) while acknowledging the Person as including the "cognitive, metacognitive, motivational, affect, and volitional" characteristics which are "relatively stable" as they guide the learner's top-down self-regulation (Efklides, 2011).

2.2 A metacognitive model of writing

Hacker's (2018) Metacognitive Model of Writing serves to explain the role of different aspects of SRL, such as control and monitoring, in the meta-processes involved with writing. There are two levels to this model: the object-level and the meta-level. Different metacognitive strategies fall within these two levels, and the interaction between the two levels; all of this together represents the metacognitive processes at work while writing.

There are also three phases described in Hacker's (2018) Metacognitive Model of Writing: planning, translating, and reviewing. In the planning phase, writers activate their prior knowledge, set goals, and develop a plan for organizing their ideas. Metacognitive strategies such as self-regulation and self-monitoring are used to facilitate this process. Practically, this might involve brainstorming ideas, outlining a structure for the piece, considering the needs and expectations of the audience, and establishing a timeline for completing the work.

In the translating phase, writers generate and revise their text. The use of metacognitive strategies such as self-reflection, self-correction, and problem-solving helps to ensure that the writing is clear, coherent, and effective. During this phase, the writer often chooses the right words and sentence structures to convey their ideas, make decisions about tone and style, and revise their plan as necessary to accommodate new insights or information.

In the reviewing phase, writers evaluate their work and make revisions based on feedback and reflection. This phase also includes self-evaluation and the use of metacognitive knowledge, such as knowledge about one's own cognitive processes, to guide revisions. Here, the writer engages in metacognitive processes to evaluate their work, identify strengths and weaknesses, and revise the text as necessary. This might involve proofreading for errors in grammar, punctuation, or spelling, revising for clarity or coherence, and seeking feedback from others to identify areas for improvement.

In this model, strategies refer to “plans or methods aimed at achieving a goal” (Hacker, 2018, p. 221) which makes the goal orientation of the learner extremely important at both the object-level and the meta-level. The object-level includes such strategies as control and monitoring. Control strategies include generating, revising, editing ideas and then putting those ideas into words, while monitoring strategies encompass reviewing and reflection (Flower & Hayes, 1981; Hacker, 2018). While control and monitoring strategies are different and serve different purposes in the writing process, the lines between them are often blurry (Hacker, 2018).

The representations of ideas that have been generated – and which may ultimately be included in the text produced – exist on the meta-level. It is here that the writer “consciously represent[s] the cognitive processes occurring at the object-

level and treat[s] them as the objects of thought" (Hacker, 2018, p. 222). At the meta-level, the writer can manipulate, judge, and analyze the declarative and procedural aspects of their writing; they can assess their ideas and writing, make judgements of difficulty or mastery, and determine if their goals in writing were achieved or not.

From these judgements and assessments, information from the meta-level cycles back to the object-level where it is again subjected to control strategies and possibly included in the text produced. In the course of this implicit processing, ideas can also then be addressed with monitoring strategies before being re-incorporated into the model of the object-level writing at the meta-level. Here, the cycle of monitoring and control can repeat several times before the writer pens their first word, at which point they have "exerted control over his or her thinking and has initiated the production of meaning in a text" (Hacker, 2018, p. 222). In order for this cycle of monitoring and control to continue, the writer must apply both cognitive and metacognitive skills. However, according to Wischgoll (2016), the driving and controlling force behind this cycle is metacognitive strategy use.

2.3 Writing as applied metacognition

This explicit goal of creating meaning in a text is a key factor in the definition and application of metacognitive experience, knowledge, and strategies in the writing process. As referenced previously, Hacker (2009) asserts that "writing is applied metacognition." It is important to note that this definition was meant to apply to the writing process in general – and the not the specific context of academic writing (Flower & Hayes, 1981; Hacker, 2018). Throughout the entire process of writing, from idea formation to reflection on the finished work, metacognition plays a key

role in a person's ability to make their ideas known, understood, and accepted (Hacker, 2018; Negretti, 2012).

In a more specific and relevant context, Negretti (2012) highlights the importance of academic writing as a means of rhetorical communication and the insight that learners' interaction with and within this rhetorical context; it sheds light onto their metacognitive awareness and strategy use. This look at "what student academic writers do and why they do it, that is the development of metacognitive awareness and its connection to strategic self-regulation in writing" (Negretti, 2012, p. 144) connects directly to what Efklides (2011) refers to as the metacognitive knowledge and metacognitive strategies that mediate the self-regulation that occurs between the Task, Person, and Person x Task levels as represented in the MASRL Model.

Furthermore, Breetvelt, van der Bergh, and Rijlaarsdam (1994) classify academic writing as following a "high-planning route" since it requires the writer to explore a complex task throughout the writing process (p. 107). Thus, cognitive tasks such as writer's understanding and elaboration of the task are not a discrete step in the process. Rather, it is a process that occurs throughout the planning, monitoring, and self-evaluation stages of writing, which are then incorporated into the task as a whole through the application of metacognitive strategies (Karlen, 2016).

It is also important to emphasize the cyclical nature of the phases of self-regulation that occur during the writing process, since the same strategy when applied at different points or stages of the writing process can serve different purposes or outcomes in terms of the overall goal of the writer (Breetvelt et al., 1994). This means that the same or similar metacognitive supports can yield very

different results depending on the point in the writing process at which the learner interacts with these supports (Cer, 2019).

2.4 Classifying metacognitive instruction

Osman and Hannafin (1992) classified four different types of metacognitive instruction according to whether the training approach is embedded or detached, and whether the metacognitive strategy being trained is content-dependent or content-independent. They classified interventions for metacognition as either *embedded* or *detached*, in reference to the training approach. Embedded strategies are those which are introduced, taught, and utilized in the context of a specific lesson in the subject area, while Detached methods are taught explicitly as stand-alone and highly-transferable skills which are independent of any subject.

Then, the interventions were further divided into *content-dependent strategies* and *content-independent strategies*. Content-dependent strategies are specific to the content or material being presented in a given lesson, with near-transfer as the main goal. Content-independent strategies are those which can be applied to several topics, themes, or subjects in the learner's experience (Osman & Hannafin, 1992). Osman and Hannafin (1992) pointed out that, in many cases, "the distinctions among strategies are related to specific methods of implementation rather than inherent differences in the strategies per se" (p. 92). That is, the content or goal of the metacognitive intervention are not the only factor that define it: the distinctions among these interventions are based not only on the nature of the intervention, but also on how it is applied and integrated into the lesson as a whole (Osman & Hannafin, 1992).

For the purposes of this study, the researcher attempted to incorporate metacognitive instruction that covers all four quadrants of Osman and Hannafin's classification matrix. Their classification includes four different types of metacognitive instruction according to whether the training approach is embedded or detached, and whether the metacognitive strategy being trained is content-dependent or content-independent. They also recommend using a mix of different approaches to train metacognitive skills and strategy use throughout the course of instruction (Osman & Hannafin, 1992, p. 91).

The designs for this research incorporate interventions from all four quadrants of Osman and Hannafin's matrix, starting with primarily embedded approaches (i.e., supports that pertain very explicitly to the writing task at hand with a goal of near and immediate transfer) and increasingly incorporating more and more detached approaches (i.e., supports that are more readily transferable across tasks and topics) as the course of instruction continues. Metacognitive supports are more embedded at the beginning of the intervention and progress to detached approaches. This general trend seeks to promote more self-efficacy when it comes to applying the metacognitive and SRL skills in cross-curricular contexts.

2.5 Metacognitive scaffolding in academic writing

Scaffolding is a term coined by Vygotsky (1978) to describe the support provided to a learner by a "more knowledgeable other" (such as an instructor or more advanced peer) in order to help them achieve a task or goal that they would otherwise be unable to accomplish on their own. Scaffolding involves offering support in the learning environment to facilitate the acquisition of new knowledge or skills, and then gradually removing this support over time as the learner moves towards mastery

(Wood, Bruner, & Ross, 1976). Some common scaffolding techniques include breaking large tasks into smaller and more manageable parts, offering cues or prompts to guide the learner, giving feedback, and modeling the appropriate output (Wood & Wood, 1996; Vygotsky, 1978).

Scaffolding as both a principle and a technique can be applied to most facets of education. Metacognitive scaffolding involves a focus on developing the learner's ability to reflect on their own thinking processes and then apply these reflections in a way that allows them to regulate their learning. The goal of scaffolding metacognitive instruction is for the learner to become aware of how they think, the learning strategies that they employ, and their own strengths and weaknesses, so that they can become a self-regulated and independent learner (Molenaar, van Boxtel & Sleegers, 2011).

An and Cao (2014) found that when faced with complex problem-solving tasks, learners who had access to metacognitive scaffolds in the form of computer-delivered modules showed significant positive effects on their problem-solving processes. In the case of computer-delivered metacognitive scaffolds, however, it is important to remember that "Scaffolds are not found in software but are the functions of processes that relate people to performances in activity systems over time" (Pea, 2004, p. 446). This means that aspects of the support must necessarily fade over time. In the current study, such aspects include the decreased frequency of the support, the increased complexity of the support, and the shifting type of support from content-dependent strategies to content-independent strategies, as described above (Osman & Hannafin, 1992; Pea, 2004; Puntambekar & Hubscher, 2005).

2.6 Metacognitive training in the context of academic writing

Previous studies (e.g., Hammann, 2005; Karlen, 2017; Karlen & Campagnoni, 2017; Negretti, 2009, 2012; Wischgoll, 2016) show that use of metacognitive strategies in academic writing enhances both metacognitive knowledge and academic writing achievement. These findings have been confirmed in several studies conducted in an English as a Foreign Language (EFL) context as well (Al-Jarrah et al., 2019; Cer, 2019; Goctu, 2019; Oz & Sen, 2021; Ramadhanti, 2019; Teng, 2019; Teng & Yue, 2022; Teng et al., 2022).

Metacognitive strategies in the academic writing process include planning strategies that help writers set and orient their goals in writing, monitoring strategies that allow writers to make ongoing judgments and adjustments to their work while writing, and self-reflection strategies that help writers evaluate their own writing as well as the writing process as a whole (Goctu, 2017; Ku & Ho, 2010; Negretti & McGrath, 2020). These strategies can be relatable to different aspects of metacognition and self-regulated learning (Efklides, 2011; Zimmerman & Bandura, 1994) and applied at each step of the academic writing process (Cer, 2019).

Karlen and Campagnoni (2017) argue that diversity and quality of metacognitive strategies employed by academic writers is directly related to their underlying metacognitive strategy knowledge and the affective implicit beliefs of academic writers. Such implicit beliefs include value judgements by learners of their own self-efficacy and feelings or attitudes towards academic writing, which then interact with metacognitive knowledge and strategy use to contribute to learners' overall SRL, particularly in the academic writing process (Efklides, 2011; Hacker, 2018; Negretti, 2021). In their study, Karlen and Campagnoni (2017) also found out that providing more diverse metacognitive supports can lead to more effective SRL throughout the academic writing process.

Metacognitive scaffolds can also help to curb three of the major problems that novice academic writers face, which are a high dependency on explicit teacher feedback; an inability to accurately assess their own understanding of the task, process, and/or goals and expectations of the task; and a lack of understanding of the benefits of applying metacognitive strategies throughout the writing process (Ramadhanti, 2019). By incorporating guidance and prompts for metacognitive strategy use, learners can overcome these weaknesses while also practicing their metacognitive strategy use (Goctu, 2017; Riddell, 2015). Such guidance can take the form of guiding questions to define the task and orient goals (Efklides, 2011; Jegede, Taplin & Fan, 1999) and/or self-reflection prompts to promote calibration and self-efficacy (Osman & Hannafin, 1992; Riddell, 2015).

For effective metacognitive instruction in any context, it is important to provide clear and frequent opportunities for learners to practice metacognitive strategy use since learners are not very likely to take the time to reflect on their own cognition unless they are explicitly taught and prompted by their teacher or instructional materials (Ellis et al., 2014; Aghaie & Zhang, 2012). Ellis et al. (2014) also stress the importance of having learners practice these metacognitive strategies in order for them to grow and develop to the point that the learner can select and apply an appropriate strategy without prompting of the teacher.

In the more specific context of academic writing, Cer (2019) found that presenting instructional supports throughout the whole writing process (i.e., during the pre-, while-, and post-writing stages) that promoted cognitive regulation and metacognitive skill use led to increased metacognitive awareness and significantly higher writing achievement. Goctu (2017) had similar findings, with higher learner

satisfaction related to their writing output in addition to higher metacognitive knowledge and writing achievement.

Ku and Ho (2010) conducted a qualitative study that explored the relationship between learners' metacognitive skills and their critical thinking abilities. They found that students who applied metacognitive strategies more frequently, consistently, and effectively also exhibited higher critical thinking capabilities. Since critical thinking is a key component in academic writing achievement (Barnet et al., 2017), metacognitive supports that promote critical thinking can also promote academic writing achievement.

Al-Jarrah, Al-Jarrah, and Talafhah (2019) highlight the importance of explicitly training metacognitive skills and prompting their application throughout the writing process. This training and prompting proved effective for learners of all achievement levels, and the researchers were able to identify some patterns that applied to a very broad range of the participants. For instance, certain metacognitive strategies seem to be more apparent and widespread than others. Learners were much more likely to employ planning strategies than they were evaluation strategies, which implies that evaluation strategies should be a focal point in metacognitive supports provided throughout the writing process.

De Silva and Graham (2015) also found that learners were more likely to apply metacognitive planning strategies after they had already started writing, regardless of their existing metacognitive knowledge. They also examined the combination of different metacognitive strategies used throughout the writing process, focusing on the importance of stimulated recall. Stimulated recall is a research method used to investigate the thought processes of individuals during a particular task or experience, including metacognitive strategies. In the context of

metacognitive strategies, stimulated recall involves asking individuals to recall and describe their thought processes and decision-making during a particular task or learning experience (De Silva & Graham, 2015). This allows researchers to gain insight into the metacognitive strategies that individuals use to regulate their learning and performance. Stimulated recall can provide a structure for learners to monitor and evaluate their own learning processes, identify areas of difficulty, and adjust their strategies to improve their performance (De Silva & Graham, 2015).

The qualitative study conducted by Teng and Yue (2022) identified the potential of metacognition in improving academic writing performance. They used structural equation modeling to investigate the relationship between Chinese university students' metacognition, critical thinking skills, and academic writing. The study focused on whether metacognitive awareness could enhance critical thinking and academic writing. The researchers measured metacognitive writing strategies, including knowledge and regulation in academic writing, and five critical thinking skills: inference, recognition of assumptions, deduction, interpretations, and evaluation of arguments. The study found a dynamic relationship between metacognition, critical thinking skills, and academic writing performance. The results indicated that university students with a higher level of metacognitive awareness were more likely to think critically, which resulted in better academic writing performance (Teng & Yue, 2022). These findings also highlight the importance of promoting metacognitive strategies and critical thinking skills in academic writing instruction.

The findings of Oz and Sen’s (2021) study indicate that participants in the experimental group who received instruction which included self-regulated learning activities demonstrated a significant improvement in self-regulated learning skills,

lifelong learning, and critical thinking tendencies compared to the control group. The qualitative data analysis also supported the positive contribution of such teaching activities based on self-regulated learning to participants' self-regulated learning skills.

Nourazar et al. (2022) investigated the impact of scaffolding awareness and the use of metacognitive strategies during a strategy instruction program that focused on a specific form and genre of writing, namely IELTS writing task 2. Their findings suggest that metacognitive instruction can be a valuable tool for improving learners' writing skills, and the use of metacognitive strategies can enhance this process. The study highlights the importance of supporting learners to improve their ability to effectively recall and apply metacognitive strategies while they are writing.

All in all, the literature confirms the use of theoretically-sound metacognitive supports as a means of increasing metacognitive awareness, knowledge, and strategy use with the ultimate goal of increasing academic writing achievement. Metacognition plays a key role in SRL in general (Efklides, 2011) and especially in the context of academic writing (Hacker, 2009; Ku & Ho, 2010). Learners are much more likely to apply metacognitive skills and achieve effective SRL when they are explicitly prompted to do so (Aghaie & Zhang, 2012; Ellis et al., 2014; Osman & Hannafin, 1992). This means that offering metacognitive supports during academic writing instruction can lead to more frequent and effective application of metacognitive strategies. As a result, this may impact learners' overall academic writing achievement (Al-Jarrah, 2019; De Silva, 2015; Goctu, 2017; Hacker, 2009).

2.7 Design guidelines and justification

The materials presented to participants in the experimental group included interventions at the pre-writing, while-writing, and post-writing stages that were designed to support metacognitive skill and strategy use. Throughout the semester, the metacognitive supports were provided alongside each writing assignment, where each relevant support module was presented to participants according to the pacing of the class syllabus, as they were assigned the assignments.

2.7.1 Pre-writing supports

After participants saw the prompt for the writing assignment and before they started writing, they were guided through a series of computer-delivered pre-writing exercises. All of the modules (i.e., the materials presented in tandem with each writing assignment) contained the following elements in the pre-writing supports:

Guiding questions helped participants fully understand the prompt of each writing assignment. Such guidance, when it leads to a better understanding of the course and/or assignment expectations, can lead to goals that are aligned with the task and ultimately more metacognitive and self-regulation skill use (Efklides, 2011; Jegede, Taplin, Fan, Chan, & Yum, 1999). For example, guiding questions during the pre-writing phase helped participants form a clear and manipulatable understanding of the task at the meta-level (Hacker, 2018) while also encouraging participants to reflect on their own planning process and prompt metacognitive strategy use from the beginning of the process (Cer, 2019; Karlen, 2016).

Visual content for activating prior knowledge helped recall and engage prior knowledge of topic and context and also triggered higher levels of SRL strategy use, including metacognitive strategy use (Taub, Azevedo & Boushet, 2014). In the current study, visual content provided a more concrete example of the topic against which participants could judge their own understanding and prior knowledge; it prompted participants to answer the question, "What do I already know about the topic for this task?" This helped participants understand the task at hand and orient their goals, which leads to more effective SRL overall (Zimmerman & Bandura,

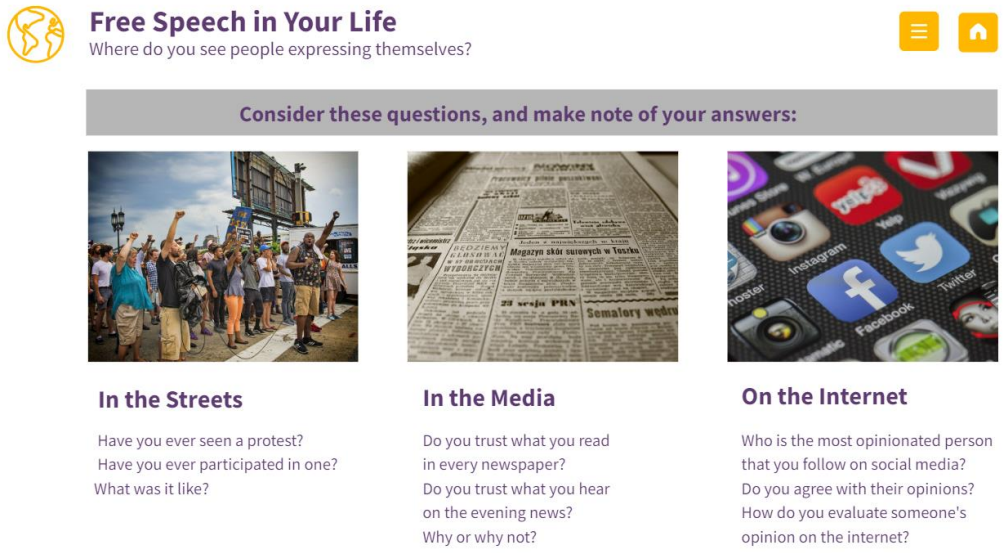

Figure 1. Sample from the Pre-Writing Support Module from WA#2.

1994; Efklides, 2011).

Prompts for planning the writing helped participants orient their goals for their writing (Hacker, 2018), consider their audience and view their writing through the lens of rhetorical communication (Negretti, 2012), and plan their own metacognitive skill use in the context of a given writing assignment (Karlen, 2016). For instance, modeled outlines and/or mind maps provided in the pre-writing phase helped participants have a clearer understanding of the task requirements and standards for achievement.

2.7.2 While-writing supports

Once participants started writing, they were encouraged to interact with while-writing supports that included the following components:

Monitoring strategies were promoted by offering clear standards against which to judge their own writing while they wrote (Dahlen, 1999; Taub et al., 2014). Authentic materials that achieve the rhetorical goal of the writing assignment were also provided as a model so that participants could judge their own ongoing performance (Karlen, 2016). For example, a news clip or article from the course book served as a model for strong argumentation. Participants received guidance for analyzing these authentic models and judging their own writing-in-process in comparison with the provided materials.

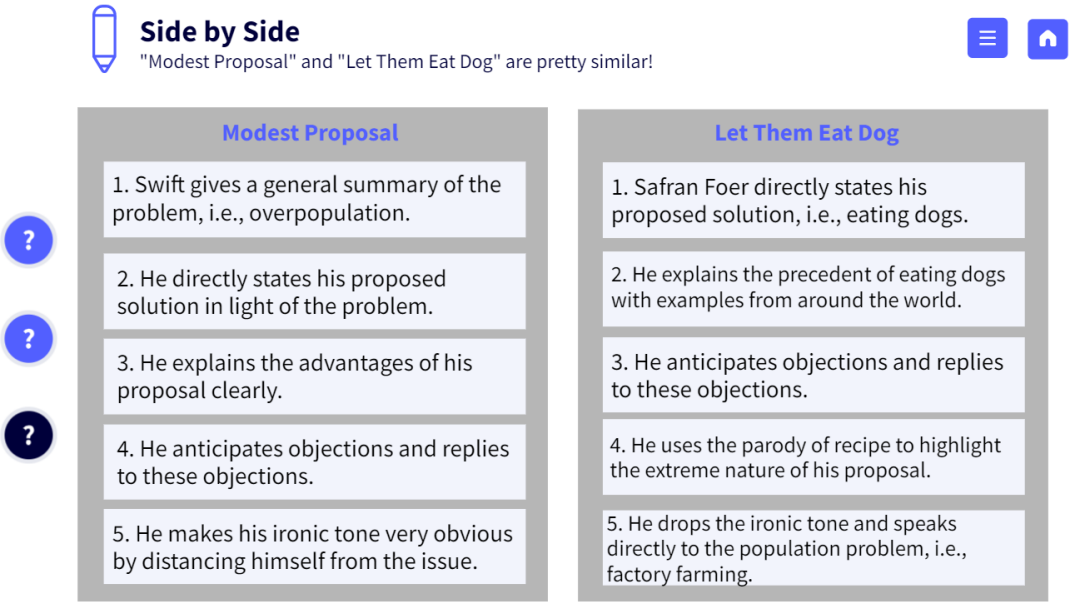

Figure 2. Sample from While-Writing Supports for WA#4.

Control strategies were promoted by offering check-ins and opportunities for participants to update their approach to the writing assignment throughout the writing process (Meza, Rodriguez & Caviedes, 2021; Veenman et al., 2006) according to the monitoring supports. Control strategies were also prompted by offering chances for

participants to reflect and control their own self-efficacy, which is a clear predictor in the effectiveness of a metacognitive support treatment (Teng et al, 2021; Wischgoll, 2016). For instance, prompts for reflection on specific, in-progress elements of their writing assisted participants in seeing the impact of metacognitive strategy use in the thick of their writing experience (Cer, 2019).

2.7.3 Post-writing supports

After completing their writing and before submitting their final draft to be graded, participants were presented with metacognitive supports that featured the following elements:

Self-reflection prompts encouraged participants to look back on their writing output both as a means of promoting metacognitive strategy use and as a way of reflecting on metacognitive skill use throughout the writing process (Meza et al., 2021; Negretti, 2012; Riddell, 2015). These prompts asked participants to assign a grade to their own paper, and to justify their judgement of their writing achievement. Prompts referred to specific aspects of the provided rubric (Appendix A) and model papers provided within the scope of the intervention (Riddell, 2015). There were also prompts to elicit future strategy use and help participants answer the question, “What will you do differently/better next time?” (Karlen & Compagnoni, 2017). In this way, learners were able to reflect on their metacognitive knowledge and skill use alongside their academic writing achievement.

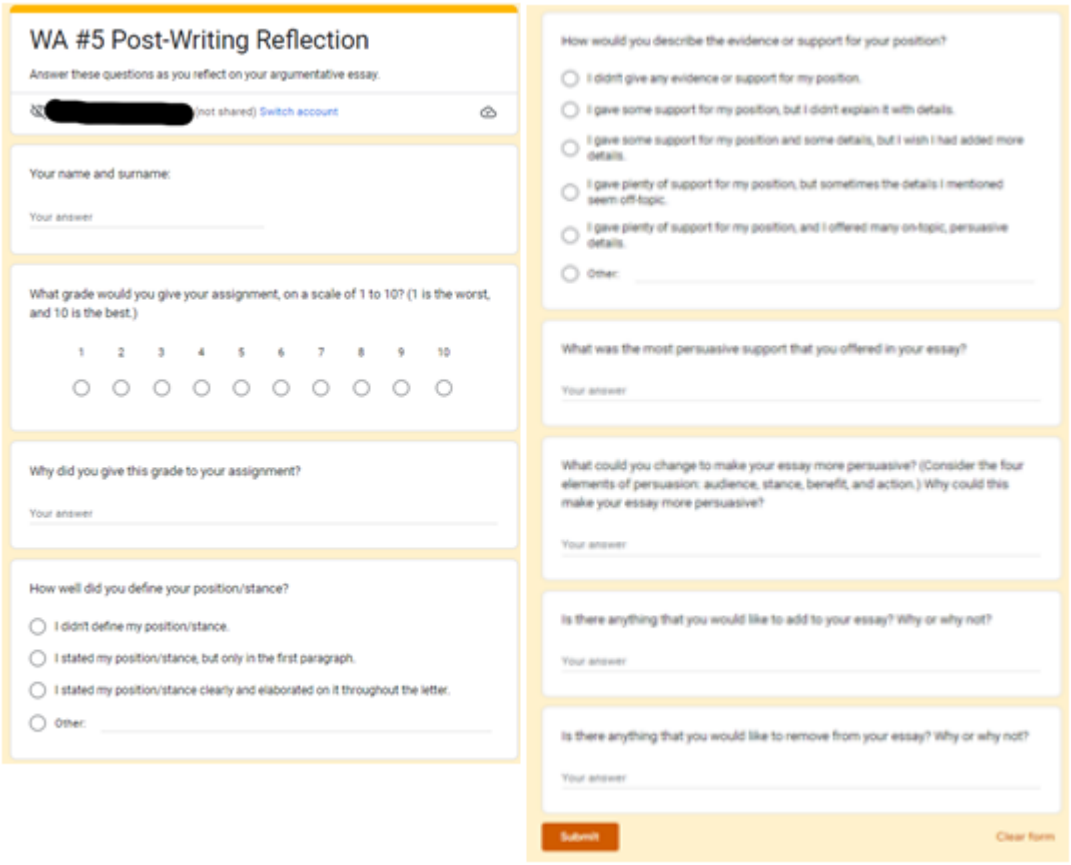

Figure 3. Example of Post-Writing Support from WA#5.

Calibration between the participants' perceptions of their own academic writing abilities and their actual performance was promoted by having them examine a model essay and critique the model and their own paper according to the rubric provided (Osman & Hannafin, 1992; Teng, 2017). This allowed the participants to reflect on their writing output, independent of the process that produced it.

2.7.4 Metacognitive scaffolds used in the study

Throughout the intervention, the frequency of metacognitive support decreased, the complexity of metacognitive support increased, and the type of metacognitive support was changed to promote farther skill transfer. These adjustments served to promote automatization, self-efficacy, and self-dependence on the part of learners.

Automatization refers to a participant's ability to select and apply appropriate cognitive or metacognitive strategies in a given context without consciously considering the skills and/or strategies that can be applied, or why they are particularly suited for the task at hand. Automatization can increase the efficiency of SRL and reduce the cognitive load presented by metacognitive knowledge and awareness (Efklides, 2011). In the current study, the *frequency of the support* was reduced as the intervention progressed in order to promote automatization. Participants saw fewer metacognitive supports in each writing assignment as the semester went on, and these supports were spaced further apart in the delivery of the supplemental materials so that they became a reminder of automated metacognitive strategy use, rather than instruction or explicit instruction for metacognitive strategy use (Osman & Hannafin, 1992).

Self-efficacy refers to a participant's own perception of how effective their metacognitive strategy use is or will be when approaching their learning goals. High and accurately-calibrated self-efficacy is a key indicator of both metacognitive strategy use and academic writing achievement (Hammann, 2005), and it plays a crucial role in helping learners orient their goals from the outset of the task (Breetvelt et al., 1994). The *complexity of the support* increased as the intervention progressed to promote self-efficacy throughout the writing process. Reflection prompts and guiding questions in each phase of the writing process aimed to increasingly target critical thinking skills and other "higher-order thinking skills" at the planning, monitoring, and control stages, where "[m]etacognition is no doubt a core component" (Ku & Ho, 2010, p. 254). This means that over the course of the intervention, the participant relied less on the metacognitive support and more on their own perceptions of the task, goals, and appropriate metacognitive strategies.

Self-dependence refers to a participant's ability to complete a given task or achieve a given goal with little to no input from the instructor and/or supplemental instructional materials. Exhibiting higher metacognitive strategy use is related to higher levels of self-dependence in the academic writing context (Teng, 2020). The *type or classification of the support* according to the definitions and examples posited by Osman and Hannafin (1992) shifted throughout the course of the semester to include more Detached and Content-Independent supports in order to prompt farther transfer for these metacognitive skills and strategies as the intervention progressed. This farther transfer – even transfer into cross-curricular academic writing – aimed to increase learners' self-dependence across several contexts while also decreasing their dependence on feedback or input from their instructor or instructional materials.

Figure 4 offers examples of metacognitive supports that were offered in the online modules in the current study, and classifies them according to Osman and Hannafin's (1992) matrix. The instructional design elements described in the matrix are categorized along two axes: the horizontal axis represents the progression from content-dependent strategies to content-independent strategies, and the vertical axis represents the progression from embedded to detached strategies.

As indicated by the arrows along the axes, the design of the online support modules for the current study sought to elicit increasingly content-independent and increasingly detached strategies throughout the course of the semester. Examples of design features that applied to each of these strategy types are presented in each box of the matrix. The ultimate goal of the metacognitive scaffolding was to present participants with instructional designs that increasingly prompted and elicited detached, content-independent strategies as they completed writing tasks during the

semester. The end goal of such a design was to promote automatization, self-efficacy, and self-dependence.

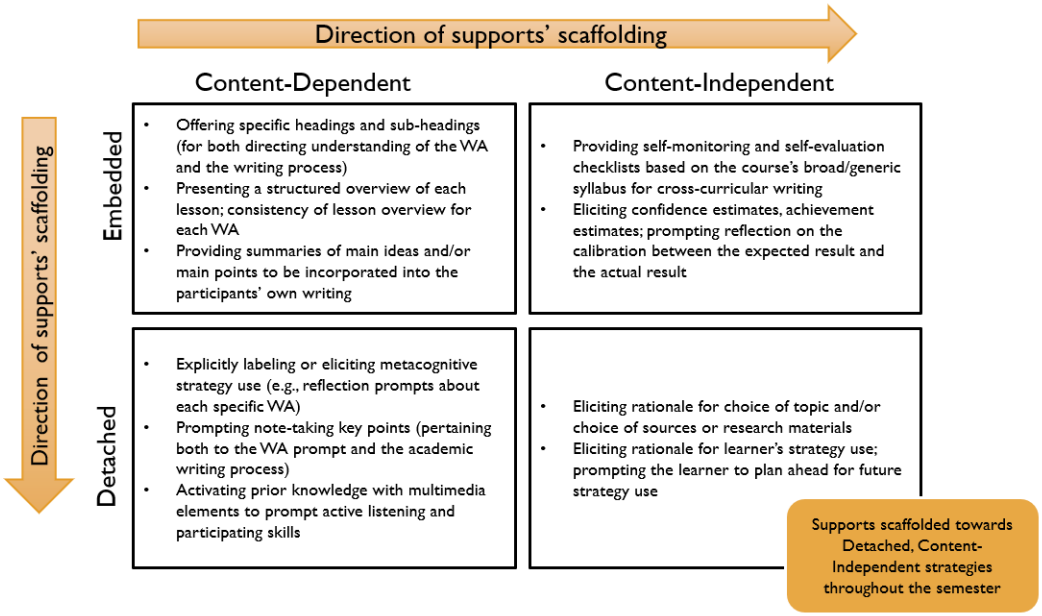

Figure 4: Matrix of scaffold design

CHAPTER 3

METHOD

3.1 Research design

This research study used a qualitative design that includes three cases. Each participant was treated as a case. The intervention of the study consisted of a series of online supports that were presented to participants throughout the course of the semester and which corresponded directly with the writing assignments assigned by their instructor. These supports included metacognitive scaffolds that were designed to train, prompt, and drill metacognitive strategies and skills throughout the writing process. Data was collected through artifact-based interviews at the end of the semester, as well as participants' writing assignments and written reflective responses to the prompts pertaining to their own writing assignments.

The intervention was presented to two different sets of participants in two different semesters: the pilot group received the intervention during the Spring 2022 semester in the context of an online-medium iteration of the course. The participants in the pilot group gave feedback in the form of end-of-semester artifact-based interviews; the research also looked at their writing assignments and written reflective responses. Based on this input from the pilot study, certain changes were made to the design of the metacognitive support modules, which will be discussed in the following section.

3.2 Study iterations

Before the main study took place, the researcher conducted a semester-long pilot study with an online section of the same course. The syllabus, course book, course

material, and writing assignments for the pilot study course were the same as those of the main study course. The major difference between the pilot study and the main study was that the pilot study's course was conducted online while the main study's course was conducted face-to-face on campus.

For the pilot study, the researcher conducted five semi-structured artifact-based interviews with five participants at the end of the semester. These interviews lasted about 25 minutes each, and included questions about the metacognitive supports as well as participants' own application of metacognitive skills and strategies throughout the writing process. From these interviews, the researcher was able to collect valuable feedback which led to changes in the design and application of the online metacognitive support modules for the main study.

These changes in the design were based largely on the feedback and qualitative data collected during the five artifact-based interviews. For example, the researcher shifted a more focused attention to the reflection forms after these pilot interviews, since several participants highlighted the importance and effectiveness of these post-writing supports. Furthermore, the researcher was able to address usability issues in the online modules as expressed by the participants. Finally, elements that were not mentioned or which were deemed to be excessive or extraneous by the participants were re-examined, and in some cases, pared down. The most notable example was the reduction in the number of guiding questions during the pre-writing sections of the first three online support modules, since several participants mentioned that the number of guiding questions seemed too high, and that some of the questions were too straightforward or obvious to prompt real thinking and metacognitive reflection.

Once the online metacognitive support modules had been updated according to the feedback from the pilot study's participants, the researcher recruited a new set of participants from the Fall 2022 offering of the course for the main study.

3.3 Context and participants

The context of this study was an academic writing course in a language teacher education program at a large research university in Istanbul, Turkey. Participants volunteered from one section of the first-year required writing course from the Foreign Language Education Department at this university. The course aimed to teach pre-service English teachers the academic writing process and introduce them to several methods and strategies for writing effectively. The course was taught in English, and all of the participants were applying the language in an English as a Foreign Language (EFL) context.

Participants were selected through purposive sampling (Saldana, 2013). The goal was to reach out key informants based on two criteria: (1) completion of the online metacognitive support modules and (2) submission of the writing assignments. This sampling method yielded three participants who completed most of the modules and submitted most of the writing assignments (see Table 1). They were between 18 and 19 years old, in their first semester of study in their program. All participants completed one year of preparatory English classes during the 2021-2022 academic year, before entering the department in Fall 2022.

Before the study was conducted, ethical approval was attained from the Institutional Review Board of the university (see Appendix B). Participation was completely voluntary; all participants consented to the release of their writing

assignments, reflection form data, and interview data (see Appendix C for the full consent form).

At the end of the semester, participants who had the most consistent interaction with the support modules were specifically invited to join the interview. There was a total of three participants who ultimately agreed to join the interview. Table 1 gives an overview of each participant, the extent of their participation throughout the semester, and a brief description of their writing achievement based on their writing output (i.e., the general quality of their writing assignments).

3.4 Data collection procedures

Qualitative data for the main study was collected via three semi-structured, artifact-based interviews at the end of the semester; one interview was conducted with each participant. Interviews were conducted after participants had submitted all of their writing assignments, but before they received feedback and scores for the fifth (and final) writing assignment. The artifacts presented in the interview included the participant's own writing assignments. At points, the researcher referred to specific assignments or excerpts from assignments, and participants were able to navigate through their papers and indicate anything from the artifacts to aid their own explanations throughout the interview. Each interview lasted about 45 minutes; participants chose whether to complete the interview in Turkish or in English. Throughout the course of each interview, participants were presented with their own writing assignments (see Appendix D for the interview questions).

Table 1. Participant Profiles

Participant	Gender	Description of Participation	Description of Achievement
Participant 1	Female	WA#1 – completed online module; submitted post-writing reflection. WA#2 – completed online module; submitted post-writing reflection. WA#3 – not included in research study. WA#4 – did not complete the online module. WA#5 – did not complete the online module.	Participant consistently scored high (sometimes exceeding 100%) on her assignments; her writing exhibits a level of complexity that exceeds that of many of her classmates; she is consistently able to tie together ideas in a logical and convincing manner.
Participant 2	Male	WA#1 – did not complete the online module. WA#2 – completed online module; did not submit post-writing reflection. WA#3 – not included in research study. WA #4 – completed online module; submitted post-writing reflection. WA #5 – completed online module; submitted post-writing reflection.	Participant received average scores on his assignments; his writing is often disjointed, though he his arguments are usually complex and delve deeper than surface-level observations; the varied and often sporadic changes in his sentence structure and tone sometimes detract from the idea he is trying to express in his writing.
Participant 3	Female	WA#1 – completed online module; submitted post-writing reflection. WA#2 – completed online module; did not submit post-writing reflection. WA#3 – not included in research study. WA#4 – did not complete the online module. WA #5 – completed online module; submitted post-writing reflection.	Participant received average to high scores on her assignments; her writing is straightforward and easy to follow; where she lacks complexity in her sentence structure and language use, she makes up for it with clear and effective arguments in the content of her writing.

For data collection, several tasks were presented throughout the semester. In week 1, participants were recruited and asked to complete the consent form. The metacognitive supports were made available to the participants one week before the due date of each writing assignment, and remained accessible for the rest of the semester. The metacognitive supports provided throughout the semester were delivered in tandem with the writing assignments. These assignments were a series of

five writing assignments provided by the course instructor, and the materials which included metacognitive supports were given to participants by the researcher as a means of guiding them as they completed each corresponding writing assignment.

The writing assignments were collected in the third, sixth, ninth, and tenth weeks of the semester. The participant interviews were conducted in week 14, the final week of the semester. Writing Assignment #3, which was collected by the instructor in week 7 of the semester, was excluded from the dataset by the researcher. This was due to a miscommunication between the instructor and the researcher regarding the due date of the assignment; the instructor assigned and collected WA#3 without notifying the researcher, so there wasn't sufficient time to offer the online metacognitive support module before the submission of WA#3.

Data collection procedures are shown in Table 2:

Table 2. Data Collection Procedures

Task	Week Assigned	Topic
Consent Form	1	General recruitment of participants
Writing Assignment #1	3	A balanced dialogue, explaining both sides of a controversial topic.
Writing Assignment #2	6	A letter of complaint that expresses a problem and proposes a solution.
Writing Assignment #3	7	*Excluded from the research study.*
Writing Assignment #4	9	Write your own "modest proposal."
Writing Assignment #5	10	A brief essay explaining and supporting a position on a controversial topic.
Participant Interviews	14	Artifact-based interviews conducted with students who participated consistently throughout the semester.

The metacognitive support materials comprised of pre-, while-, and post-writing interventions; these were delivered via guiding questions, activities for activating schema based on the topic of the writing assignment, prediction prompts, and reflection prompts.

3.5 Data analysis

In order to analyze the qualitative data, the interviews were all transcribed and organized before thematic analysis and content analysis were conducted. The analysis took place in four cycles; the first cycle was conducted with *holistic coding*, the second with *provisional coding* with some elements of *simultaneous coding*, the third with *process coding*, and the fourth with *process coding* entwined with *simultaneous coding*. These cycles of coding were applied to the interviews, as well as the writing assignments and post-writing reflection forms of the participants, where applicable.

3.5.1 First cycle of coding

The first cycle of coding employed *holistic coding*, which offered a "preparatory approach" to the data before more thoroughly coding and categorizing it (Saldana, 2013). The codes used in this cycle drew on broad categories and definitions derived from Flavell's (1979) seminal work and initial model of metacognition.

These codes fell under two broader categories: 1) Metacognitive Regulation, and 2) Metacognitive Knowledge. Metacognitive Regulation comprises the planning, monitoring, and evaluating that participants articulated and demonstrated throughout the writing process; utterances that spoke to each of these elements were coded under this category. Likewise, Metacognitive Knowledge includes declarative knowledge, procedural knowledge, and conditional knowledge as expressed by each participant; utterances that spoke to each of these knowledge types were duly coded.

Table 3 gives a description of each code; these descriptions were derived from Flavell's initial description of his model of metacognition (Flavell, 1979).

3.5.2 Second cycle of coding

The second cycle of coding applied *provisional coding* (Saldana, 2013) and included codes derived from the literature; these codes came from the elements and interactions described in Efklides' (2011) MASRL Model. Elements of *simultaneous coding* were also employed during the second cycle, wherein two or more codes overlapped and the interaction between these codes lent deeper insight into the data (Saldana, 2013).

Since MASRL focuses on interactions between elements of self and task to present a model of self-regulated learning, the provisional codes drawn from the model itself were coded simultaneously alongside other provisional codes in order to represent the interaction between the two elements. In Table 4 – as well as in the codes themselves – the interaction between two or more elements is represented with an "x."

As in the first cycle, the codes from the second cycle fall into three broader categories, which include the Person Level, the Task x Person Level, and the Phases of Processing at the Task x Person Level. The codes within each of these categories are represented in MASRL Model (Efklides, 2011) (see Table 4).

Table 3. Definitions and Descriptions of 1st Cycle Codes

Broad Category	Code	Meaning	Description
Metacognitive Regulation	PLN	Planning	Showing how the student predicts and prepares for their writing, especially in terms of their expressed goal/purpose for writing; showing skills/strategies that aid in this prediction and/or preparation.
	MON	Monitoring	Showing how the student monitors their knowledge and learning (knowing what they know/don't know); showing how this monitoring leads to application of/changes in the skills applied throughout the writing process.
	EV	Evaluating	Showing how the student judges, compares, and evaluates their own writing; showing how these evaluations are formed; showing how these evaluations contribute to/help determine how the student continues or completes the writing process.
Metacognitive Knowledge	DK	Declarative knowledge	Exhibits knowledge of the student's own understanding and skills (especially as it applies to their learning and/or writing); awareness (and ability to articulate) different factors that affect their learning/writing process.
	PK	Procedural knowledge	Exhibits knowledge of different skills/strategies; exhibits knowledge about how to choose and/or apply a specific skill/strategy to solve a problem or accomplish the goal/purpose of the writing.
	CK	Conditional knowledge	Exhibits knowledge of different conditions ("if + then") that can impact their learning/writing process.

Table 4. Definitions and Descriptions of 2nd Cycle Codes

Broad Category	Code	Meaning	Description
Person Level	SLF	Self-concept	Showing how the student perceives themselves; showing their perceived self-efficacy; showing their perceived ability, skill level, strengths and weaknesses, etc.
	MOT	Motivation	Showing the goals that students have while performing the task; can be intrinsic motivation (I-MOT) or extrinsic motivation (E-MOT); expectancy-value beliefs
	MK	Metacognitive Knowledge	Knowledge of self and others; knowledge of tasks, goals, and strategies; beliefs about cognition/memory/other cognitive processes
	MS	Metacognitive Strategies	Showing the student's usual strategies -- such as planning, monitoring, and self-evaluations -- to control cognition/learning
	AF	Affect	Attitudes and emotions (anxiety, interest, fear, pride, shame, etc.)
Task x Person Level	AF x ( )	Affect (interacting with another element)	Attitudes and emotions (anxiety, interest, fear, pride, shame, etc.) → falls into both levels, although interaction is necessary to class it in Task x Person Level
	MOT x ( )	Motivation (interacting with another element)	Showing the goals that students have while performing the task; can be intrinsic motivation (I-MOT) or extrinsic motivation (E-MOT); expectancy-value beliefs → falls into both levels, although interaction is necessary to class it in Task x Person Level
	ME	Metacognitive Experiences	Expressing/articulating the student's own experience with cognitive and metacognitive endeavors; can be prospective, during, or retrospective
	REG	Regulation of Affect and Effort	Showing how the student articulates and adjusts affect (attitudes and emotions) and effort (time, energy, resources and how they're distributed) in order to complete the task in line with their goals
Phases of Task Processing at Task x Person Level	TR	Task Representation	Refining the initial overall perception of the task; leads to task-specific goal-setting and planning • Automatic (AT): based on familiarity; fluent; effortless • Analytic (AN): triggered by cognitive interruption due to task novelty, interruption of cognitive process, complexity, increased cognitive load, and/or lack of task-related information/knowledge
	CP	Cognitive Processing	Can be based on nonanalytic processes when TR was automatic. When TR is analytic/effortful: interruptions of cognitive processing and error occurrence usually increase; student monitors these interruptions and errors and self-regulates according to their ability
	PRF	Performance	Happens *after* cognitive processing is completed; monitoring the outcome of the ME; estimate of correctness, feeling of confidence, feeling of satisfaction; self-observation and self-reflection as explicit evaluations of goal attainment

3.5.3 Third cycle of coding

The third cycle of coding employed *process coding*, in which observable activities – in this case, activities directly related to the usage and application of metacognitive skills and strategies – are noted, along with their strategic implementation over time (Saldana, 2013). Utterances which pointed to the implementation of a specific metacognitive strategy or skill were coded according to the strategy described.

Table 5 lists the codes and descriptions of the third cycle codes. Since all of these codes fell into the same broad category of applied metacognitive strategies, they are not further differentiated.

3.5.4 Fourth cycle of coding

The fourth cycle of coding applied the same *process coding* approach as in the third cycle, and also brought in elements of *simultaneous coding* to show how the applied metacognitive skills and strategies which were identified in the third cycle interacted with elements of the models of metacognition explored in the first and second cycles of coding. No new codes were added during the fourth cycle. The researcher re-examined the whole dataset, looking at all of the codes from the preceding three cycles and looking for overlaps, connections, and interactions between the existing codes.

Table 5. Definitions and Descriptions of 3rd Cycle Codes

Code	Definition	Description
PRK	Prior knowledge	Activating and/or drawing on prior knowledge or prior experience in order to plan, monitor, or evaluate cognition throughout the writing process.
GS	Goal setting	Articulating the goal of the writing; differentiating the goals of various writing styles and assignments.
GO	Goal orientation	Referring back to the expressed goals, aims, or targets of their writing while making decisions throughout the writing process.
ASK	Asking questions	Asking themselves questions throughout the writing process in order to define and align their goals, or evaluate their performance; examples of such questions were also coded "ASK" by the researcher.
AUD	Audience	Keeping the audience in mind throughout the planning and monitoring phases, as a means of attaining the goals and/or aims of their writing.
MFM	Monitoring feelings of mastery	Articulating their abilities, how these abilities contributed to their thought processes while writing (or how gaps in their abilities hindered them while writing), and how these abilities grew and/or changed over the course of the semester.
FOK	Feeling of knowing	Articulating the "tip of the tongue" phenomenon; acknowledging gaps in knowledge and/or recall ability.
SOC	Social strategies	Involving peers in co-regulation; involving peers (or seeking help from peers) in the application of cognitive and/or metacognitive strategies throughout the writing process.
MTA	Monitoring time allocation	Describing how or why they spent time on certain aspects of the writing process; justifying why certain aspects of the writing process deserved more or less time than others.
PWR	Post-writing review, revision, and reflection	Reviewing and reflecting on the paper before submission, usually while reflecting on goal attention, mastery of the topic, and/or overall success of the paper as a piece of academic writing output.
JS	Judgment of sophistication	Monitoring the writing in terms of the participants' own perception of "academic" and "sophisticated" language; operating on the assumption that "sophisticated is better," thereby deploying strategies to achieve such sophistication.
ORG	Organization strategies	Articulating how the organization of their writing contributed to the goal or purpose of each assignment, or to academic writing in general.
RFB	Response to feedback	Making changes to their goal, purpose, and/or writing process based on external feedback (from their peers, their current instructor, or previous instructors).

Table 6. Overview of Code Frequency

		Frequency in Interview Transcripts			
Broad Category	Code	Participant 1	Participant 2	Participant 3	TOTAL
Metacognitive Regulation	PLN	11	9	12	32
	MON	11	16	13	40
	EV	14	11	19	44
Metacognitive Knowledge	DK	13	10	17	40
	PK	20	27	24	71
	CK	9	4	1	14
Person Level	SLF	22	17	10	49
	MOT*	6	10	8	24
	MK	15	8	5	28
	MS	15	17	16	48
	AF*	34	10	12	56
Task x Person Level	ME	21	11	2	34
	REG	15	22	13	50
	TR	13	18	15	46
	CP	8	19	9	36
Phases of Task Processing at Task x Person Level	PRF	13	10	20	43
	PRK	7	9	3	19
	GS	9	5	5	19
Metacognitive Strategies	GO	19	8	6	33
	ASK	4	6	7	17
	AUD	6	10	6	22
	MFM	16	6	9	31
	FOK	4	1	3	8
	SOC	3	--	9	12
	MTA	11	4	4	19
	PWR	2	8	7	17
	JS	5	9	5	19
	ORG	6	6	3	15
	RFB	2	3	5	10
TOTAL		334	294	268	896

** These counts include the AF and MOT codes that were used to show interactions between other elements in the 3rd cycle of coding, as described above.*

3.6 Trustworthiness of the study

In order to ensure the rigor and trustworthiness of the current research study, the researcher employed strategies to address the credibility, transferability, and confirmability of the results.

To establish credibility, several measures were taken throughout the research process. Prolonged engagement was fostered by conducting the study in an academic writing course over the entire semester, allowing for an in-depth understanding of the participants' experiences. Additionally, the use of semi-structured, artifact-based interviews provided rich and detailed information, contributing to the credibility of the findings (Creswell, 2018). Plus, the researcher had prolonged engagement with the data by conducting thorough and iterative readings of the interview transcripts, participants' writing assignments, and reflection form responses. Coding the data in four cycles allowed for a comprehensive exploration of the data; this process of coding involved identifying initial themes, refining and revising them, and ultimately arriving at a final set of themes that accurately represented the participants' experiences (Saldana, 2013).

In order to promote transferability, the researcher provided detailed information about the context and university writing course, offering clear insights for fellow researchers and practitioners about the context(s) that can most benefit from the findings of the current study (Creswell, 2018). Moreover, the characteristics of the participants, such as their age, academic background, and language proficiency, were thoroughly documented, aiding readers in assessing the applicability of the findings to similar contexts.

To address confirmability, the researcher actively engaged in reflexivity throughout the data analysis process by critically reflecting on her own assumptions,

biases, and preconceptions, aiming to minimize their influence on the interpretation of the data (Creswell, 2018). The use of semi-structured interviews allowed participants to navigate through their papers and provide clarification, ensuring the objectivity and confirmability of the collected data. Plus, the use of four cycles of coding provided a rigorous and systematic approach to analyze the data, reducing the potential for researcher subjectivity (Saldana, 2013). Furthermore, the final set of themes and interpretations were grounded in the participants' voices and experiences, contributing to the objectivity and confirmability of the findings.

3.7 Researcher subjectivity

In this qualitative study, the biggest contributor to researcher subjectivity was her role as an academic English instructor in the university's own preparatory school for the seven years prior to conducting this research. This experience greatly informed her notions of how to teach the academic writing process, as well as what constitutes acceptable academic writing. It also informed her design decisions as to what to include in the online metacognitive supports, the level of academic English to include in the supports, and the way in which she directed the recommended organization of each writing assignment. For example, she relied on the organizational elements that were very familiar to her from the preparatory school's standardized curriculum. Or, she could have unwittingly favored metacognitive strategies that she prefers to use, rather than presenting a balanced view of a wide range of metacognitive strategies. Finally, she could have emphasized certain parts of the writing process where she saw students struggle the most, while also overlooking other parts of the writing process in her design; she may have made premature value

judgments about the different strategies and information she put forth in the online metacognitive support modules.

Teaching experiences prior to her position at the university's English preparatory division could have also influenced the researcher's subjectivity. For instance, she has taught academic writing in many different contexts over the past ten years, including in first-year writing courses, which were similar in content and structure to the course which served as the context for the current study. However, the cultural and lingual background of this teaching experience was much different from the current context, since it featured mostly American students with a wide diversity of ages, and most of whose first language was English. Over the years, experience with online courses and academic writing coaching focused on academic writing for specific standardized exams could have also informed the researcher's expectations for the participants' writing process and writing output.
Furthermore, the researcher's role as "teacher" could have influenced the interaction between the researcher and the participants during the interview. Plus, her own ideas about what constitutes "academic writing" based on the models and examples she was familiar with could have interfered with her perception and judgement of the participants' writing, especially for writing assignments where content and organization deviated from the essay styles that she had been teaching for so many years. Finally, while interpreting the data, the researcher could have emphasized the participants' adherence to certain academic writing conventions, rather than looking solely at the participants' expressed experiences and thought processes, which could have affected or altered the interpretation of the data.

CHAPTER 4

FINDINGS

As a result of the data analysis, seven primary themes emerged: (a) Participants who feel less confident about academic writing seem to benefit more from the supports; (b) Application of prior knowledge seems to be most effective at the planning and/or task representation phase; (c) The interaction between affect and self-concept seem to guide the application of metacognitive strategies for planning and task representation; (d) Participants' perception of their audience influenced their calibration while monitoring and evaluating; (e) Participants' monitoring of time allocation seems to interact with the performance phase and evaluation of their writing; (f) Participants relied on "judgments of sophistication" throughout the cognitive processing and performance stages to monitor and evaluate their writing; and (g) Guiding questions, self-concept, and prior knowledge seem to interact and form the preliminary step for goal orientation during the task representation phase.

4.1 Participants who feel less confident about academic writing seem to benefit more from the supports

When asked about the supports and their effect on their writing processes, participants who expressed lower confidence levels also expressed the most reliance on and benefit from the metacognitive supports. For example, Participant 3 explained, "The modules [i.e., the supports] helped me so much and they were great because someone like me - I don't know how to do things and I needed some guidance and your modules were so useful." This same participant also described herself as "anxious" while writing, which led her to conclude, "I need some

guidance, … more than [the guidance we had received] in class." She also expressed a lack of confidence or sureness when it came to choosing a topic and initiating the task representation phase: "At first, I was like 'what should I do? I don't know what to do' or I couldn't think of anything, then with the help of your modules and the example papers, it was great [i.e., helpful, effective]." As seen, the participant expressed that it was her anxiety – her lack of confidence – surrounding the starting of her writing assignment that initially pushed her to make use of the supports. And, in the end, it was this lack of confidence that was overcome thanks to the metacognitive support she received from the online module.

In the same way, participants who expressed more confidence in their writing abilities and/or ability to get started on each assignment reported benefitting less from the supports. For instance, Participant 1 remarked that she did not use the supports as much for later assignments, and when asked why, she replied:

> So for me it [the support module] wasn't that effective I'd say, but that's because I've had so much time to prepare and learn how to start an essay you know, how it should go, what's the structure and what topics to choose [because of my previous experiences with academic writing]. It was just -- it's kind of like reflex to me at this point.

Here, her confidence in her prior cognitive and metacognitive knowledge is apparent, and as a result, she deemed the support modules to be less effective. The same pattern emerged in her feelings towards her writing achievement; she remarked, "So, I was a bit cocky, or really cocky, but usually I say I'm fairly confident in my writing, so I know when I'm going to get the full mark." It can be seen that the participant's confidence level informs her involvement in the writing process and her decision not to use the support module in her later papers.

Similarly, Participant 2 expressed confidence in his ability to find and develop topics without the help of the support modules, especially for his later

assignments: “The supports were helpful; they asked questions that caused me to think. They were helpful, but like I said, most of the stuff I had already seen in [the university’s in-house English] prep school.” As seen, the participant articulated confidence in his prior knowledge, and cited this as the reason that he did not engage with the support modules.

From these examples, we see that participants’ perceived knowledge and abilities influenced their decisions on whether or not to access the online modules. They relied on their own confidence in the writing process to predict if they would benefit from the support modules or not, and this guided their interaction with the modules.

4.2 Application of prior knowledge seems to be most effective at the planning and/or task representation phase

During the initial phases of the writing process (i.e., planning and task representation), participants tended to apply their prior knowledge more frequently and consciously than they did in other phases of the writing process. This prior knowledge took three main forms: 1) the participants’ prior knowledge of the topic they were writing about; 2) the participants’ prior knowledge about the academic writing process; and 3) the participants’ prior metacognitive knowledge, including their understanding and application of metacognitive strategies, which they were able to articulate effectively.

Participant 2 described his reliance on prior knowledge while choosing a topic, and stressed that prior knowledge about the writing topic is critical to starting the academic writing process regardless of how small that prior knowledge may seem at first. He explained his thought process like this:

> I think that if I have even the tiniest information about a topic, at least I know this, and I can add things onto it and write about it. For instance, I didn't know anything about "animal testing" [the topic he chose for WA#1], like who did what or how many animals died or whatever. But when I was small, I had a cat, and I was interested in wolves so I had done some research about that. So I added onto these experiences to come to the conclusion that I don't support animal testing at all.

Participant 3 expressed a similar thought process while choosing a topic for WA#5, an open-ended research paper. She found an interesting topic from her daily life by looking at her previous experiences and extrapolating a way to write about it academically. She summed it up well when she said, "I had to write about it. So I had to know something about it prior to the writing process, and I have to at least know *something* [about the topic]."

Prior knowledge about the academic writing process also seemed to benefit the participants at the planning and task representation phases. For instance, Participant 2 expressed how he applied his prior knowledge obtained at the English preparatory school to the very first steps of the academic writing process: "In preparatory school, our instructors usually said that we were the most free [i.e., the least constrained in terms of content and style] in the introduction. I mean, they said that we could start with a quote or something, or we could define something, like that." Throughout his writing assignments, Participant 2 consistently applied this prior knowledge of the academic writing process. He started each introduction paragraph with a definition, quote, or other such "hook" sentence, just like he'd learned in English preparatory classes.

Participant 2 also described how he referred back to his previous assignments from his English preparatory year and checked aspects such as organization, sentence structure, and word choice while preparing the assignments. Thus, he applied prior knowledge of the writing process throughout the semester.

Similarly, Participant 1 applied her prior knowledge of the writing process, particularly when prompted to write a letter of complaint (WA#2). She said, “I'm used to helping my aunt and my mom with their corporate emails, so it was fairly easy to do.” It seems that existing understanding of what a letter or email should look like directly affected her planning and task representation, which set her up for smoother monitoring as she was writing.

Participant 1 also expressed that she used brainstorming and planning strategies that she had learned previously in a different context. She took a year of creative writing courses (taught in her native language), and was able to transfer some of the metacognitive planning skills that she acquired through that past experience:

> We used to have assignments within that creative writing field, for example free flow which is basically: they start a timer and you have to write whatever comes to mind. It could be a story, but you can't stop the pen and you can't delete. So that really opened me up to being able to come up with new ideas…

The participant went on to explain how this specific strategy was her primary method for starting each writing assignment. She applied her prior knowledge of metacognitive strategies to the current assignments.

4.3 The interaction between affect and self-concept seem to guide the application of metacognitive strategies for planning and task representation

As participants were planning their writing assignments, they tended to rely on affective input (i.e., their emotions or beliefs about the writing task) and their own self-concept (i.e., their perception of their self, self-efficacy, and/or ability, strengths, and weaknesses as they relate to academic writing) in order to form an understanding of the prompt. They also seemed to rely on these emotions and perceptions as a

means of measuring or judging the value or overall quality of their chosen topics, examples, and/or plan for completing the writing assignment. For instance, if they experienced positive affect towards a topic or writing assignment, they generally described their planning and execution of the task as more successful. These affective inputs were sometimes influenced by the online support modules provided by the researcher, in that the online support modules prompted participants to consider their feelings or perceptions in an affective way while planning their writing.

The most prevalent pattern revolved around participants' positive perceptions of their own interests, and how assignments that aligned more with their own interests guided their choice of topic and planning methods, including metacognitive skill use at the task representation and planning phase. According to Hacker (2018), these positive perceptions can change or influence the meta-level perceptions of the goal of the writing, which effects the planning and task representation.

For instance, Participant 3 identified her best writing as the assignment that interested her the most (WA#4), saying, "I enjoyed writing this and reading it; I was just reading it again and again because I liked it so much… I knew what I was writing and just enjoyed it the most, so it was the easiest." She even acknowledged that the topic she chose might not be popular, but her interest in the topic let her consider it as a viable and appropriate one.

Participant 1 also based her topic selection on her personal interests, saying "I find it incredibly enjoyable to find topics to write about things I'm interested in – maybe [topics that] I didn't know I was interested in [until I started planning and writing about this topic]." Her task representation started by gauging her interest in a topic in order to assess its viability, and then taking the next steps in planning her

writing. She further explained how affect helped her continue through the planning and execution of each writing assignment, highlighting a feeling of 'involvement': "It's more about writing about things that intrigue you, the writing itself going the way you plan, sometimes of being upbeat and you're being more motivated I guess – it's all about being involved with the essay."

The participants' interest and affective attitudes towards academic writing in general also shaped their task representation phase for each writing assignment. Participants who expressed positive feelings towards the writing process tended to perform better while writing. And, writing assignments that participants associated with positive feelings tended to be better according to participants' self-reported grade from the instructor and their self-reflection feedback from the online modules.

Self-concept also played a guiding role in the planning and task representation phase. Starting each writing assignment, participants tended to look to their own strengths and weaknesses. This allowed them to plan their writing and anticipate or predict the next steps in their writing process. These assessments of strengths and weaknesses as an indicator of self-concept varied according to the participant. For instance, Participant 1 reflected on her weaknesses in the planning stage of her writing process, commenting on both time management and idea generation from the outset. She described herself as a "procrastinator," and assessed how this ongoing weakness influenced her affectively from the beginning of the writing process: "I am not one to thrive under pressure, I'm more of a shrivel up into a corner kind of person under pressure, but I repeatedly do it to myself so it must be some masochism or something."

Here, the participant's self-concept is clearly on display, and her own assessment of her perceived shortcomings seems to contribute contributed to the time allotment and planning phase of her writing experience.

Participant 2 also described how she struggles with idea generation – specifically, the generation of too many potentially viable ideas at the beginning of the writing process: "I have too many ideas; that's why I struggle with starting projects. I have too grand ideas, and they just keep growing and growing and growing until it's something I can't actually finish."

These two perceived weaknesses interact to form a situation that Participant 1 described below:

> So I think that [the fact that I have too many ideas] also adds into the procrastination aspect of it: I want to write about so many things, were I have so many ideas, 'It could be like this, it could be like that.' During the deliberation, I forget to actually start the writing.

These self-concepts held by Participant 1 impacted her writing process from the very beginning, and affected the task representation phase at both the Person level as she grappled with judgments on herself and her perceived weaknesses and the Person x Task level as she applied these concepts and perceptions to the broader context of each writing assignment (Efklides, 2011; Karlen, 2016).

Participant 2 explained how his self-concept interacted with his application of prior knowledge as he was planning WA#1:

> I'm not someone who likes to argue; usually, if someone has a different perspective than me, I like to just let them – I mean, I don't like to impose my own perspective… I respect their perspective, but while I was writing this one [WA#1] I got pretty angry. It's like, I was thinking like there was a really annoying person in front of me. And I was writing as if there was someone against me, someone annoying.

The participant was able to draw on prior affective experiences to set the topic, tone, and organization of his paper. He wrote as though he were arguing with an annoying

person, and was able to channel those feelings into the task representation phase, while also acknowledging aspects of his self-concept that might otherwise negatively affect his ability to write in an argumentative style.

All of the participants referenced their feelings, beliefs, and self-concepts as a basis for choosing their topics and planning their writing. Their articulated examples shed light on the close relationship between affect and self-concept, and how that interaction may shape the planning and task representation phase.

4.4 Participants' perception of their audience influenced their calibration while monitoring and evaluating

Calibration is a major part of monitoring and evaluating, because it allows the writer to align their expectations and evaluations with the criteria that will ultimately determine the overall success of their academic writing. In the context of this study, the participants seemed to keep a strong perception of their audience – most often described as the instructor of the course – in the front of their minds while monitoring and evaluating their writing. This pattern speaks directly to rhetorical and communicative aspects of academic writing, which is critical to goal orientation and achievement (Negretti, 2012).

In order to judge the quality of their writing before submission, all three participants mentioned going over the paper as if they were the instructor. They all described taking on the instructor's perspective as a means of more accurately judging and evaluating their writing, and as a way to more accurately predict the score they anticipated receiving for each writing assignment. As Participant 1 described it, "Going over it as a professor thing is one of the best things I've thought

of till now. I think it's been really beneficial because it really shifts the lens on your writing."

Participants also used the instructor's perspective as a means of monitoring and evaluating the affective value of their assignments. Both Participant 2 and Participant 3 identified the instructor's interest in a topic as a justification for choosing a topic. Participant 3 even described how she used the instructor's interest in a topic as a criterion for grading and assessing her own papers. For instance, when explaining how she would grade her Writing Assignment #5, she said: "It deserves an eight. if you are interested in this topic it might be a nine. I think [the instructor] would find it interesting, but some people may not find it interesting and it's just such nonsense." As seen, the participant's perception of the overall quality and achievement of the paper is based not only on the words that she wrote, but also on the affective interaction that occurs between the writing itself and the audience (Negretti & McGrath, 2020). This is a clear example of a metacognitive strategy that was modeled and prompted in the online support modules. All three participants effectively described their application of this strategy during the academic writing process.

4.5 Participants' monitoring of time allocation seems to interact with the performance phase and evaluation of their writing

The performance phase and evaluation phase of the writing process were greatly shaped by the ways that participants practiced time allocation and time management. Participants described how they spent their time on certain aspects of the writing process, and in doing so, they showed how their time allocation monitoring

throughout the process culminated in the various evaluation strategies they chose to employ during the performance phase.

For Participant 1, the performance and evaluation phases of her writing were determined entirely by the clock. When asked how she knew a paper was complete and ready for final submission, she said, "Usually when it's time for me to pack up and go to school and I have a lesson that day [i.e., the day that the paper is due to be submitted in class]." So, Participant 1's gap in monitoring her time allocation actually prevented her from applying metacognitive knowledge and strategies. More specifically, her tendency to procrastinate on each assignment inhibited the use of metacognitive evaluation strategies during the performance phase of her writing experience.

Participant 2 took a very different approach to his writing timeline, preferring to write the assignment several days in advance:

> We had a week [to finish each assignment]; she [the instructor] assigned it on Thursday and we had to submit it the following Thursday. I preferred to finish the assignment on the weekend, like just sit down and write it on Sunday, because I had other homework throughout the week. Plus, I don't know, I come [to class] from far away -- I have to travel for 2 hours. When I get back, I could be sleepy or something, so that's why I usually finished the assignments on the weekend.

In the days between finishing the assignment and the due date, Participant 2 explained how he went back and read the paper with fresh eyes. He claimed that this allowed him to better assess the quality of his writing, and when he saw something that could be improved, he made changes to the paper: "I mean, the things I write could sound good to me one day and then sound ridiculous the next day … That's why I look at it again a day later, and if it's finished, then I call it and I say 'It's done.'" This strategy of writing, letting the paper rest, and then going over it again with fresh eyes was a strategy that was put forth in the online support modules. The

participant's monitoring of his own time allocation allowed for the effective and timely application of this strategy.

Participant 3 also applied this method of finishing, waiting, and going back to make changes on her writing if necessary. She mentioned how the online support modules prompted her to take this approach, and she claimed that the strategy was helpful and ultimately allowed her to improve the quality of each writing assignment before she submitted it. She also expressed that she had used this strategy in other classes and other writing contexts, as well, saying "Yes, if I had some time, I did that." She also mentioned that she thought an essay on which someone spent more time should inherently be batter. When talking through her self-assessment during the evaluation stage, she said that she never gave below-average grades to her own work "because I have my time to these words [i.e., I didn't wait until the last minute to complete the assignment; I put plenty of time into the assignment]; I didn't write them in half an hour. I gave my hours, maybe sometimes days." Here, Participant 3 refers to how she monitored time allocation in order to evaluate and justify her perception of the performance phase.

4.6 Participants seemed to rely on "judgments of sophistication" throughout the cognitive processing and performance stages to monitor and evaluate their writing

While monitoring and evaluating their writing throughout the writing process, participants seemed to have a driving concept of "sophistication" that greatly influenced their tone and use of the English language. They each described how they used cognitive and metacognitive strategies with the clear goal and intention of making their writing sound more sophisticated, where "sophistication" was judged on both the Person level and the Person x Task level.

Participants seemed to define “sophistication” in terms of their own perception of the academic level of their writing output. Participants used words like “more academic” or “less academic” to describe their tone and word choice; they also mentioned English language level (i.e., “elementary” or “B1”) as a means of determining sophistication. The researcher chose the word “sophistication” to describe the qualia expressed by the participants in this case, because of an explanation from Participant 2 in which he described methods that he used to “bring his writing to a more sophisticated mode.” These patterns and methods were also described similarly by Participant 1 and Participant 3, with the expressed goal of making their language sound “more academic,” or more appropriate for the level of sophistication that they thought their readers were looking for.

Based on the descriptions and strategies expressed by the participants, “sophistication” (and such subsequent “judgments of sophistication”) encompassed the participants’ perceived level of language, where it referred to the application of English in an academic setting, and reflected the participants’ perception of their audience’s standard of sophistication, as well.

For instance, Participant 1 explained her ideal level of sophistication saying, “I would be proud to even send it to a journal or something. That’s usually the quality I expect from myself.” After admitting that she usually does not attain that quality or level of sophistication in everything that she writes, she went on to describe her methods for making her writing sound more formal. She mainly did this by adding synonyms to make what she deems a “sophisticated” structure:

> I use the structure ‘something, something, and something [a list of three words with similar meanings]. It's a word and then its synonym, but they're very similar in meaning, but I want to add both of them [in order to increase the perceived formality and/or sophistication of the writing].

She explained how this strategy achieved two goals: it resulted in writing that she perceived to be more sophisticated, and it gave her a strategy for learning and acquiring new vocabulary that she had been able to apply in other writing and speaking contexts.

Participant 2 ultimately used a more technology-integrated approach to increasing the perceived sophistication of his papers. First, he described the need for a more "sophisticated" writing output, acknowledging that his writing was not sophisticated enough in its first draft. He also acknowledged the difficulties of upping the sophistication in a paper, saying "This [taking the paper to a more perceivably sophisticated form] is the hardest thing, and I had a hard time with it." He went on to describe how at first, he just made the sentences longer in an attempt to sound more sophisticated, but this strategy ultimately "felt like [he] was writing 'literature' [as opposed to an academic paper]." So, he turned to technology as a secondary strategy once he judged that his own unaided attempts were not sufficient:

> I don't know if this is a strategy, but sometimes I use a rephrasing tool from the internet. I mean, I write really simple sentences -- like it seems like primary school writing to me. So I use this bot -- it's a bot actually -- and I put my own sentences and words in there.

The participant then described how the bot takes his sentences and paraphrases them with a higher level of formality and higher-level academic vocabulary, citing examples from his own writing assignments. He also claimed that he was able to learn and apply sentence structures and vocabulary items in later papers and other writing contexts, thanks to the input he received from the bot on the earlier writing assignments. It seems that Participant 2's drive to apply this strategy was derived from his own judgment of sophistication, and he applied the strategy in a way that directly addressed the perceived shortcoming. This strategy was applied during the end of the monitoring phase and throughout the evaluation phase.

Participant 3 discussed her judgments of sophistication mostly in terms of word choice. She emphasized the importance of differentiating between academic vocabulary and more informal, everyday expressions. She described her initial approach to boosting the perceived sophistication of her writing assignments, saying "At first, I felt like if I use more words in my sentences, it looked longer so it was more academic. But it wasn't." She then described how she shifted her approach to focus on specific words, and to substitute more academic vocabulary on a word-by-word basis. This strategy proved to be effective – at least as described by the participant – since she mentioned that she achieved higher marks on papers where she used "more academic synonyms" by applying her strategy of writing, evaluating and judging the sophistication of the paper, then going back and replacing common words with more academic synonyms.

Based on comments from the participants, it is possible to infer that input from the instructor initially prompted this awareness of "sophistication" as a parameter to be monitored, judged, and evaluated throughout the writing process. However, based on the varied descriptions of what exactly constitutes "sophistication" in academic writing, as well as the various strategies and approaches to enhancing the perceived sophistication of the writing assignments, it seems that once participants were made aware of "sophistication" as a parameter, they acquired and applied cognitive and metacognitive strategies to meet this parameter without explicit instruction.

4.7 Guiding questions, self-concept, and prior knowledge seem to interact and form the preliminary step for goal orientation during the task representation phase

The online modules made use of guiding questions during the pre-writing activities as these questions were specifically designed to elicit prior knowledge and support the task representation phase. Participants expressed that these supports were helpful. For instance, Participant 2 put it: “The supports were helpful, as they asked questions about the topics. It made me think about it and stuff; it was helpful.”

In cases where perceived shortcomings in self-concept were expressed – such as a lack of confidence or an expressed gap in procedural knowledge at the outset of the writing process – guiding questions effectively triggered prior cognitive and metacognitive knowledge, which offered participants a way forward in their writing. These guiding questions were able to fill the gap in knowledge in a way that led to more effective goal orientation. For example, Participant 3 said that she often asked “What should I do [next]?” as a means of continuing towards her goal in writing, while Participant 2 was a bit more specific, asking himself “What could I do that’s better?” at each step of the writing process. And, when participants’ goals in writing were better aligned with each assignment’s requirements, they were able to better apply their metacognitive and/or self-regulation skills (Efklides, 2011; Jegede, Taplin, Fan, Chan, & Yum, 1999).

Participants also asked questions of themselves during the planning stage that shed light on their goal orientation. For instance, they asked things like “What should I do?” and “Oh, how [come] I didn’t think of that?” (Participant 3), as well as “What could I do [i.e., what topic could I write about] that’s better?” (Participant 2). These broad questions were answered with more questions – in the form of guiding questions in the online support modules. As Participant 3 put it, “I couldn't think of anything, then with the help of your [pre-writing] modules and the example papers, it was [helpful].” Instead of direct answers to these general questions, participants were

able to draw support from the guiding questions in order to orient their goals for writing and begin their planning in the pre-writing stage. This led to a clearer and more manipulatable understanding of each writing assignment at a meta-level (Hacker, 2018), which supports activation of prior knowledge, self-reflection on the planning phase, and cognitive and metacognitive strategy use from the outset of the pre-writing stage (Cer, 2019; Karlen, 2016).

CHAPTER 5

DISCUSSION AND CONCLUSION

This qualitative study aimed to explore the metacognitive skills and strategies employed by participants throughout the academic writing process, the effects of online metacognitive support modules on their use of these strategies, and the contribution of their use of metacognitive skills and strategies to their writing achievement. The study was conducted over the course of one semester as part of a first-year writing course for undergraduate students in the foreign language education department.

This qualitative study explored three research questions. The first research question sought to identify and define the metacognitive skills and strategies that participants applied throughout the writing process. The results of the current study showed that participants were most likely to apply metacognitive skills that focused on applying prior knowledge, responding to affective cues and self-concept, keeping their audience in mind while writing, applying "judgments of sophistication" to monitor and evaluate their writing, and using guiding questions to inform their goal setting and goal orientation throughout the writing process.

The second research question of the study aimed to examine how the online metacognitive support modules provided by the researcher guided the participants' use of metacognitive strategies throughout the academic writing process. The findings showed that students who expressed lower confidence in their writing abilities and knowledge of the academic writing process were more likely to rely on the online metacognitive support modules. In addition, the guiding questions that prompted prior knowledge at the pre-writing stage were particularly helpful for task

representation and goal setting as the questions interacted with participants' own affect and self-concept during the planning and task representation phases. The post-writing reflection prompted by the online metacognitive support modules also contributed to participants' calibration during the evaluation stage.

The third research question explored how the participants' use of metacognitive skills and strategies throughout the academic writing process contributed to their overall writing achievement. The results of the current study reveal that participants who applied metacognitive strategies throughout the academic writing process – whether those strategies were self-prompted or elicited by the online metacognitive support modules – tended to express a sense of higher achievement or higher satisfaction with their writing output. Furthermore, participants who applied the post-writing metacognitive strategies were more likely to show a stronger sense of calibration between their perceived writing achievement and their actual writing achievement.

On the whole, the analysis of participants' writing assignments and interview data revealed several important themes that shed light on the ways in which undergraduate students use metacognitive skills and strategies in academic writing. In the following section, the findings of the current study are discussed by referring to the existing body of literature. Then, possible implications of the findings on instruction and instructional design are presented. Finally, suggestions for further research and the limitations of the study are explored.

5.1 Learners' confidence and their metacognitive strategy use

Participants who expressed lower levels of confidence seemed to benefit more from the online metacognitive support modules. This highlights the importance of the

person level in the MASRL model (Efklides, 2011), specifically the task perception phase. Learners who lack confidence in a particular area may struggle to accurately perceive the demands of the task and their own abilities, which can hinder their goal-setting, planning, understanding of the rhetorical purpose of their writing, and overall performance (Negretti, 2021; Efklides, 2011). For this reason, metacognitive supports can be particularly beneficial for learners who perceive their own achievement to be lower than they expected. That is, they did not perform as well as they anticipated. This is consistent with previous studies which show that targeted metacognitive supports – especially those that highlight calibration and goal orientation – can help close the gap between a learner's anticipated achievement and their actual writing achievement. As a result, this can boost both their metacognitive skills and writing achievement (Goctu, 2017; Riddell, 2015).

By providing targeted supports through the online metacognitive support modules of the current study, learners who expressed lower levels of confidence were able to enhance their self-efficacy, which might have led to an improvement in their self-regulation abilities and learning outcomes (Hammann, 2005; Nordlof, 2014; Zimmerman & Bandura, 1994). According to the findings of the current study, differentiation and scaffolding of metacognitive supports could prove particularly effective for students who express low confidence in their writing abilities, as a means of promoting stronger SRL. Previous studies show and the current findings confirm that providing students with explicit instruction and guidance on metacognitive strategies can help them develop more effective writing routines, which as a result can boost their confidence and self-efficacy in the academic writing context (Goctu, 2017; Oz & Sen, 2021; Teng & Yue, 2022; Teng et al., 2021).

5.2 Role of prior knowledge in planning and task representation

Next, the application of prior knowledge seems to be most effective when it is applied at the planning and/or task representation phase. This finding rests firmly in the task level in the MASRL model, specifically the planning phase where concepts and ideas are ideally manipulatable for the learner (Hacker, 2018; Efklides, 2011). Also, this aligns with the cognitive load theory, which suggests that providing learners with appropriate prior knowledge can help to reduce cognitive load during learning (Taub et al., 2014; Zimmerman & Bandura, 1994).

In the current study, this is especially observable at the beginning of the academic writing process, when many different elements interact: at the outset of the writing process, participants had to combine their understanding of the task, the audience, and their own experience in order to define and orient their goals in writing. From this, it can be seen that learners who activate their prior knowledge during the planning phase can develop more effective strategies for accomplishing their goals (Efklides, 2011). This also applies more specifically in instances where learners interact with multi-media computer-delivered instructional materials (Song et al., 2016; Taub et al., 2014). For example, in the writing assignments in the current study where learners had a certain level of agency when it came to choosing the topic of their writing, they were quite likely to start with a topic that they already had prior knowledge about. Where they knew that they had had prior knowledge – either in terms of topic or task – was lacking, they expressed that they could rely on the online metacognitive supports to help fill in the gaps in their prior knowledge from there. Their prior knowledge of topic and/or task informed the way in which they interacted with the online metacognitive support modules (Taub et al., 2014). In this way, activating prior knowledge – either of the topic that they were writing about and/or

academic writing as a process – helped learners make connections between new information and existing knowledge (Hacker, 2018; Riddell, 2015; Karlen & Compagnoni, 2017). By drawing on prior knowledge elicited by guiding questions or examples in metacognitive supports, learners may be better equipped to identify key concepts, organize their thoughts, and generate ideas, which can lead to more effective writing outcomes (Al-Jarrah, 2018; DeSilva, 2015).

5.3 Role of affect and self-concept in planning and task representation

When it comes to applying metacognitive strategies for planning and task representation, the interaction between affect and self-concept seem to play a key role in guiding these phases. This can be best interpreted in terms of the person level at the task perception and goal-setting phases in the MASRL model (Efklides, 2011). The current study affirms the importance of affect and self-concept in guiding the application of metacognitive strategies for planning and task representation. The importance of affect and self-concept in academic performance is seen across subjects and genres, and metacognitive support in many different contexts can increase learners' awareness and recall of their own metacognitive knowledge (Efklides, 2011; Ellis et al., 2014; Osman & Hannafin, 1992).

Moreover, learners' affective states and self-concept can influence their perception of the task, their goal-setting, and their planning processes (Breetvelt et al., 1994; Hacker, 2018; Negretti, 2012). For example, as in the findings of the current study, a learner who perceives writing as a daunting task may set unrealistic goals and develop ineffective strategies, which can hinder their self-regulation and learning outcomes. On the other hand, by promoting a positive affective state and a strong self-concept of both topic and task, instructors can help learners develop more

effective metacognitive strategies and improve their self-regulation abilities (Teng et al., 2021; Negretti, 2021; Veenman et al., 2006). Since learners' beliefs about themselves and their abilities can affect their use of metacognitive strategies (Hacker et al., 2009; Ellis et al., 2014; Osman & Hannafin, 1992), it is important to support learners' regulation of their self-concept from the outset of the academic writing process. To this end, the current study confirms that it is important to consider the affective and self-conceptual factors – such as interest, motivation, and engaging patterns of social interaction – that can impact students' use of metacognitive strategies.

Furthermore, by applying the metacognitive scaffolds in terms of both frequency and complexity throughout the course, the efficacy of the support can contribute to more transferable learning (Osman & Hannafin, 1992; Pintrich, Wolters & Baxter, 2000). Because metacognition plays a key role in adequately addressing questions and prompts related to affect and self-concept (Ku & Ho, 2010), participants should start relying less on the scaffolding supports throughout the semester. Instead, they must rely more and more on their own perceptions of the task and their own strengths and weaknesses; this applies at both the Task and Task x Person levels (Efklides, 2011). This, combined with more Detached and Content-Independent supports (Osman & Hannafin, 1992) can help to promote a stronger sense of self-efficacy in the learner, which can lead to a higher and more effective incidence of SRL, as was the case in the current study.

5.4 Learners' perceptions of audience and sophistication

In the current study, learners' perception of their audience seemed to influence their calibration throughout the academic writing process, especially at the performance

phase and evaluation of their writing. This highlights the importance of the task level in the MASRL model, especially the monitoring and evaluation phases. Learners' perception of their audience can influence their monitoring and evaluation processes, as they adjust their performance to meet the expectations of their audience (Efklides, 2011). Audience awareness is a key component in academic writing, especially when taken in its rhetorical context (Negretti, 2009). For example, a learner writing an essay for a specific audience (e.g., an instructor or a peer) may monitor their writing more closely and adjust their writing style and tone to align with their audience's expectations. More specifically, it often drives goal orientation and inherently requires the application of metacognitive knowledge (Ku & Ho, 2010; Flower & Hayes, 1981). This is especially valid as learners rely on existing genre knowledge to align their goals and expectations for the writing (Negretti, 2009). The results of the current study highlight that goal alignment according to the expectation of the audience tends to occur at the beginning of the semester, and was supported by explicit instruction and guiding questions from the online metacognitive support modules that directly asked “Who is the audience for this writing? How might the audience impact your topic choice/word choice/tone/etc.?”

These guiding questions can be adapted throughout the semester so that learners can create and apply their own concept of audience. Effectiveness pf these scaffolds supporting audience awareness depends on the learner’s own understanding of their audience. For instance, later in the semester, the materials could include questions like “Based on your [existing but not prompted] understanding of the audience, what words, examples, or topics could be the most effective?” or “How would you change your writing to appeal to a different audience [and then define this ‘different audience’]?” This scaffolding approach to the complexity of the question

and the higher-order thinking skills elicited can lead to increased self-dependence and self-efficacy, as well as a more calibrated goal-setting the planning stage and more effective goal orientation throughout the monitoring and evaluation stages of the task.

When learners take their audience's perspective into account as a point of reference while planning, monitoring and evaluating their writing, they are using their perception of their audience as tool with which they can apply metacognitive knowledge to achieve a rhetorical goal while writing (Hacker, 2018; Negretti, 2009). In this way, learners may be better equipped to make more goal-appropriate evaluations and adjustments throughout the academic writing process.

In addition to keeping the audience in mind and trying to predict the tone, word choice, and content that would appeal directly to their audience, learners lean on their own "judgments of sophistication" during the cognitive processing and performance stages in order to monitor and evaluate their writing. This speaks specifically the monitoring and evaluation phases of the task level in the MASRL model (Efklides, 2011). Learners employ perceptions of writing quality in academic performance, especially at key points in the monitoring and evaluation phases. This influences their calibration and their ability to accurately identify and revise issues in tone and rhetoric in their academic writing (Breetvelt et al., 1994; Negretti, 2012).

On the whole, learners who rely on "judgments of sophistication" can develop a more sophisticated understanding of the task and the skills required to accomplish it; they can also develop clearer and more manipulatable concepts of their goals in writing (Hacker, 2018). For example, learners who monitor their writing based on the complexity of their arguments or the sophistication of their language can develop a deeper understanding of the writing process and improve their self-regulation

abilities, and this can lead to clearer goal alignment and calibration for future writing experiences (Negretti, 2012). This also highlights the importance of the learner's perceived quality of their own writing, since this perception informs many aspects of SRL, including goal orientation, calibration, self-observation, and outcome-related regulation of effort (e.g., Hammann, 2005; Jegede et al., 1999; Teng, 2019). This emphasis on perceived quality is consistent with the notion that writing involves a complex interplay between cognitive processes and existing ideas as to what constitutes "sophisticated" or "academic" language (Hacker, 2018; Negretti, 2012).

This is why it is important to provide learners with clear examples of acceptable academic language, including expectations surrounding tone, word choice, organization, and content. In the current study, the online support modules included such examples in the form of authentic materials, checklists, and reflection forms that referred to elements of the rubric by which writing assignments were assessed. These reflection questions that draw on the elements of rubrics and checklists are also an effective tool for drawing attention to the key aspects of a given writing task (Riddell, 2015), as well as eliciting future metacognitive strategy use based on their perceived performance to that point (Karlen & Comopagnoni, 2017).

5.5 Role of time allocation in enacting, monitoring, and evaluation

Furthermore, learners' ability to monitor their time allocation shapes the performance phase and evaluation of their writing. How learners allocate time, and how they perceive their own time allocation, is connected to the task level in the MASRL model, specifically the enacting, monitoring, and evaluation phases (Efklides, 2011). This is further highlighted in the current study, where participants expressed how

monitoring their time allocation connected to their ability to properly monitor and evaluate their writing. This pattern is consistent with research that looks at academic writing in specific and metacognitive evaluation in general (Hong et al., 2021; Son & Metcalfe, 2000).

Learners who monitor their time allocation during the enacting phase can improve their performance and evaluation processes, as they manage their time more effectively and allocate sufficient time for monitoring, adjustment, and revision (Ellis et al., 2005; Son & Metcalfe, 2000). For example, according to the results of the current study, learners who monitor their time allocation from the time a writing assignment is assigned and the due date can better ensure that they have enough time for revising and editing their work, which can improve the quality of their writing and their overall learning outcomes.

In the light of this finding, it can be seen that self-paced online support modules can help learners regulate their time allocation, in addition to guiding them through the steps of the academic writing process (Hong et al., 2021). This could be achieved by offering learners strategies for managing their time effectively before, during, and after writing tasks. In self-paced computer-delivered supports, instructional designers can provide hints (or explicit directions) as to how long pre-, while-, or post-writing activitIES should take, especially at the beginning of the semester when learners are still getting used to the academic writing process. These scaffolds at the outset of the semester can inform learners' time monitoring and time allocation (Hong et al., 2021); as the semester continues, time allocation-related supports can become less and less frequent in order to prompt automatization on the part of the learner in terms of time allocation monitoring. By slowly removing these

time allocation supports, the learner comes to rely on their own time monitoring capabilities.

In the current study, participants tended to express their time allocation in terms of hours. Their point of reference for time allocation was almost always the date and time that each writing assignment was due. Because they were rushing to complete their writing in the final hours of the assignment, they expressed a pressure during the evaluation stage. Self-paced materials that show the estimated time for completion from the outset can help learners adapt their pace so that they have sufficient time to review and revise their work before submitting it (Tullis & Benjamin, 2011). Additionally, materials at the beginning of the semester can provide hints as to which aspects or activities within the support should be prioritized in the event of a time crunch (Tullis & Benjamin, 2011; Zimmerman & Bandura, 1994). Then, as the semester continues, these hints as scaffolds can be removed as learners develop their own self-dependency and self-efficacy when it comes to monitoring time allocation.

Overall, effective time management during the writing process can lead to better writing outcomes, and computer-delivered supports that are segmented relative to the learners' progress in the writing process (i.e., before-, while-, and after-writing supports) encourage learners to monitor and adjust their time allocation throughout the academic writing process (Hong et al., 2021; Ramadhandti, 2019).

5.6 Interplay of guiding questions on goal orientation

Finally, based on the findings of the current study, there is an interaction between guiding questions, self-concept, and prior knowledge, which informs the early stages of the academic writing process and forms the preliminary step for goal orientation

during the task representation phase. Goal-setting is an integral part of pre-writing, and it interacts with the self-concept, prior knowledge, and affective aspects of planning (Duffy & Azevedo, 2015; Meza et al., 2021). This highlights the importance of the task level in the MASRL model, specifically the task perception and goal-setting phases (Efklides, 2011). This also stresses the importance of consistent goal orientation for academic writing success (e.g., Al-Jarrah, 2019; Cer, 2019; Koriat et al., 2006; Oz & Sen, 2021).

In the current study, providing learners with the support to form clear and manipulatable goals during this pre-writing phase helped inform learners' understanding of the writing task as a whole at the meta level (Hacker, 2018). The online metacognitive support modules gave learners clear guidance – at least at the beginning of the semester – to help them to develop clear and manipulatable goals that were aligned with their writing tasks. The scaffolds then faded throughout the semester, so that what started as defining the goal for the learner eventually shifted to eliciting the learners' own goal(s) through guiding questions or reflection prompts. As learners became more self-dependent, they were expected to state their own goals without guidance, and then the online support modules prompted reflection as to the feasibility and accuracy of these goals through reflective goal orientation activities in the while-writing stage.

As a result, learners who use guiding questions, draw on their prior knowledge, and develop a strong self-concept during the task representation phase can set more effective goals and develop more efficient strategies for achieving them. For example, learners can be presented with guiding questions (e.g., What is the purpose of your writing? Who is your intended audience? What do you already know about the task and/or topic?) to help them develop a clear understanding of the task

and their goals (DeSilva & Graham, 2015; Teng & Yue, 2022). By drawing on their prior knowledge and developing a strong self-concept of both the task and topic for academic writing, learners can develop more effective strategies for achieving their goals, such as organizing their ideas, conducting relevant research to fill in any perceive gaps in their topic- or task-related knowledge, monitoring and adjusting their metacognitive skill use, and evaluating and editing their writing at the end of the process (Teng et al., 2022).

5.7 Implications for instruction and instructional design

The findings of this study have several implications for instructional design and instruction. First of all, the study highlights the importance of providing metacognitive support for learners who feel less confident about academic writing. In order to help build confidence and a strong self-concept, elements in the pre-writing phase – such as guiding questions which help to orient the learners' writing goals and foster a deeper understanding of the prompt – can center on the learner's own lived experience, prior knowledge, or interests. Offering a space and guidance for reflection in the post-writing period is another way to inspire confidence in learners through calibrated self-reflection. In addition to being a motivating factor, bringing in such elements can boost learners' confidence alongside their metacognitive knowledge and strategy use.

Next, the current study suggests that prior knowledge is most effective when applied at the planning and/or task representation phase. Offering supports to guide the metacognitive processes which underpin these interactions – especially at the outset of the writing assignment –can help ease the cognitive load caused by the need to recall and apply specific metacognitive strategies. When metacognitive supports

are presented appropriately, the learner can be better equipped to readily recall specific metacognitive strategies. This happens with exposure and practice through use of scaffolds over time. In this way, the learner moves from a pre-writing process of goal orientation that is heavily reliant on metacognitive support material to an automated process where they can apply metacognitive strategies quickly and without a strain on their cognitive load. Therefore, instructional designers and instructors should provide learners with relevant prior knowledge of topic, task, and metacognitive skills before engaging them in writing tasks.

Furthermore, learners should be guided towards self-confidence and a stronger sense of self-efficacy as they interact with metacognitive support materials; in doing so, they can improve their academic writing achievement (Hammann, 2005). In order to build up this sense of self-efficacy, instructional designers should fade scaffolds in terms of complexity throughout the course of the semester. For example, as the semester progresses and the learner gains more experience in academic writing, the materials can include complex guiding questions and reflection questions that tap into critical thinking and other higher-order thinking skills more.

Additionally, the current study suggests that participants relied on "judgments of sophistication" throughout the cognitive processing and performance stages to monitor and evaluate their writing. Therefore, instructional designers and instructors should provide students with clear criteria for evaluating their writing and helping them to develop a more nuanced and calibrated understanding of writing quality. This can come in many forms, including a standardized rubric which was used to evaluate learners' writing output throughout the course of the semester, and a checklist for each assignment that emphasizes the key aspects of each specific writing assignment. They should also provide examples of authentic materials where

academic language is applied clearly and correctly. With more exposure to correct examples of "sophisticated academic language," learners can develop a more accurate and calibrated perception by which to guide their "judgments of sophistication." Thus, rather than choosing the longest word or most obscure synonym in an attempt to sound "academic," learners can develop a deeper understanding of what constitutes academic language and then apply this understanding.

To summarize, the findings of this study have several implications for instructional design and academic writing instruction. These implications highlight the importance of providing metacognitive support, prior knowledge, considering affect and self-concept, audience awareness, time management, criteria for evaluating writing quality, and goal orientation in enhancing students' use of metacognitive strategies and improving their overall writing achievement.

5.8 Further research

While this study provides valuable insights into the metacognitive skills and strategies used by students during the academic writing process, further research is needed to deepen our understanding of how to effectively support and develop these skills. One possible avenue for future research is to incorporate quantitative data to complement the qualitative data collected in this study. Quantitative data could be collected through measures such as self-report surveys or standardized writing assessments to provide more objective measures of participants' writing achievement and the effectiveness of the metacognitive support modules. Tools such as the Metacognitive Skills Knowledge Test About Academic Writing (MSK-AW)

developed by Karlen (2017) can offer a reliable way to collect quantitative data that lends insight into the metacognitive knowledge and skill use among participants.

Another important direction for future research is to use design-based research approaches to systematically test the efficacy of specific metacognitive supports. By employing a design-based research approach, researchers can work collaboratively with teachers and students to iteratively develop, implement, and refine instructional interventions that are tailored to the specific needs of the students and the context in which they are learning. This approach has been shown to be particularly effective in academic writing instruction because it allows researchers and practitioners to work together to create interventions that are both theoretically grounded and practical in their application (Cer, 2019; De Silva & Graham, 2015; Teng, 2020; Teng & Yue, 2022).

Furthermore, future studies can expand the sample size of participants to gather a wider and broader understanding of the themes expressed in the current study. With a larger sample size, further research will be able to assess how widespread the themes expressed in this study actually are, and it can be able to determine more themes that emerge as more individuals' metacognitive skills and strategies are articulated and analyzed. A larger sample size will also allow the future researchers to have a stronger confidence in their findings, since any themes and patterns will have emerged across a larger data set representing more oblique participant profiles.

Moreover, future studies can be conducted to explore the impact of prior instruction on the participants' writing output. For example, in the current study, all of the participants had received one year of instruction at their university's in-house English preparatory school, where their instructors followed a standard syllabus for

teaching academic writing and the writing process. However, differences in instruction or augmentation of the syllabus by the instructor could have informed the participants' understanding of the writing process and the role of metacognitive strategy use within it. So, future studies should control for the prior instruction that participants have received, especially in terms of explicit instruction about metacognitive skills and strategy use.

The English proficiency level of participants should also be controlled for in future studies. All of the participants in the current study are L2 English speakers, and they all have the same L1. Participants exhibited varying levels of English proficiency; while all of the participants were fluent English speakers and writers who had passed the university's proficiency exam prior to starting their departmental course, their levels of English were still disparate to one another. Future research which controls for this disparity can offer a better and clearer insight into the participants' metacognitive strategy use during the academic writing process, since ESL writers face their own unique hurdles and strategies while writing (Raimes, 1987). By controlling for the participants' English proficiency level, future research can mitigate this extraneous factor as it relates to describing, analyzing, and explaining participants' metacognitive strategy use.

Improvements can also be made in the design of the online support modules for future research. For example, each module could include check-in points that serve as both formative assessment for the participant and a tool for checking how much of the module participants completed successfully, and at what pace. This data could lend insight into participants' time allocation and mastery of the metacognitive strategies presented in the support modules. It would also allow the researcher to see a clearer line between the participants' mastery of certain metacognitive knowledge,

their articulated metacognitive experiences during the writing process, and their writing achievement as derived from their writing output.

Furthermore, including supports that promote an authentic audience could shift the context of a future study, since it could have a deep influence on participants' goal-setting and task orientation. In the current study, participants viewed their instructor as their audience. However, if future studies frame the writing assignments in an authentic setting (such as a blog post, where the audience is much broader), this new rhetorical context could offer the researcher a clearer look at the cognitive and metacognitive processes underlying key points in the planning phase, such as topic selection and goal orientation. It might also give participants the opportunity to leverage their own affect in their decision-making throughout the writing process, which could lead to a dataset that would result in more insights to the Person level and the affective interactions occurring at the Person x Task level (Efklides, 2011).

Conducting a similar study in different contexts is another way to expand upon the current research. For instance, future researchers could use similar online metacognitive support modules for courses in other content areas that include academic writing, but are not designed to explicitly teach the academic writing process (as the course in the current study was). In this way, researchers can be able to assess the impact of the metacognitive instruction offered in the online support modules without the interference of explicit instruction offered in the classroom as a part of the existing course syllabus.

Overall, incorporating quantitative data, using design-based research approaches, expanding the sample size of participants, controlling for prior instruction and proficiency level, incorporating new features into the design of the

support modules, and changing the context where metacognitive scaffolds are offered can help researchers, educators, and instructional designers better understand how to support the development of metacognitive skills and strategies in students and to design and implement more effective instructional interventions that can be applied in a variety of educational settings.

5.9 Transferability of the study

This study is transferable to academic writing classes at the undergraduate level, especially in instances where participants in this class are experiencing their first semester of departmental courses. This is because many of the themes and patterns observed in the participants also overlap with the lived experiences of undergraduate students in their first year of study, such as issues with time allocation monitoring. Additionally, all of the participants were studying in the same department: Foreign Language Education. Thus, the other courses that they were taking during the semester overlapped, and they were receiving similar instruction in their other courses in addition to the academic writing course from which they were recruited.

Moreover, this study is transferable for contexts where participants already have an established background in academic writing and have received explicit instruction in academic English usage. The current study included only participants who had completed one year of English preparatory classes at the university's preparatory English division. Therefore, all of the participants possessed similar prior procedural knowledge of academic writing, and had proved a level of mastery over this skill through the university's English proficiency exam, which includes a writing section that required the participant to write two cohesive essays with appropriate academic language.

Additionally, all of the participants in this study used English as a Second Language (ESL), and the focus of their studies in English had been on its academic usage. ESL writers often face a series of unique challenges throughout the academic writing process, and they also tend to have specific strategies for overcoming these hurdles (Raimes, 1987; Teng, 2019). In the current study, many of the cognitive and metacognitive strategies that participants described as integral to their academic writing process were also a means of addressing the second language aspect of the task. This is an important facet of the current study that affects its transferability extensively.

Finally, the participants who gave the interviews were actively recruited from among the total pool of consenting participants. The participants who were recruited for interviews were those who consistently submitted the online metacognitive support modules; that pool was six participants. Of those six, only three attended the interviews. Compared to their classmates, these three participants showed a higher interest in both completing the online support modules and proactively planning for and following through with the interview. This implies that the three participants could be more invested or interested in the academic writing process than their classmates, or that they saw a value in participation that their classmates did not.

5.10 Limitations of the study

This research study faced many limitations; the most notable was the limited number of writing assignments collected from each participant throughout the semester. Had more writing samples been collected from each participant at more frequent intervals and with more consistent input from the online metacognitive support modules, the researcher would have been able to get a clearer and deeper understanding as to

exactly how the metacognitive scaffolds interacted with participants' use of metacognitive strategies on an assignment-by-assignment basis.

APPENDIX A

CRITICAL THINKING V.A.L.U.E. RUBRIC

CRITICAL THINKING VALUE RUBRIC
for more information, please contact

The VALUE rubrics were developed by teams of faculty experts representing colleges and universities across the United States through a process that examined many existing campus rubrics and related documents for each learning outcome and incorporated additional feedback from faculty. The rubrics articulate fundamental criteria for each learning outcome, with performance descriptors demonstrating progressively more sophisticated levels of attainment. The rubrics are intended for institutional-level use in evaluating and discussing student learning, not for grading. The core expectations articulated in all 15 of the VALUE rubrics can and should be translated into the language of individual campuses, disciplines, and even courses. The utility of the VALUE rubrics is to position learning at all undergraduate levels within a basic framework of expectations such that evidence of learning can by shared nationally through a common dialog and understanding of student success.

Definition

Critical thinking is a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion.

Framing Language

This rubric is designed to be transdisciplinary, reflecting the recognition that success in all disciplines requires habits of inquiry and analysis that share common attributes. Further, research suggests that successful critical thinkers from all disciplines increasingly need to be able to apply those habits in various and changing situations encountered in all walks of life.

This rubric is designed for use with many different types of assignments and the suggestions here are not an exhaustive list of possibilities. Critical thinking can be demonstrated in assignments that require students to complete analyses of text, data, or issues. Assignments that cut across presentation mode might be especially useful in some fields. If insight into the process components of critical thinking (e.g., how information sources were evaluated regardless of whether they were included in the product) is important, assignments focused on student reflection might be especially illuminating.

Glossary

The definitions that follow were developed to clarify terms and concepts used in this rubric only.

• Ambiguity: Information that may be interpreted in more than one way.

• Assumptions: Ideas, conditions, or beliefs (often implicit or unstated) that are "taken for granted or accepted as true without proof." (quoted from www.dictionary.reference.com/browse/assumptions) • Context: The historical, ethical. political, cultural, environmental, or circumstantial settings or conditions that influence and complicate the consideration of any issues, ideas, artifacts, and events. • Literal meaning: Interpretation of information exactly as stated. For example, "she was green with envy" would be interpreted to mean that her skin was green.

• Metaphor: Information that is (intended to be) interpreted in a non-literal way. For example, "she was green with envy" is intended to convey an intensity of emotion, not a skin color.

Definition

Critical thinking is a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion.

Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet benchmark (cell one) level performance.

	Capstone 4	Milestones 3 2		Benchmark 1
Explanation of issues	Issue/problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/or backgrounds unknown.	Issue/problem to be considered critically is stated without clarification or description.
Evidence *Selecting and using information to investigate a point of view or conclusion*	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/evaluati on, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken	Information is taken from source(s) without any interpretation /evaluati on. Viewpoints of experts are taken as fact, without question.

	thoroughly.		as mostly fact, with little questioning.	
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/ hypothesis)	Specific position (perspective, thesis/hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/hypothesis).	Specific position (perspective, thesis/hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/hypothesis) is stated, but is simplistic and obvious.

Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

APPENDIX B

ETHICS COMMITTEE APPROVAL

Evrak Tarih ve Sayısı: 13.01.2022-47880

T.C.
BOĞAZİÇİ ÜNİVERSİTESİ
SOSYAL VE BEŞERİ BİLİMLER YÜKSEK LİSANS VE DOKTORA TEZLERİ
ETİK İNCELEME KOMİSYONU
TOPLANTI KARAR TUTANAĞI

Toplantı Sayısı : 27
Toplantı Tarihi : 13.01.2022
Toplantı Saati : 10:00
Toplantı Yeri : Zoom Sanal Toplantı
Bulunanlar : Prof. Dr. Ebru Kaya, Prof. Dr. Fatma Nevra Seggie, Dr. Öğr. Üyesi Yasemin Sohtorik İlkmen
Bulunmayanlar :

Josilyn Michelle Markel
Eğitim Teknolojisi
Sayın Araştırmacı,

"Metacognitive Interventions in the Context of Academic English Writing: A Mixed-Method Study" başlıklı projeniz ile ilgili olarak yaptığınız SBB-EAK 2022/01 sayılı başvuru komisyonumuz tarafından 13 Ocak 2022 tarihli toplantıda incelenmiş ve uygun bulunmuştur.

Bu karar tüm üyelerin toplantıya çevrimiçi olarak katılımı ve oybirliği ile alınmıştır. COVID-19 önlemleri kapsamında kurul üyelerinden ıslak imza alınamadığı için bu onay mektubu üye ve raportör olarak Fatma Nevra Seggie tarafından bütün üyeler adına e-imzalanmıştır.

Saygılarımızla, bilgilerinizi rica ederiz.
Prof. Dr. Fatma Nevra SEGGIE
ÜYE
e-imzalıdır

Prof. Dr.Fatma Nevra SEGGIE
Raportör

SOBETİK 27 13.01.2022

Bu belge 5070 sayılı Elektronik İmza Kanununun 5. Maddesi gereğince güvenli elektronik imza ile imzalanmıştır.

APPENDIX C

PARTICIPANT CONSENT FORMS

Institution sponsoring research: BOĞAZİÇİ UNIVERSITY
Title of the Research Project: Online Metacognitive Scaffolding in the Context of Academic English Writing: A Qualitative Study
Project Manager: Assist. Prof. | E-mail address: | Phone:
Researcher: | E-mail address: | Phone:

Dear students,
Dr. , an instructor in the Department of Computer Education and Educational Technology at Boğaziçi University, is carrying out a scientific research project. The study aims to explore how completion of certain learning materials will affect the metacognitive knowledge and writing achievement of students in FLED 103.
FLED 103 Academic Writing is a course designed to introduce foreign language teacher candidates to the academic cross-curricular writing process. As a student in this course, you will complete a total of six writing assignments throughout the semester. In addition to the instruction that you receive from the instructor, the researcher has designed a series of materials to help you complete these writing assignments.
As a participant, you will be asked to use these materials while preparing your writing assignments. At the end of the semester, there will be interviews to will be conducted either via Zoom videoconference platform or face-to-face on campus; these interviews will be recorded as an audio file. Interviews will take 40-50 minutes. Volunteering for the research means that your writing assignments and the audio recording of your interview become data for this research study.
Your identities will not be shared at any part of the research. Your involvement in the study is voluntary, and you may choose to not participate or to stop participating at any time without penalty. The decision to be in the study or not and the researcher's evaluation of your work will not affect your grades. However, your participation in the research will make a contribution to the design of effective metacognitive support for writing. All stored records will be destroyed after the completion of the research. There are no known risks or inconveniences associated with this study.
Please ask if you have any questions about the study before signing this form. If you have any questions later, you can ask the project coordinator (Phone:). You can consult the Boğaziçi University Ethics Committee for Master and PhD Theses in Social Sciences and Humanities (SOBETIK) about your rights regarding research ( ).
I have read the text above and understand the scope and purpose of the research I am being asked to participate in. I understand that I can quit this study whenever I want,

without having to give any reason, and that I will not encounter any negative consequences if I quit.

Participant Name-Surname:……. Section of FLED 103..... I approve to participate in the study. ☐ I approve to join an audio-recorded interview. ☐ Date (day/month/year):...../...../.....	Researcher Name- Surname:

APPENDIX D

INTERVIEW QUESTIONS

English	Turkish
Questions about the writing process.	
Overall, how did the FLED 103 writing classes go for you this semester?	Genel olarak FLED 103 yazma dersleri bu dönem senin için nasıl gitti/geçti?
Did you experience any difficulties/challenges while completing the course requirements? If yes, could you explain what those were?	Ders gerekliliklerini yerine getirirken herhangi bir zorluk yaşadın mı? Yaşadıysan, o zorluklardan biraz bahsedebilir misin?
How did you start the writing process for FLED 103 course assignments? What was your first step?	FLED 103 dersi ödevlerinde yazma sürecine nasıl başladın? İlk adımın neydi?
What was your next step? How did you continue the writing process?	Bir sonraki adımın neydi? Yazma sürecini nasıl devam ettin?
How did you know when the paper was complete?	Yazma ödevinin tamamladığını nasıl anladın?
Which writing assignment was the easiest for you to complete? Which one was the most difficult? Why? [Where applicable, retrieve these writing assignments, show it to the student, and ask about the easiest/most difficult aspect of the paper while they're looking at it.]	Hangi yazma ödevini tamamlaman en kolayıydı? En zoru hangisiydi? Neden sence?
Questions about metacognitive strategy and skill use.	
Please explain why you used [example of previously-offered metacognitive strategy use].	Lütfen neden [önceden kullunan metacognitive strateji kullanımı örneği] kullandığınızı açıklayın.

How did the pre-writing metacognitive strategies help you? Which pre-writing metacognitive strategies worked better/were more effective for you for the assignments? [Offer examples of strategies if necessary.] Follow Up: Why do you think these strategies helped you more while preparing to write?	Yazma öncesi metacognitive stratejiler size nasıl yardımcı oldu? Hangi yazma öncesi metacognitive stratejiler ödevler için daha iyi ise yaradi/daha etkiliydi? [Gerekirse strateji örnekleri acikla.] Sizce bu stratejiler yazmaya hazırlanırken neden size daha çok yardımcı oldu?
How did the while-writing metacognitive strategies help you? Which while-writing metacognitive strategies worked better/were more effective for you for the assignments? [Offer examples of strategies if necessary.]	Yazarken metacognitive stratejiler size nasıl yardımcı oldu? Yazma sırasında hangi metacognitive stratejiler sizin için daha iyi ise yaradi/ödevler için daha etkiliydi? [Gerekirse strateji örnekleri acikla.]
Questions about calibration.	
How did the scores you gave your own papers compare to your actual scores? What accounts for this difference, in your opinion?	Kendi ödevlerinize verdiğiniz puanlar, gerçek puanlarınızla karşılaştırıldığında nasıldı? Arada bir fark var mıydı? Varsa, bu farklılığın nedeni sence nedir?
Please explain how you arrived at each score for your own papers.	Kendi ödevlerini nasıl puanladığını açıklayabilir misin?.
How did you know if/when your score was accurate? In addition to the rubric, what other criteria did you use to judge your paper?	Ödevlerine verdiğin puanların doğru olup olmadığını nasıl anladın? Verilen rubriğe ek olarak, ödevini değerlendirmek için başka hangi kriterleri kullandın?
Questions about artifacts (the student's own Writing Assignments).	

[While showing the whole writing assignment] What was your goal in writing this paper? What did you want your writing to achieve here?	[Tüm yazma ödevini gösterirken] Bu ödevi yazmaktaki amacı neydi? Yazınızın burada ne elde etmesini istediniz?
[While indicating a specific supporting detail] Why did you include this detail in your writing? How did its inclusion support the main goal of your writing?	[Belirli bir destekleyici ayrıntıyı belirtirken] Neden bu ayrıntıyı yazınıza dahil ettiniz? Dahil edilmesi, yazınızın ana amacını nasıl destekledi?
[While showing the whole writing assignment] Please briefly describe the overall organization of this writing assignment. What words or features of the writing make this organization clear to the reader? [student should indicate the words/features on the assignment]	[Tüm yazma ödevini gösterirken] Lütfen bu yazı ödevinin genel organizasyonunu kısaca açıklayın. Yazının hangi kelimeleri veya özellikleri bu organizasyonu okuyucuya açık hale getiriyor? [ödevdeki kelimeleri/özellikleri öğrenci belirtmelidir]
[While showing the whole writing assignment] In what other context(s) could you use this style of writing?	[Tüm yazma ödevini gösterirken] Bu yazı stilini başka hangi kontekst(ler)da kullanabilirsiniz?
[Where applicable, as an artifact-based follow-up to discussion about MC skills and strategy use]: In what other context(s) could you use the strategies/skills from this assignment?	[Uygun olduğu durumlarda, MC becerileri ve strateji kullanımı hakkında yapılan tartışmanın yapay temelli bir devamı olarak]: Bu ödevdeki stratejileri/becerileri başka hangi kontekstlerde kullanabilirsiniz?

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