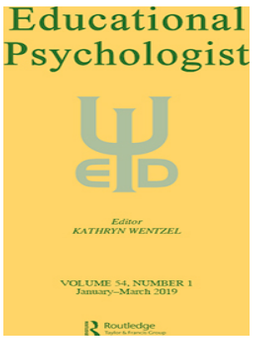

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Toward an Integrated Framework of Multiple Text Use

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We introduce the Integrated Framework of Multiple Texts to understand how students use and form connections between multiple texts to accomplish personal or task goals. The Integrated Framework of Multiple Texts conceptualizes students' multiple text use as unfolding over the course of three stages—preparation, execution, and production. In the preparation stage of the framework, individual difference factors and students' task analysis result in learners' adoption of a default stance, or a general orientation, toward multiple text use. During the execution stage of the framework, students engage in a variety of behavioral, cognitive, and metacognitive/regulatory strategies to develop cross-textual links and to integrate information across multiple texts. The execution stage concludes with students' development of a variety of affective and cognitive outcomes as a consequence of text access. Finally, in the production stage of the framework, students draw on these affective and cognitive outcomes to develop external, often written products.

In today's information-rich world, individuals commonly search for and use multiple texts to accomplish a variety of goals, including pursuing an interest, resolving a conflict, reaching a decision, building an argument, or informing others (Bråten, 2008; Coiro, 2003; Goldman & Scardamalia, 2013). The texts necessary to accomplish these goals can take many forms—from newspapers and scientific articles to blogs and tweets—and can be extremely variable in quality and credibility (Bråten, Strømsø, & Salmerón, 2011; Kammerer & Gerjets, 2012; List, Alexander, & Stephens, 2017). The demands of living and learning in the 21st century require that students become skilled in navigating the incredible volume and extreme complexity of the information sources they will doubtlessly encounter, learning to cull those that are accurate, informative, balanced, and authenticated from those that are inaccurate, misleading, biased, or "fake" (Goldman & Scardamalia, 2013; List & Alexander, 2017a). Given these demands, it is not surprising that models attempting to capture the nature of multiple text use are now populating the literature (Brand-Gruwel, Wopereis, & Walraven, 2009; List & Alexander, 2017b, 2018; Rouet & Britt, 2011).

Indeed, due to the complexity associated with synchronously searching for, processing, evaluating, and integrating information from multiple texts to meet a variety of task goals, the number of models of multiple text use available in the literature abound. The Integrated Framework of Multiple Texts (IF-MT) builds on these earlier models to construct an integrated metaframework of the factors necessary to consider when examining students' multiple text use. The IF-MT most directly builds on models specifying the role of individual difference factors in multiple text use (List & Alexander, 2017b, 2018), the processes students engage in when presented with multiple texts (Rouet, 2006; Rouet & Britt, 2011), and the nature of students' integration or cognitive representation of multiple texts (Britt, Perfetti, Sandak, & Rouet, 1999; Perfetti, Rouet, & Britt, 1999). Nevertheless, we consider the IF-MT to constitute an important addition to these existing models for several reasons. First, individually, each of these models fails to account for the full range of empirical work around multiple text use that has emerged over the last few decades. This includes research examining the role of epistemic beliefs (Bråten, Britt,

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Strømsø, & Rouet, 2011; Bråten & Strømsø, 2009; Mason, Ariasi, & Boldrin, 2011), learners' strategic processing (Anmarkrud, Bråten, & Strømsø, 2014; Bråten & Strømsø, 2011; Wolfe & Goldman, 2005), and argument construction (De La Paz, 2005; Wiley et al., 2009; Wiley & Voss, 1999) in multiple text use.

Second, as several of these long-existing models have matured (e.g., Perfetti et al., 1999), their integration presents an opportunity for reanalysis and reexamination (Britt, 2017). Moreover, the current information landscape, characterized by concerns regarding our entry into a posttruth era, dominated by the coexistence of accurate and allegedly fake news (Lazer et al., 2018; Peters, 2017), demands a renewed examination of the difficulties that information consumers face in making sense of the variety of sources saturating the Internet today. In this ever-shifting informational climate, we believe the goal of the IF-MT—to introduce an integrated framework for conceptualizing multiple text use—is essential. At the same time, we do not presume that the IF-MT will stand as the definitive conceptualization of multiple text use in decades to come. Rather, we expect that as the literature on multiple text use continues to develop and increase, further refinement of the IF-MT or the articulation of alternative frameworks and models will occur. However, we believe this literature has sufficiently matured and expanded to warrant its examination and integration (List & Alexander, 2017a).

In this article, we introduce the IF-MT. In developing this framework, we sought to build on and connect to the rich research tradition that has developed around multiple text use over the last 25 years. Although a synthesis of the existing empirical and theoretical work around multiple texts is involved, we refer to the IF-MT as an Integrated Framework because, in addition to bringing together varied theoretical conceptions of multiple text use, the IF-MT additionally conceptualizes multiple text use in light of research not specific to the use of multiple texts (e.g., strategy use, relational reasoning). As such, we consider the IF-MT to be a synthesis of the theories and investigations of information search, comprehension, and integration that have been carried out across studies of students' single and multiple text use alike. Indeed, the term *framework*, rather than *model*, is deliberately used in this examination to specify the componential nature of the IF-MT and its descriptive, rather than proscriptive, purpose. As such, in introducing the IF-MT, we seek to identify and taxonomize the factors impacting students' multiple text use, rather than specifying the causal mechanisms underlying students' multiple text processing. We begin by briefly overviewing the IF-MT. Then we describe the theoretical and empirical research base underlying each component of this framework. Finally, we discuss the implications of the IF-MT for instruction.

Before proceeding, it is important to explain what we mean by the term *text* as it pertains to the IF-MT. Various definitions of text populate the literature, ranging from more conservative to more liberal interpretations, and with texts alternately referred to as sources, documents, or websites (Goldman & Scardamalia, 2013). From our perspective, a text is any document that contains linguistic information, or the printed representation of connected discourse, alone or alongside other symbolic information (e.g., pictorial, graphic, or numeric). Moreover, a text is an object intentionally created to convey meaning (Ricoeur, 1991). As such, texts can be considered to be authored entities or discourse coming from some source, responsible for text origin; this characteristic of texts as sourced documents has been much emphasized in work on multiple text use (Goldman & Scardamalia, 2013).

THE INTEGRATED FRAMEWORK OF MULTIPLE TEXT USE

In the section that follows we introduce the IF-MT. To date, we believe this to be the most comprehensive conceptualization of students' interactions with multiple texts. The IF-MT conceptualizes multiple text use as unfolding through a series of three stages: preparation, execution, and production. In the preparation stage, learners establish a stance toward task completion. During execution, learners activate a variety of behavioral, cognitive, and metacognitive/regulatory strategies while processing multiple texts. The execution stage ends with learners' development of affective or cognitive outcomes, with the latter constituting mental representations of the content in multiple texts, constructed in light of learners' goals for text access. Finally, during production, learners transform the affective and cognitive outcomes gained as a consequence of multiple text use into external, often written, products. The IF-MT is depicted in Figure 1.

Preparation

In the first stage, *preparation*, students conceptualize a multiple text task in terms of both its objective features, which are often externally assigned, and in terms of their personal perceptions of these features. External features include the (a) substantive elements (i.e., the domain, subdomain, and topic being explored) and (b) structural requirements (i.e., objective standards delimited for task completion) of any given task. These features may then be perceived by learners in terms of their (a) personal motivations (i.e., perceived value that task completion may hold for them) and the (b) cognitive products, or learning outcomes, that they expect to result as a consequence of text access. A host of internal, or individual

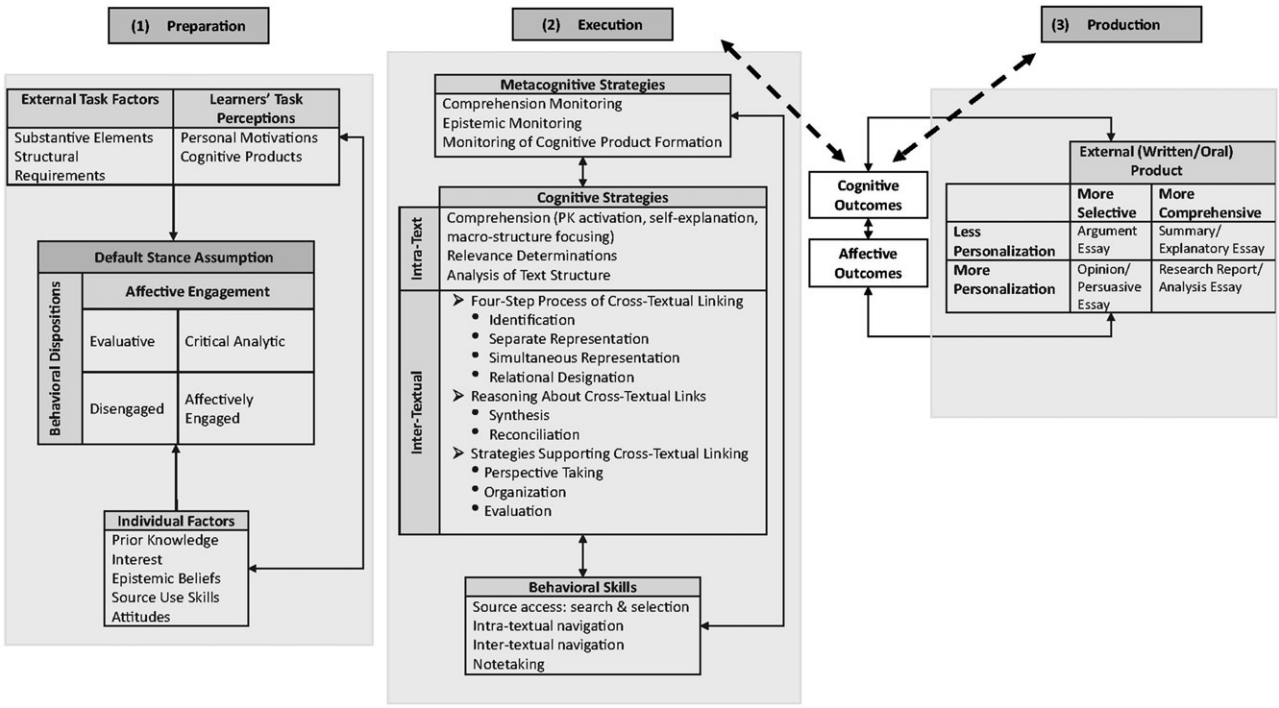

FIGURE 1 Integrated framework of multiple texts. *Note.* Bidirectional arrows represent a reciprocal relationship. The unidirectional arrows in the preparation stage represent the role of individual difference factors and learners' task perceptions in determining students' assumption of a default stance. PK: prior knowledge.

difference, factors serve to configure learners' perceptions of multiple text tasks, reflected in their personal motivations for task completion and the cognitive products that they expect to result. Such individual difference factors include learners' prior domain and topic knowledge, existing interests and attitudes, text-processing abilities, and skills in source evaluation, as well as epistemic beliefs. Situationally specific, objective task factors (i.e., substantive elements, structural requirements) and the individual difference factors contributing to learners' task perceptions (e.g., personal motivations, cognitive products) result in students' adoption of a preparatory stance toward a multiple text activity or a "default stance." This default stance then shapes the multiple text processing in which students engage. For example, in the cognitive affective engagement model (CAEM; List & Alexander, 2017b, 2018), individuals are characterized as manifesting certain orientations toward multiple text tasks: disengaged, affectively engaged, evaluative, or critical analytic default stances. Although these default stances constitute somewhat preexisting orientations, these are also likely to iterate to some degree once the parameters of specific multiple text tasks unfold.

Execution

The second stage, *execution*, comprises the core behaviors and strategies defining learners' interactions with multiple texts. Specifically, three groups of strategies are identified and considered to function in tandem: behavioral, cognitive, and metacognitive or regulatory strategies. Behavioral strategies refer to those intentional actions that learners physically perform as they engage with multiple texts, including information search, text selection and navigation, and note taking or annotation. Cognitive strategies, by comparison, refer to the mental processes that are undertaken during multiple text use and can be divided into strategies focused on intratextual comprehension (i.e., the processing of individual texts) and intertextual integration (i.e., synthesizing or reconciling content from multiple texts). Behavioral and cognitive strategy engagement are both guided by metacognitive or regulatory strategy use. Three types of metacognitive or regulatory strategies are specified in the IF-MT. These are strategies associated with comprehension monitoring (i.e., students' self-evaluations of their understanding), epistemic monitoring (i.e., students' monitoring of texts not violating their epistemic standards for trustworthiness), and the monitoring of cognitive product formation (i.e., students' monitoring of their task goals and their achievement of expected cognitive and affective outcomes). The execution stage concludes with learners' determination that their intended cognitive products have been achieved and that further text access is no longer necessary.

Production

Multiple text use, undertaken during the execution stage of the IF-MT, results in the achievement of a variety of cognitive and affective outcomes. Cognitive outcomes reflect the knowledge gains that are a consequence of students' multiple text access. Such knowledge gains include both the realization of expected cognitive products (e.g., learning more about a topic) and the cognitive representations of multiple texts that students form (e.g., documents model; Britt et al., 1999; Perfetti et al., 1999). Affective outcomes include changes in learners' interests or attitudes as a consequence of multiple text access. Although interest and attitudes have both cognitive and affective dimensions (Breckler & Wiggins, 1989; Krapp, Renninger, & Hidi, 2004), our emphasis here is on learners' affective reactions to a topic or texts resulting from any personal investment in that area of inquiry or any increased or decreased predisposition to engage further with the topic or texts that this experience may instigate. Crucially, cognitive and affective outcomes are ones that are internal to the learner and, indeed, in and of themselves may constitute the end of students' multiple text use. Nevertheless, these outcomes may lead to students' development of a variety of external products in the production stage of the IF-MT. Typically written, external products differ according to how selectively or comprehensively they represent content in texts and the degree to which learners personally transform text-based content. As such, we build on earlier models (i.e., Documents Model Framework; Britt et al., 1999; Perfetti et al., 1999) to specify that the multiple text integration evidenced in the external products that students construct should differ according to learners' desired cognitive products and the structural requirements of particular tasks. Specifically, we suggest that students may integrate texts in different ways when formulating different types of cognitive outcomes or external products and consequently should not be expected to comprehensively integrate all available texts in composing a written response.

We now discuss each stage of the IF-MT in greater detail and in light of existing empirical findings in the field of multiple text use.

EMPIRICAL WORK UNDERLYING THE IF-MT

Preparation

The preparation stage most closely mirrors insights originally proposed in the CAEM (List & Alexander, 2017b, 2018). The CAEM considers learners' engagement in multiple text use to be defined by two dimensions. The *behavioral dispositions* dimension captures students' habituated skills with regard to source evaluation and multiple text integration (e.g., sourcing or the consideration of document information, like author). The *affective engagement* dimension reflects students' motivation for task completion, including factors like interest and prior attitudes. Jointly, these two dimensions define each of the four *default stance profiles* toward multiple text use that students may adopt. Default stances constitute general orientations toward task completion and capture students' goals for multiple text use as well as providing a lens through which learners' text use behaviors and processing can be conceptualized. Four default stance profiles have been identified: (a) disengaged, (b) affectively engaged, (c) evaluative, and (d) critical analytic default stance orientations.

A *disengaged* default stance is marked by students having limited skills with regard to multiple text use and low motivation for task completion. Students adopting an *affectively engaged* default stance do so because they are motivated by the topic of a task, despite lacking the evaluative skills necessary for multiple text integration. Conversely, students with an *evaluative* default stance, even absent particular motivation for task completion, may be expected to engage in certain high-level text use practices associated with multiple text evaluation and integration (e.g., sourcing; corroboration). Yet those holding this stance either may manifest a perfunctory approach to text use or may selectively use texts to support their existing views on a particular topic, not seeking to understand issues in a way that is best substantiated by the available evidence. Finally, learners adopting a *critical analytic* default stance are those who both have strong habits with regard to source evaluation and multiple text integration and are motivated by the task. Initial evidence for CAEM profiles or default stances has been identified based on an analysis of students' written responses (List & Alexander, 2018) and CAEM-aligned profiles have been identified in cluster-analysis-based examinations of students' multiple text and hypertext use (Killi, Laurinen, & Marttunen, 2008; Lawless & Kulikowich, 1996; List & Alexander, 2017c). Nevertheless, much more investigation is necessary to empirically establish the default stance profiles identified in the CAEM.

In the CAEM, the default stance that participants adopt is expected to be influenced by task analysis, that is, learners' decomposition of a task into its substantive elements, structural requirements, personal motivations, and expected cognitive products. Substantive elements refer to the academic domain in which a task is nested and the specific topic being examined, whereas personal motivations pertain to the interests or attitudes that learners bring to the domain or topic of the task and, therefore, the value they assign to task completion. Structural requirements include the form and complexity of any external product

expected to result from students' multiple text engagement (e.g., 2,000-word research report; persuasive essay). Cognitive products, in contrast, reflect the individual learning outcomes that students expect to result from multiple text engagement. Such task analysis contributes to students' adoption of a default stance, which influences the quantity and quality of the behavioral, cognitive, and metacognitive/regulatory strategies that students enact during the execution stage of the IF-MT.

In this way, the IF-MT draws directly on insights from Rouet and Britt's (2011) multiple documents task-based relevance and content extraction model (MD-TRACE; Rouet, 2006). The MD-TRACE expressly identifies students' construction of a task model, or a cognitive representation of task demands, as setting the stage for later multiple text use. More recently, Rouet, Britt, and Durik (2017) introduced the RESOLV model to further identify those factors in the task environment (i.e., context) that learners may draw on in formulating a *context model* of task demands. Contextual factors that learners may attend to and cognitively represent include the task requester (i.e., the individual assigning the multiple text task), the request (i.e., task), and the resources (i.e., supports and obstacles) available in the task environment to support multiple text task completion. Common to the CAEM, the RESOVL, and now the IF-MT is the recognition that the task and context of multiple text use is encoded, analyzed, and represented by users. Nevertheless, these differ in the aspects of the task and context that are emphasized. In the IF-MT, we specifically highlight the role of topic in students' task representation (i.e., substantive element) and underscore that students may be expected to both interpret and represent the goals that they are assigned (i.e., structural requirements) and their personal goals for task completion (i.e., individuals' cognitive outcomes) in adopting a default stance.

In the preparation stage, the IF-MT expands on the CAEM by more explicitly specifying the individual difference factors that may have a bearing on learners' default stance adoption and subsequent multiple text use during the execution stage of the framework. As such, the default stances that students adopt reflect the constellation of individual difference factors that have the most direct bearing on learners' strategy use during the completion of particular multiple text tasks. Five individual difference factors are specified in the IF-MT. No doubt other affective and cognitive individual difference factors, including emotions and need for cognition, have a bearing on multiple text use (Mason, Boldrin, & Ariasi, 2010; Mason, Scrimin, Tornatora, & Zaccoletti, 2017; Muis et al., 2015). Nevertheless, in the ensuing discussion, we consider only those individual difference factors that presently have strong theoretical and empirical associations with models of multiple text use.

Prior Knowledge

Prior knowledge is the individual difference factor that has been found to contribute most to single text comprehension (Alexander & Jetton, 2000; Alexander, Kulikowich, & Jetton, 1994a; Coiro, 2011; McNamara & Kintsch, 1996) and has been used in studies of multiple text use primarily as a control variable (Bråten & Strømsø, 2011; Le Bigot & Rouet, 2007; Stadtler & Bromme, 2007). Within the context of single text processing, prior knowledge has been found to support learners' inferencing, attendance to the structural features of texts and other comprehension-supporting information, and situation model construction via the integration of information in text with learners' prior knowledge (Kendeou & van den Broek, 2007; Kintsch & van Dijk, 1978; McNamara, 2001; van den Broek, Rapp & Kendeou, 2005). Within the context of multiple text use, prior knowledge has been found to support intertextual strategy use (Rouet, Favart, Britt, & Perfetti, 1997; Wineburg, 1991) by allowing learners to better recall or infer the relations among multiple texts (Le Bigot & Rouet, 2007; Moos & Azevedo, 2008).

In the IF-MT, prior knowledge is conceptualized as supporting both intratextual and intertextual strategy use, improving both the comprehension of individual texts and the integration of content across texts (Bråten & Strømsø, 2011), in the execution stage of the framework. In the preparation stage, we also expect students' prior knowledge and correlated interest in the topic to support their adoption of a more critical-analytic orientation toward multiple text use (Alexander et al., 1994a; Alexander, Kulikowich, & Schulze, 1994b). This more critical-analytic orientation may subsequently give rise to a more thorough evaluation of multiple texts encountered and an improved integration of their content (Ennis, 1989; Kong, 2014; Willingham, 2007). Even absent particularly high affective engagement, learners' prior knowledge may remain a significant factor in their adoption of an evaluative default stance, through its association deep level with strategy use.

Interest

The role of interest in reading comprehension has long been an area of study (Alexander et al., 1994b; Hidi, 2001; Schiefele, 2009). It has more recently been explored within the context of multiple text use (List, Stephens, & Alexander, 2018; Strømsø, Bråten, & Britt, 2010). Bråten, Anmarkrud, Brandmo, and Strømsø (2014) modeled the role of both situational and individual interest in multiple text use and found both of these to have an indirect relation with task performance via strategy use. The IF-MT framework accounts well for these findings. Both

individual and situational interest have a bearing on learners' adoption of more affectively engaged default stances toward multiple text tasks, expected to translate into greater strategy use and higher quality performance outcomes.

Epistemic Beliefs

In their integrated model of epistemic beliefs and documents model representation, Bråten, Britt, et al. (2011) described four dimensions of epistemic beliefs expected to influence learners' multiple text comprehension and integration. These are students' beliefs about (a) *certainty* (i.e., the extent to which knowledge is ever-evolving), (b) *simplicity* (i.e., the extent to which knowledge is complex), (c) *source* (i.e., the extent to which knowledge comes from authority), and (d) *justification* (i.e., the extent to which knowledge is established through reason or corroboration). For example, Bråten, Britt, et al. (2011) suggested that the certainty dimension of epistemic beliefs, capturing the extent to which students consider knowledge to be ever fluid or permanently established, dictates whether students approach multiple texts with a desire to find a definitive answer, explicitly stated in text, or with the goal of understanding multiple perspectives. Indeed, Bråten, Britt, et al. (2011) connected students' epistemic beliefs to a variety of strategies associated with multiple text use. These include students' engagement in *corroboration* (i.e., the comparison of texts to identify instances of agreement or conflict) and *sourcing* (i.e., the consideration of author information) in evaluating text content. Moreover, Bråten, Britt, et al. (2011) specified the particular role that students' beliefs may have in their construction of cognitive representations of single and multiple texts.

In the IF-MT, we propose a more streamlined approach to understanding the role of epistemic beliefs in learners' multiple text use. We suggest that learners' beliefs about appropriate sources of knowledge and methods for justifying knowledge correspond to their assumption of a default stance. For instance, learners holding beliefs that knowledge ought to be justified by multiple texts (Bråten, Ferguson, Strømsø, & Anmarkrud, 2013) may routinely engage in corroborative text access and may, therefore, demonstrate a higher propensity for adopting an evaluative or critical analytic default stance toward multiple text access. Moreover, epistemic beliefs serve as the basis for learners' evaluative strategy use and epistemic monitoring during multiple text access, described further in the Execution section of the IF-MT.

Source Evaluation Skills

Theoretical models of multiple text use (Brand-Gruwel et al., 2009; List & Alexander, 2017b; Rouet & Britt, 2011) have outlined a role for students' existing skills in determining subsequent task performance, justifying the inclusions of source evaluation skills in the IF-MT. Although students' engagement in source evaluation during text access has been examined extensively (e.g., Bråten, Strømsø, & Britt, 2009; List et al., 2017; Mason et al., 2010; Rouet, Britt, Mason, & Perfetti, 1996; Wiley et al., 2009), the role of students' habituated or default skills with regard to source evaluation and integration has received more limited attention (Hargittai, Fullerton, Menchen-Trevino, & Thomas, 2010; Metzger, 2007). Nevertheless, in the IF-MT we seek to make a critical distinction with regard to nature of skills in the preparation versus the execution stages of the framework. Specifically, in the preparation stage, the focus is on whether students possess the requisite skills to evaluate sources and to what level of competency and consistency. Thus, in preparation, skills function as individual difference factors. In contrast, the issue in the execution stage is whether students use whatever skills they have in processing multiple texts. At this stage, it is more about learners' motivations toward skills use, as reflected in the default stances that they assume.

As such, in the preparation stage, students' multiple text skills reflect their predispositions toward evaluating source or author information when considering texts and corroborating information across sources to form cross-textual connections or links (Hargittai et al., 2010; Wineburg, 1991). Learners' skills with regard to evaluation and multiple text integration correspond to the behavioral dispositions dimension that guides default stance assumption; a higher propensity for adopting an evaluative or critical analytic default stance may further be associated with strategy use during the execution stage of the IF-MT.

In other words, we hold that students may be more or less disposed to critically evaluate information and still elect whether to use such evaluative strategies within specific situations. Indeed, the literature has documented both students' dispositions toward critically thinking about and evaluating information (Facione, Sanchez, Facione, & Gainen, 1995; Jiménez-Aleixandre & Puig, 2012; Killi et al., 2008) and students' strategic enactment when processing multiple texts (Brem, Russell, & Weems, 2001; Graesser et al., 2007; Stadtler & Bromme, 2008).

Attitudes

In their classic definition, Eagly and Chaiken (1993) wrote that attitudes are "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (p. 1). Within this definition, attitudes, like interest, have both cognitive and affective dimensions that result in behavioral, cognitive, and

affective engagement (Breckler, 1984; Breckler & Wiggins, 1989; Ostrom, 1969). In the IF-MT, we distinguish attitudes from interest in three ways. First, attitudes have an evaluative component, more so than does interest. Second, although disinterest may be considered to result in learners' disengagement, positive and negative attitudes alike have been found to spur engagement, with intensity, not valence, the deciding factor (Brendl & Higgins, 1996; Cunningham, Raye, & Johnson, 2004). Third, even though interest may be conceptualized as of primary importance to the individual, attitudes, although still an individual difference factor, have been investigated as much more determinant of external events (e.g., intergroup relations, consumer decisions, Ajzen, 2008; Ajzen & Fishbein, 2005; Esses, Jackson, & Armstrong, 1998).

Students' attitudes have been associated with differential strategy use while processing attitude-consistent versus attitude-inconsistent texts (Maier & Richter, 2016). Strategies implicated include those associated with attention allocation, with cognitive resources tending to be directed toward the processing of attitude consistent content, and critical evaluation, associated with the overscrutinizing of attitude inconsistent information (Maier & Richter, 2016; McCrudden & Barnes, 2016; McCrudden, Barnes, McTigue, Welch, & MacDonald, 2017). Drawing on literature on single text processing, we expect attitudes within multiple text use to be associated with learners' information selection, depth of processing, and performance, as assessed by both cognitive (e.g., text recall) and affective (e.g., attitude strength) outcomes (Ditto & Lopez, 1992; Lord, Ross, & Lepper, 1979; Taber & Lodge, 2006). Based on the literature addressing interrelations among attitudes, emotions, and information evaluation, we contend that students holding strong attitudes about a topic are more likely to adopt affectively engaged or critically evaluative default stances during the preparation stage of the IF-MT (Dillard & Peck, 2000; Petty, Gleicher, & Baker, 1991).

Learners' decomposition of a task into substantive elements, structural requirements, personal motivations, and expected cognitive products, along with a host of individual difference factors, jointly result in students' assumption of a default stance toward multiple text use. The default stances that learners adopt are then associated with a variety of multiple text use behaviors and strategies; these are described in the execution stage of the IF-MT.

Execution

The execution stage of the IF-MT is most directly related to the MD-TRACE, Rouet & Britt, 2011). The MD-TRACE conceptualizes multiple text use as carried out across a series of five steps, that may iterate or recur (Rouet & Britt, 2011). When given an assignment requiring the use of multiple texts, Step 1 of the MD-TRACE proposes that students first develop a task model or a cognitive representation of task demands. In Step 2, the initiating step of multiple text access, students determine that they have an information need, requiring multiple text use. Students then go about satisfying this information need by engaging with multiple texts. Step 3 includes students' processing of multiple texts. Three subprocesses are identified: information selection, processing, and the integration of information across texts to form a documents model. A documents model is an integrated, cognitive representation of the central topic or issue discussed across texts, as well as a representation of the relations among texts as agreeing or disagreeing with one another (Britt et al., 1999; Perfetti et al., 1999). In Step 4, learners develop a written product. Finally, in Step 5, students evaluate this product relative to task demands and the task model developed in Step 1; following Step 5, students cycle back to earlier steps of the MD-TRACE, as needed.

A few key processes appear foundational to the MD-TRACE. Chief among these is the determination of text relevance (i.e., text's consistency with a particular task or suitability for students' needs; Rouet & Britt, 2011). In effect, relevance processing may be expected to underlie all of the subprocesses identified in Step 3 of the MD-TRACE, including information selection, processing, and integration. For instance, students have been found to differentially process relevant vis-à-vis irrelevant information during multiple text use (Anmarkrud et al., 2013; Rouet, Ros, Goumi, Macedo-Rouet, & Dinet, 2011). Further, integration of texts' content has been considered to be based, in part, on learners' prioritization of relevant over irrelevant information in texts (Britt et al., 1999). Moreover, Britt and Rouet (2012) emphasized the role of sourcing, or students' identification of texts as separate entities and their association of content in texts with source or author, as key to integration (Britt, Rouet, & Braasch, 2013).

In the IF-MT, we expand on this model by outlining the specific cognitive and metacognitive strategies, beyond relevance processing, underlying the behaviors specified in the MD-TRACE (i.e., multiple text selection, processing, integration). In the IF-MT, we examine three types of strategies supporting multiple text use. These strategies are (a) behavioral, (b) cognitive, and (c) metacognitive/regulatory in nature. As noted, we consider students' enactment of these strategies in the execution stage to pertain more to their willingness to exert the effort necessary to do so than it does to their particular strategic strengths or limitations. The following section describes each strategy supporting multiple text use in detail.

Behavioral Strategies

A number of behaviors have been identified as fundamental to multiple text use. In the IF-MT, four such behavioral strategies are specified, including those associated with (a) text access, including information search and selection; (b) intratextual navigation, supporting reading; (c) intertextual navigation, reflecting movement across texts; and (d) note taking. Although these strategies are identified as behavioral in the IF-MT, they are nevertheless supported by cognitive and metacognitive processes. For instance, students' decisions about information relevance and self-determinations of comprehension have been found to impact text access and navigation (Reader & Payne, 2007; Rouet et al., 2011; Wilkinson, Reader, & Payne, 2012). Nevertheless, the strategies described herein are identified as *behavioral* for two reasons. First, the engagement of these strategies has been found to have a strong heuristic component (Lim, 2013; Rose & Levinson, 2004). Second, the nature of these strategies, in contrast to cognitive or metacognition ones, is such that there are directly observable or recordable traces of their execution.

Text Access

Theoretical models have commonly identified text access (i.e., searching for and selecting informational sources) as the behavior initiating multiple text use (Brand-Gruwel et al., 2009; Rouet & Britt, 2011). Empirical work has found search and website selection to be undergirded by a variety of cognitive processes, including relevance determinations and trustworthiness evaluations (Braasch et al., 2009; Gerjets, Kammerer, & Werner, 2011; Kammerer & Gerjets, 2012; Le Bigot & Rouet, 2007; Rouet et al., 2011). At the same time, the manual and often heuristic nature of search and selection leads us to conceptualize text access as primarily behavioral in nature in the IF-MT (Kammerer & Gerjets, 2012; Rouet et al., 2011).

For instance, Jansen, Spink, and Saracevic (2000), analyzed more than 50,000 search queries to determine typical search and selection behaviors. These included a reliance on short queries, with an average query length of only 2.21 key terms, and the limited exploration of search results, with 58% of users never accessing websites not listed on the first page of hits. Despite their heuristic nature, search and selection are critical components of the multiple text use as they determine the scope of information that learners have to process and integrate and, as such, have a profound impact on performance (Kienhues, Stadtler, & Bromme, 2011).

Intratextual Navigation

The role of intratextual navigation, or moving between locations within a single text, is suggested by empirical data from at least four sources. First, studies of strategy use during single text processing have often documented students' engagement in rereading, suggesting a degree of intratextual navigation (Pressley & Afflerbach, 1995). Likewise, evidence from studies using eye-tracking and other online processing measures indicates that students strategically vary reading speed, engaging in skimming (i.e., quickly scanning content) versus linear reading, in an effort to purposefully traverse or dynamically move within text (Duggan & Payne, 2011; Salmerón, Naumann, García, & Fajardo, 2017). Third, investigations of multimodal or multimedia text processing (e.g., a text with an image or diagram) point to students cycling between different sections of the same text to facilitate comprehension (Ainsworth, 2008; Cromley, Snyder-Hogan, & Luciw-Dubas, 2010; Scheiter & Van Gog, 2009). Finally, recent work comparing single text processing in print and digital environments has pointed to the navigational affordances and challenges inherent in digital contexts (e.g., scrolling; Hillesund, 2010; Mangen, 2008). Such intratextual navigation behaviors have been found to have print analogs, including students turning pages or using a table of contents (Grossnickle, 2015).

Collectively, behaviors associated with finding positions within a single text and moving between these reflect intratextual navigation. Engagement in intratextual navigation, or more dynamic movement within a text, has been associated with positive comprehension outcomes in studies of single text processing (Cromley et al., 2010; Duggan & Payne, 2009; Evans & Gibbons, 2007), and, in the IF-MT, is also expected to improve multiple text integration. Although students may navigate within texts without forming cross-textual connections, the more dynamic navigation and better comprehension of individual texts may support the formation of cross-textual relations, supporting multiple text integration (Wiley et al., 2009).

Intertextual Navigation

Growing out of work on hypertext navigation, where a single text is segmented and explicitly linked across component parts, a variety of studies have examined students' intertextual navigation or movement between multiple texts. The majority of such studies have profiled or otherwise identified patterns in students' navigation (Lawless & Kulikowich, 1996; List & Alexander, 2017c; List, Grossnickle, & Alexander, 2016a; Reader & Payne, 2007). Profiles to emerge have been consistent with default stance orientations identified in the CAEM (List &

Alexander, 2017b). More specifically, navigation has been described as (a) limited or disengaged; (b) engaged but superficial in nature; or (c) both engaged and deep level, with a focus on learning. This later distinction between surface-level and deep-level navigation has been found to be a differentiator of students learning disproportionately much or little from a multiple text task (Goldman, Braasch, Wiley, Graesser, & Brodowinska, 2012).

Two features of this research are relevant to our formulation of the IF-MT. First, navigation patterns have been found to vary as a consequence of individual difference factors, like prior knowledge and interest (Lawless, Brown, Mills, & Mayall, 2003; Potelle & Rouet, 2003; Salmeron, Kintsch, & Cañas, 2006; Wilkinson et al., 2012). In the IF-MT, we consider navigation profiles to arise as a consequence of students' assumed default stance. For instance, learners may choose to access more or less texts, as a consequence of their interest in a topic (Ainley, Hidi, & Berndorff, 2002; List et al., 2018). Second, deep-level patterns of navigation have been associated with multiple text integration and task performance (Goldman et al., 2012; List & Alexander, 2017c; List et al., 2016a; Wiley et al., 2009). In the IF-MT, individual difference factors are likewise associated with strategy use, including intertextual navigation, in the execution stage of the framework, and with task performance, in the production stage.

Note Taking

There are several benefits associated with note taking, including benefits attributable to encoding and to external storage (Kiewra, 1989; Kobayashi, 2005, 2006; Rickards & Friedman, 1978). During composition, note taking helps students identify and elaborate on key information (i.e., encoding), while supporting referencing and review, after writing (i.e., external storage; Kobayashi, 2005; Rickards & Friedman, 1978). Further, note taking may be a behavior facilitating multiple text integration by supporting the mapping of relations among texts and the creation of an external representation of intertextual relations (Kobayashi, 2009).

The IF-MT further examines the cognitive strategies involved in multiple text use.

Cognitive Strategies

Two groups of cognitive strategies are specified in the IF-MT: intratextual strategies, which support the comprehension of individual texts, and intertextual strategies, aimed at multiple text integration.

Intratextual Strategies

Although multiple text integration extends beyond simply the comprehension of individual texts, strategies identified as facilitating single text processing can support multiple text integration. The IF-MT focuses on certain strategies supporting single text comprehension and classifies these as enacted prior to, during, or after reading (Afflerbach & Cho, 2009; Guthrie et al., 2004; McNamara, 2012; Pressley & Afflerbach, 1995).

Before reading, strategies associated with prior knowledge activation have been found to facilitate comprehension (Alvermann & Hynd, 1989; Alvermann, Smith, & Readence, 1985; Dole, Valencia, Greer, & Wardrop, 1991; Spires & Donley, 1998) by engaging students' existing knowledge schema and encouraging the elaborative, or deep-level, processing of text. During reading, inferencing, or filling in gaps in text based on prior knowledge, has been found to be a key strategy supporting comprehension (Best, Rowe, Ozuru, & McNamara, 2005; McNamara, 2004). Although many students do not readily engage in inferencing, *self-explanation*, or periodically articulating the meaning of text during reading, has been identified as a strategy supporting inferencing and resulting in improved comprehension (Ainsworth & Burcham, 2007; Chi, Leeuw, Chiu, & LaVancher, 1994; McNamara, 2004). After reading, macrostructure comprehension strategies, such as summarizing or main idea identification, have further been found to support comprehension (Armbruster, Anderson, & Ostertag, 1987; Bean & Steenwyk, 1984; Stevens, 1988).

Of interest, strategies to foster single text comprehension have, for the most part, not yet been examined as a mechanism for supporting multiple text integration. An exception to this comes from Britt and Sommer (2004), who specifically examined the role of single text-based, macrostructure-focusing tasks in multiple text integration. In particular, Britt and Sommer (2004) compared students reading two texts, either sequentially (i.e., control) or with an intervening summary task (i.e., macrostructure condition). The summary condition was found to improve multiple text integration. Given this encouraging finding, other intratextual comprehension strategies can be hypothesized to improve learning from multiple texts and therefore are included in the IF-MT.

Two other intratextual strategies seem pertinent to multiple text integration. These are strategies focused on relevance determinations and the analysis of text structure. Relevance determinations support single text processing in a variety of ways, including by determining where to direct attentional resources during processing and by cuing students to the kinds of strategies needed to meet task goals (McCrudden & Schraw, 2007). Relevance determinations have also been found to play an

intertextual role by supporting the linking of relevant content across texts (Anmarkrud, McCrudden, Bråten, & Strømsø, 2013); nevertheless, these are specified as an intratextual strategy in the IF-MT because such judgments are often based on students' determinations of a particular text's pertinence to task demands or to cognitive product development.

Analysis of text structure involves the decomposition of texts into key structural or functional elements (e.g., cause and effect, problem/solution, compare and contrast; Meyer, Brandt, & Bluth, 1980; Meyer & Ray, 2011). Such strategies support single text comprehension by cuing attention to the structural elements of text, facilitating the formation of intratextual connections, and bolstering students' understanding of text organization, resulting in more coherent recall (Meyer & Poon, 2001; Meyer & Rice, 1982; Spyridakis & Standal, 1987). Analysis of text structure may further foster the formation of cross-textual links by helping students to compare structural elements (e.g., causes) across texts.

In addition to the intratextual strategies identified, a number of strategies may specifically support cross-textual linking and multiple text integration.

Intertextual Strategies

In the IF-MT, we consider (a) the fundamental cognitive processes involved in cross-textual linking; (b) the processes involved in reasoning about cross-textual links (i.e., synthesis and reconciliation); and (c) the strategies that facilitate, but are not directly involved in, cross-textual linking (i.e., perspective taking, organization, and evaluation).

Cognitive process of cross-textual linking. In the IF-MT, we consider cross-textual linking to be a four-step process involving (a) identification, (b) separate representation, (c) simultaneous relation, and (d) relational designation. In the *identification* step, learners, aware that texts may indeed be related to one another, examine or search texts for possible relations between them. The identification step concludes when learners determine a potential relation between texts. This first step may be connected to automatic, or bottom-up resonance, conceptions of cross-textual linking (Beker, Jolles, Lorch, & van den Broek, 2016; Kim & Millis, 2006; Kurby, Britt, & Magliano, 2005; van den Broek et al., 2005). In effect, resonance-based understandings of integration suggest that when a particular text has a high degree of semantic or conceptual overlap with a prior text, information from that prior text is automatically activated during reading, supporting integration (Beker et al., 2016; Kurby et al., 2005). Although the degree of overlap between texts supports the formation of cross-textual links, the IF-MT is particularly focused on the deliberate intertextual strategies that students engage to identify and reason about relations across texts, referred to as top-down processes in resonance models of comprehension (Kurby et al., 2005).

In the *separate representation* step, learners conceptualize each component of a relation, nested in separate texts, independently. Third, in the *simultaneous relation* step, learners synchronize related content across texts and represent content from separate texts in a singular statement containing a relational modifier (e.g., *while*, *both*, *and*). Finally, in the fourth step, learners explicitly label their relational clause as reflecting concurrence, contrast, or some other relation (i.e., *relational designation*).

Students' engagement in the cognitive processes underlying cross-textual linking has been demonstrated, to various extents, in prior research. For instance, Wolfe and Goldman (2005), in their analysis of students' think-alouds while reading conflicting historical texts, identified students' attempts to formulate cross-textual links. For example, when referring to a previous text, one student commented, "that talked about distance too" (p. 481). Within our four-step process, such an utterance can be said to reflect the identification step of cross-textual linking, with this student identifying the trace of a relation across texts. Anmarkrud et al. (2014) identified a student conceptualizing one part of a relation within a text when they reported, "Then I think about the first texts I read … there I was told that it is not actually proven that cell phones are harmful" (p. 75) as part of a think-aloud. Such a statement may correspond to the separate representations step of the four-step process. Another student reporting "In some articles cellphones are really dangerous, whereas in others they're not bad at all" may reflect the simultaneous representation step (Step 3) of the four-step process, with the use of *some* and *whereas in others* as relational modifiers (Anmarkrud et al., 2013, p. 883). Elsewhere, engagement in cross-textual linking has been captured by students' endorsement of items corresponding to the cross-textual elaboration dimension of the Multiple Text Strategy Inventory (Bråten & Strømsø, 2011). Such items include "I tried to find ideas that recurred in several texts" and "I tried to note disagreements among texts."

The four-step process of cross-textual linking described here has further been exemplified in a recent study (List, 2018), in which participants were asked to read a set of texts presenting different points of view on the legalization of sex work. Students were specifically instructed to think aloud during processing and to explain any relations or connections among texts they identified. One student's explanation was as follows:

> So for the [first] paper … the writer … suggests in the end that it's time for people to recognize that sex workers are not a social ill but that you're going to make economic opportunities for women and their families, so

> basically he totally goes for legalizing sex work. … The third paper is *Prostitution is Immoral*, which the writer strongly disagrees with the job of prostitution. … He mentions this strongly at the end of the paper, says that '[instead of] normalizing this type of social conditions we should work to eliminate the role of these ills in our society'. So it's different from the previous paper, which, he totally disagrees with prostitution.

In this response we see that this student, after identifying a possible relation between texts (Step 1, identification), describes each text's point of view in association with its author (Step 2, separate representation). Then this student links the texts through the construction of a simultaneous relation of disagreement. We see Steps 3 and 4 reflected in the last statement this student made: "So it's different from the previous paper which he totally disagrees with prostitution." In this statement, this student simultaneously considers and juxtaposes two texts (Step 3, simultaneous relation) while identifying a relation between them (i.e., disagreement; Step 4, relational designation).

As has been suggested in prior work, the four-step cross-textual linking process, introduced here, may function at either the segment (i.e., part of text) or the whole passage level (Anmarkrud et al., 2014; Wolfe & Goldman, 2005). Specifically, students may globally relate texts to one another, based on their gist or point of view, or they may connect specific content or structural elements across texts. Moreover, this four-step process may support the formation of both low-level, explicit and high-level, thematic relations across texts. A low-level relation is a cross-textual link based on specific content explicitly introduced in texts, whereas a high-level thematic link connects categories or functional components of texts (e.g., causes, points of view), not necessarily explicitly introduced. For instance, in reading two texts about the Napoleonic Wars, identifying that "Text 1 estimates that there were 750,000 civilian causalities during the Napoleonic Wars, while Text 2 estimates that there were 3 million civilian causalities" would constitute a low-level relation, if it is directly based on content presented in texts, whereas a relation like "Text 1 and Text 2 diverge on the scale and impact of the Napoleonic Wars" would be classified as a thematic relation, if it is based on students' formation of a conceptual category, (i.e., scale/impact) not explicitly introduced in texts. As a final point, the four-step process captures the formation of cross-textual links regardless of whether texts agree with, complement, directly oppose, or partially conflict with one another.

Reasoning about cross-textual links. The fourth step of the relational reasoning process, relational designation, concludes when students identify a particular relation among texts (e.g., labeling texts as agreeing with, complementing, contrasting with, or opposing one another). Once a relation has been designated, students may engage in an additional set of processes associated with reasoning *about* the cross-textual links identified. These include synthesis and reconciliation.

When students designate the relations between or among texts as either in agreement with or complementary to one another, they may engage in synthesis. Synthesis refers to the process of combining and organizing like relations into a unified whole. Synthesis may include the connecting of multiple cross-textual links together (e.g., Text 1 agrees with Text 2 and with Text 3), the summarization of multiple cross-textual links (e.g., all of the texts agree with one another), or the extrapolation of an additional relation based on multiple, cross-textual links (e.g., Texts 1, 2, and 3 all agree on the number of civilian deaths during the Napoleonic Wars, further indicating that civilian deaths rival military causalities during the Napoleonic Wars).

When students categorize the relations between or among texts as either partially conflicting or directly oppositional, they may engage in a host of *reconciliatory processes*. These are aimed at the resolution of conflict across texts and the restoration of coherence. Stadtler and Bromme (2014) suggested that there are at least three possible courses of action available to students following the detection of a conflict across texts: (a) *ignoring the conflict*; (b) *inferring a resolution* to the conflict, based on information in texts or in prior knowledge, although such inferences may sometimes be inaccurate; or (c) *resolving the conflict* by making a decision regarding which information, across texts, to privilege.

Additional strategies supporting cross-textual linking. Three strategies facilitating cross-textual linking are described in the IF-MT (i.e., perspective taking, organization, and evaluation). McCrudden and Schraw (2007) defined perspective taking as the reading of texts from a point of view different than the student's own (e.g., reading like a librarian or like Sherlock Holmes). To date, students have typically been assigned to adopt a particular perspective toward multiple texts (Kaakinen, Hyönä, & Keenan, 2002; McCrudden et al., 2017), but spontaneous perspective taking may be a particularly useful strategy to support multiple text integration. Perspective taking may help students to link perspective-consistent content across texts or, depending on the perspective adopted, to better analyze or evaluate texts during reading.

Organization strategies are aimed at the construction of logical connections or groupings among new information to be learned (Van Meter et al., 2016). Such connection construction is often external, reflected in notes or graphic organizers, and reflective of known relational structures

(e.g., hierarchical, sequencing, comparative; Jairam & Kiewra, 2009, 2010). Recently, the use of organizational strategies has been found to be effective in supporting multiple text task performance by facilitate the cognitive process of cross-textual linking previously described (Daher & Kiewra, 2016; Firetto, 2013). The use of organization strategies is further supported by students' activation of text structure and note-taking strategies, previously described in the IF-MT. Nevertheless, here organization strategies are explicitly identified as intertextual in nature, as these may support both the improved comprehension of individual texts and the formation of cross-textual relations (Firetto, 2013).

Evaluation has been the strategy most extensively examined as supporting cross-textual linking and multiple text integration (Bråten et al., 2009; Bråten, Strømsø, & Salmerón, 2011; Britt & Aglinskas, 2002; Goldman et al., 2012; List et al., 2017; Rouet et al., 1996; Wiley et al., 2009). Evaluation refers to the judgments that students make of texts or content according to a variety of features (e.g., author, publisher, document type, date of publication; Bråten et al., 2009; Rouet et al., 1996). Consideration of these features has been thought to result in students' overall determinations of text trustworthiness, credibility, or reliability (Bråten et al., 2009; Rouet et al., 1996; Wiley & Voss, 1999). Such overall determinations support students' decisions about which information, from across texts, to attend to and include when integrating texts, and which information to dismiss (Britt et al., 1999; Perfetti et al., 1999). Moreover, evaluations facilitate the reconciliation of conflicts across texts by helping students to determine who to believe, when texts conflict (Braasch & Bråten, 2017; Braasch, Rouet, Vibert, & Britt, 2012; Stadtler & Bromme, 2014).

The engagement of intratextual and intertextual cognitive strategies is further supported by students' metacognitive or regulatory activities during task completion.

Metacognitive and Regulatory Strategies

At least three types of metacognitive or regulatory strategies are pertinent to multiple text integration. These entail the monitoring of comprehension, epistemic standards, and cognitive product formation. *Comprehension monitoring* reflects students' attendance to their understanding of texts during task completion (Afflerbach & Cho, 2009). *Epistemic monitoring* refers to students' vigilance that texts continue to meet their standards for acceptable sources of information and that their process of text use comports with their beliefs about appropriate ways to justify or determine knowledge. Dictated by students' epistemic beliefs, or personal norms regarding what constitutes an acceptable source, epistemic monitoring persists during multiple text processing and spurs additional strategy use when students determine that particular texts do not meet their criteria for acceptable sources of knowledge. An account of epistemic monitoring predicated on strategy activation following the violation of epistemic standards or norms is supported by evidence that learners possessing strong skills in text evaluation are distinguishable from their less evaluative peers by their discounting of unreliable texts, relative to trustworthy sources, during processing (Goldman et al., 2012; List et al., 2017; Wiley et al., 2009). In essence, a violation of epistemic norms may result in the engagement of evaluative strategies, described as cognitive in the IF-MT.

Finally, *monitoring of cognitive product* refers to students' attendance to their learning goals for multiple text use, as set out in Stage 1 of the IF-MT, and the potential modification of such goals during processing. As with epistemic monitoring, students' determinations that they are not achieving desired cognitive products as a consequence of text access may spur cognitive and behavioral strategy engagement during text use. Of course, all of these aspects of metacognitive monitoring should be understood as interconnected. For instance, students have been found to make trade-offs in their text use when selecting texts according to both their comprehensibility and their relevance to task demands (Le Bigot & Rouet, 2007; Reader & Payne, 2007). Students' decisions in such situations may be considered to be based jointly on their monitoring of cognitive product formation and self-evaluations of comprehension. Likewise, we see students' joint monitoring of epistemic norms and cognitive product formation, when they justify accessing and adopting information from Wikipedia due to its usefulness, despite their recognition of it as a "nonacademic" source (List, Grossnickle, & Alexander, 2016b; Shen, Cheung, & Lee, 2013).

Initial work on metacognition during multiple text use provides evidence for the types of metacognitive and regulatory processing specified in the IF-MT. For example, Wolfe and Goldman (2005), examining students' think-aloud utterances, determined that learners engaged in both comprehension monitoring, reflected in statements expressing comprehension failures or successes, and epistemic monitoring, as expressed in statements evaluating texts. Stadtler and Bromme (2007, 2008) created Met.A.Ware, a system to prompt students' metacognitive monitoring during multiple text use. Met.A.Ware separately prompted both the monitoring of comprehension (e.g., how well did you comprehend the information) and text evaluation (i.e., epistemic monitoring; e.g., rating author expertise or bias). Students were further prompted to rate: how much information do you still need on the topic, potentially reflecting the monitoring of cognitive product development, in IF-MT terms.

The cognitive, metacognitive, and behavioral strategies in which students engage are considered to be associated with the default stances that they adopt in the preparation stage of the IF-MT. Although strategy use for students adopting a disengaged default stance is presumed to be limited, the quantity and quality of strategy use associated with the other profiles are expected to differ (List & Alexander, 2018). For instance, students composing the affectively engaged profile are expected to show high behavioral engagement, accessing a lot of information about a topic of interest to them. Nevertheless, affective engaged students may be differentiated from their peers holding an evaluative stance by the more limited degree of deep-level strategy use they exhibit. Affectively engaged students, seeking to learn about a topic of interest, are expected to engage strategies focused on intratextual comprehension but to be more limited in intertextual strategy use, generally, and evaluative strategy use, more specifically, as compared to students holding evaluative and critical analytic default stances. Indeed, students adopting an evaluative default stance may be identifiable by their engagement of deep-level intratextual and intertextual strategies, particularly those associated with evaluation. Nevertheless, these students' strategy engagement may be more heuristic or perfunctory in nature, as compared to that of students adopting a critically analytic default stance. These latter students may be expected to engage in strategy use to the greatest extent, particularly as far as intertextual strategies use is concerned, as well as to exhibit a great deal of metacognitive engagement during task completion, to ensure that they are achieving their desired cognitive outcomes as a result of multiple text use.

Transitioning from Execution to Production

The execution stage terminates when learners determined that the cognitive and affective aims they wanted to achieve as a consequence of multiple text access have been realized. The decision to end text access is referred to as *cessation* and may arise for a number of reasons, corresponding to the default stance profiles discussed in the CAEM (List & Alexander, 2017b). These include both cognitive reasons, like saturation (i.e., the end of novel information being gained from multiple texts), and affective reasons, like frustration or boredom. As such, both the cognitive and affective outcomes of text access need to be considered in understanding students' decisions regarding cessation and their transition from the execution to the production stages of the IF-MT.

Cognitive Outcomes

The cognitive outcomes resulting from multiple text access have typically been considered to be cognitive representations of multiple texts, reflecting integration to varying extents. Such cognitive representations are taxonomized in the Documents Model framework (DM; Britt et al., 1999; Perfetti et al., 1999). Specifically, the DM identifies four types of cognitive models that students may construct as a consequence of multiple text access (i.e., mush model, separate representations model, documents model, and tag-all model). Such models differ in the extent to which they integrate two cognitive submodels—the integrated mental model and the intertext model. The integrated mental model, reflecting content–-content links, is a representation of the common topic or issue discussed across texts. The intertext model reflects both source–content and source–source links and captures the relations among texts. These two models variably feature in the ultimate cognitive models of multiple texts that students construct.

In the *mush model*, the integrated mental model takes precedence, whereas intertext model construction is ignored. In such a model, although content across texts is integrated, the origin of this content is lost. In a *separate representations model*, source–content links in the intertext model dominate, with limited integrated mental model construction; in this model, multiple texts are individually represented but not connected to one another. In the expert level, *tag-all model* both the integrated mental model and the intertext model are represented, and all of the content in any particular text is connected to its source of origin and sources–source connections are formed. The limitation of this model is its inappropriateness for novice learners, unable to simultaneously represent and connect all of the content coming from across multiple texts. Rather, a fourth type of model, the documents model, is considered to be the most adaptive for novice learners. In the *documents model* both the integrated mental model and the intertext model are represented, with an integrated understanding of a common situation formed and with information, contributing to this overall understanding, tagged according to its source of origin.

Much like the DM (Britt et al., 1999; Perfetti et al., 1999), the IF-MT considers the cognitive outcome of multiple text access to be a mental model of information presented across texts. Nevertheless, we differ from the DM because rather than identifying a particular mental model as normatively best (i.e., the documents model), the IF-MT evaluates the cognitive models that students construct more flexibly. Cognitive outcomes in the IF-MT can better be said to represent students' schemas developed as a result of multiple text access and, as such, should align with students' desired cognitive products. For instance,

if students intend to come to a particular decision as a consequence of multiple text access, they may have a cognitive model that selectively represents the basis for this decision. As a contrast, if learners' intended cognitive product is to gather information about a particular issue, the resulting cognitive model should be more comprehensive in nature. Empirical findings have determined that the quality of the documents models that students construct differs as a consequence of task assignment, with argument tasks typically more effective at facilitating documents model construction (e.g., Gil, Bråten, Vidal-Abarca, & Strømsø, 2010; Wiley & Voss, 1999). Nevertheless, students' written responses to different tasks have typically been evaluated by the same criteria (e.g., Bråten & Strømsø, 2009; Britt & Aglinskas, 2002; Wiley & Voss, 1999), with limited recognition that different tasks may instigate different approaches to the conceptualization of multiple texts. In contrast, the IF-MT suggests that the products that students construct in response to a multiple text task should be evaluated in accordance to the nature of the task that students undertake.

Affective Outcomes

At least two types of affective outcomes may be expected to result as a consequence of text access (List & Alexander, 2017b). First, multiple text access may result in students' increased interest in or curiosity about a particular topic (Grossnickle, 2015). Second, multiple text use may result in attitude shifts for learners. Such shifts can include both increased certainty in existing attitudes or attitude changes as a consequence of text access (McCrudden & Barnes, 2016; McCrudden et al., 2017).

Production

Following cessation, students enter the third and last stage of the IF-MT—production. This stage focuses on learners' formulation of an external or physical product reflective of the internal changes (cognitive and affective) occurring as an outcome of the execution stage.

Qualifiers

Before moving forward with the delineation of this stage, there are three qualifiers to keep in mind. First, whatever students come to know, believe, or feel about a topic as a consequence of processing multiple texts remains ensconced in their minds unless and until it is externalize in some form. This suggests, however, that students may elect *not* to make any aspect of their multiple text engagement external or public, terminating their processing at the execution stage. Further, even if students do enter the production stage of the framework, it is expect that the external products that they generate will be an incomplete, and perhaps even inconsistent, rendering of what they know, believe, or feel about a topic, following multiple text use.

Third, it is also important to acknowledge that the static rendering of the IF-MT framework shown in Figure 1 fails to capture the recursive nature of this process. In reality, as documented within the literature on synthetic reading-writing tasks (Segev-Miller, 2004; Spivey, 1990; Spivey & King, 1989), the process of generating an external product based on multiple texts is often a recursive one, with students returning to texts, as needed, to clarify, extend, or refine their written responses. The recursive nature of this process is represented via two dashed bidirectional arrows in Figure 1.

Written and Oral Products

With these qualifiers in mind, the products that students externalize during the final stage of this framework may be conceptualized in a number of ways. First, based on task and contextual factors, external products may be distinguishable according to their *specificity*, or what content within texts is viewed as relevant or irrelevant and is selectively or broadly incorporated into their formulation. For instance, when tasked with composing a research report on a particular topic (e.g., monarch butterflies), students are left to determine what aspects of the topic they want to highlight (e.g., identifying characteristics, migration patterns, and environmental threats). In contrast, when writing a persuasive or argumentative essay on this topic (e.g., what conservation efforts would most benefit monarch butterfly populations), students may need to peruse texts more selectively, with a more constrained external product the result.

Second, external products may differ according to their *personalization* or the degree to which students' own analysis, experiences, or opinions, not part of the textual content, may be expected to be included in the external products formed. Thus, if assigned an opinion piece, students may be expected to interject their personal views to a greater extent than when writing a summary essay, expected to demonstrate a more exclusive adherence to texts.

A range of external products (e.g., summaries, argument essays) have been well represented in prior research, tasking students with composing written responses based on multiple texts (Bråten & Strømsø, 2009; Wiley & Voss, 1999). Nevertheless, dimensions of specificity and personalization apply to students' formation of oral external products (e.g., participating in a debate or delivering a research report) as well. Across external products, these dimensions may serve as a basis for evaluation. In particular, students' external products may be judged according

to their comprehensiveness or specificity, with regard to the text-based information included, as well as their degree of personalization. At the same time, external products may also be assessed according to more task-general factors, such as their accuracy in reflecting texts' content or integration of information presented across texts. The evaluation of external products may further vary according to the audience presumed for these outcomes (e.g., teachers vs. friends; Rouet, Britt, & Durik, 2017).

Behavioral Products

Of course, the outcomes that emerge in the production stage need not take the form of written or oral language, although these forms are common within academic settings. The results of students' interactions with multiple texts can also manifest in the form of actions instigated by what content is encountered. The decisions students make, the actions they take, or the products they purchase are among the behavioral outcomes that may result. In effect, changes in knowledge, affect, and beliefs can be physically enacted, not only linguistically expressed.

Summary

This article introduces the IF-MT. Building on earlier work identifying profiles in students' orientations toward multiple text use (List & Alexander, 2017b), the IF-MT outlines the behavioral, cognitive, and metacognitive/regulatory strategies involved and provides a taxonomy of the types of external products that may result as a consequence of multiple text use. Critically, the IF-MT specifies the particular cognitive mechanisms underlying cross-textual linking, supporting multiple text integration, while expanding the goals of multiple text use to include knowledge building and the formulation of external products in the real world.

CONCLUSIONS AND INSTRUCTIONAL IMPLICATIONS

The IF-MT was developed for two primary reasons. First, it was intended as a unifying framework to integrate the body of research that has emerged around multiple text use over the last 25 years. Second, the IF-MT was developed as an instructional framework to support students' development of the skills necessary for effective multiple text use and integration. As such, we conclude this article by discussing the instructional implications arising from the IF-MT.

For one, mastering the processes specified in the IF-MT requires that learners be asked to engage with multiple texts to a much more considerable extent than is currently represented in many school curricula (Purcell, Buchanan, & Friedrich, 2013). As an initial entry point, the IF-MT suggests that students should be asked to analyze tasks, prior to engaging in multiple text use, and to attend to both the structural requirements of task assignments and their own predispositions (i.e., default stances) toward them. Correspondingly, evidence cited in the IF-MT suggests that teachers should consider students' affective experiences in assigning tasks requiring the use of multiple texts. This may include asking students to conduct research about topics of interest to them or introducing students to the kinds of relevant and provocative topics that may elicit strong engagement or attitude expression.

Moreover, we believe that the default stances identified in the preparation stage of the IF-MT, although descriptive in nature, can serve as useful educational tools for teachers and students alike. Instructionally, teachers understanding these stances can make them more sensitive to the relevant patterns their students exhibit when engaged with multiple texts and more effective at providing whatever support is warranted. Students, as well, can be armed both with the knowledge of multiple text processes and tasks and with the self-knowledge of their particular strengths and areas of need.

Throughout the three stages of the IF-MT, we propose that students monitor their comprehension, their learning or cognitive product formation, and the epistemic standards that they hold. Considering these three dimensions may help teachers to effectively model self-regulation and metacognition throughout multiple text use, as well as to elicit these through questioning. For instance, students' epistemic monitoring may be developed by (a) asking learners to explicitly identify and reason about the epistemic norms that they hold, (b) cuing them to monitor and apply these consistently during text access, and (c) supporting them to know how to proceed or respond when these are violated. More generally, the execution stage outlines a variety of additional behavioral and cognitive strategies that students may need to be explicitly taught to facilitate multiple text use.

In the final, production stage of the IF-MT, we set out a taxonomy of the kinds of written and oral external products that students may generate as a consequence of text access. This taxonomy both introduces the variety of multiple text-based tasks that ought be assigned to learners and suggests criteria for their evaluation. Helping students to consider the selectivity of tasks and the extent to which they demand the personalization of text-based content may further serve as a valuable avenue for scaffolding students' self-evaluations of multiple text use (i.e., monitoring of cognitive product formation). More generally, considering students' degree of affective engagement and

skill and strategy development with regard to multiple text use appear key to facilitating learners' multiple text use.

This article begins with a recognition of the critical and expanding importance of multiple text use for today's students (Goldman & Scardamalia, 2013; List & Alexander, 2017a). Through its content, we sought to address this importance by not only providing a comprehensive framework to explain the processes and products associated with multiple text use but also recommending avenues whereby multiple text use may be cultivated. We trust that this framework will further empower researchers and practitioners to develop interventions that improve students' learning from multiple texts.

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