PART 1

INTRODUCTION

"It's only a rattle," Alice said, after a careful examination of the little white thing. "Not a rattle-snake, you know," she added hastily, thinking that he was frightened: "only an old rattle-quite old and broken."

Lewis Carroll, 1871, *Through the looking glass*, chapter 4.

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Dualities of Visual Literacy

The Double-Faced Janus Image

Janus, the Roman god of doors, gates, and beginnings, was commonly depicted with a double-faced head – one face looking back and the other looking ahead (see Figure 1.1 for analogous metaphor). The double-faced Janus metaphor has been used in many different contexts and for many purposes. Because people must emerge through a door or gate to enter a new place, Janus was believed to be the guardian of exits and entrances and new beginnings. Among other meanings, Janus represented the month of January, the transition between primitive life and civilization, and the growing up of young people (Janus, 2010, 2012). In this book, Janus's two faces may aptly signify some of the many dualities of "visual literacy" – meaning fluent competence in using, interpreting, and creating diverse visual representations (see Chapter 5 for an elaboration on this term).

The Duality of Teachers' Visual Literacy as Professionals and as Learners Themselves

The major duality that may be discussed in terms of visual literacy concerns its twofold function in the teaching profession, which underlies this entire book. Like Janus's two faces, I assert that teachers' visual literacy should be intended, on the one hand, to enhance teachers' awareness of visually driven learning materials and media, in order to teach the young generations who will become citizens of a world dominated by visual culture – that is, literacy in the role of *teachers*. On the other hand, teachers' visual literacy should also be intended for the teachers themselves, as human beings who will experience their own lifelong visual learning in the future – that is, literacy in the role of *learners*. By visual literacy for teachers, I therefore mean not only the learned ability to interpret visual messages, and even to create them, but also the ability to locate relevant visual materials and evaluate their suitability

FIGURE 1.1. The double-faced metaphor (courtesy of Gil Eilam, January 2012).

for communicating, learning, and teaching purposes. I conceive visual literacy as a prerequisite for granting meaning to the explosion of information that learners encounter, for presenting ideas effectively to others, as well as for participating actively in communication within learning situations. The implications of this teacher-learner role duality, which lie at the core of the current book's rationale, will be further elaborated later.

The Duality of the Signified and the Signifier

Another important well-studied duality of interest here pertains to the very essence of what a visual representation is, vis-à-vis what it represents. In other words, every visual representation (henceforth: VR) is merely a signifier, whereas its referent (what it stands for) is what is signified – and the two are never identical (Sherin, 2000). For example, a graph constitutes a drawing printed on a paper but also represents relations between selected variables (DeLoache, 2002).

The Duality of External and Internal Representations

Another relevant duality, which must be understood in order to accurately analyze and categorize VRs, is the dual and somewhat confusing usage of the term "visualization" to describe both external and internal representations

that utilize the visual sensory system (Gilbert, 2007a). At the focus of this book are external VRs – those physical representations available in the environment that are created and exist outside the individual's mind – on street signs, computer screens, brochures, blackboards, teacher handouts, and so forth. In contrast, internal VRs are mental representations in individuals' minds. External VRs may be shared among individuals for purposes of learning, discussion, development, and so forth because they make thoughts and abstract ideas visible (Gilbert, 2007b; Rapp & Kurby, 2008; Tufte, 2001; Uttal & O'Doherty, 2008).

Such external VRs must be distinguished from internal VRs, which are defined as mental representations created by individuals and held in their minds to store, retrieve, and manipulate as needed (Reiner, 2008). Some researchers have differentiated between various types of internal VRs, but all are considered to be internal products of (a) the processing of diverse perceived stimuli and (b) construction into mental or visual imagery, models, memory, or knowledge representations that are broader than the mere description of an object and that include knowledge about its function, classification, possible usages, and possible circumstances for its use (Kosslyn, 1994; Rapp, 2007; Rapp & Kurby, 2008; Reisberg, 1997).

The interface between external and internal VRs is generally depicted as follows: Usually, individuals encounter an external VR – an external phenomenon, reality, artifact, experiment, and so on – which they transform into an internal VR in their mind and store for future use or application (Reiner, 2008).

The Dual Skills for Analyzing Any VR

When first encountering any external VR in the environment, people are accustomed to merely "experiencing" it without giving deeper cognizant consideration of its features, signified referents, developers' intentions, possible hidden messages, or effectiveness in conveying the desired information. To efficaciously analyze any VR at a deeper level, learners need to practice a basic two-pronged skill of analyzing a VR. First, learners must describe the VR, examining and articulating its structural elements and content characteristics. Only then should learners progress to interpreting the VR beyond what is directly perceived – drawing conclusions based on the information it conveys.

Dualities Concerning Interpretations of VRs

Observers of representations like drawings, cartoons, photography, or advertisements utilize dual clues for interpretation: the representations' denotations

and/or their connotations. Such representations indeed have denotations – where an image's components and their relations to referents are mostly decoded precisely, unambiguously, and directly. Yet they also have connotations – the additional, mostly contextual, meanings assigned to the image, which are decoded in different ways in different contexts and cultures (Emmison & Smith, 2000; Hall, 1973). For more on this duality, see Chapter 9.

Janus's double-linked faces may also stand for the interpretational duality of cognitive versus affective facets of VRs. The emotional and cognitive eye of the beholder may affect perception of representations, thereby shaping the meaning that individuals attribute to represented messages and therefore their responses to those messages.

One last example of interpretational duality is the inherent tension between personal and shared constructions of VRs. Visual literacy includes individuals' unique personal perceptions of VRs as well as icons shared by members of an entire culture or time period, which construct a common understanding and arrive at intersubjectivity. All of the aforementioned phenomena of interpretational duality require curriculum developers' careful attention to the selection of VRs as well as teachers' careful awareness of their students' understanding as reflected in their interpretations.

The Duality of Sociocultural and Communicational Lenses on VRs

An additional duality concerns the two main perspectives used for relating to VRs. One approach is to perceive representations through a sociocultural lens, as an artifact reflecting the existing reality at a particular point in time in the specific sociocultural context in which the VRs were created, and thereby enabling others to know and learn about this context (Barthes, 1973; Halliday, 1978; Kress & Van Leeuwen, 2006). Another approach emphasizes the conscious communicational motives underlying VRs – their use as a tool for representing information more efficiently, and particularly their use as a learning and instruction tool – thereby promoting others' perception and understanding of the information and learners' understanding of phenomena (Mayer, 2005a).

Summing Up These Dualities

In line with the Janus metaphor of doors and gates looking in both directions simultaneously, I uphold that for each of the dualities in visual literacy, both directions/sides/approaches are present. That is, VRs are generally both

a cultural artifact and a learning aid, have both a cognitive facet and an affective one, function both for learners and for teachers, and so forth.

For the last several decades, various features of these dualities of VRs have been studied from diverse perspectives and treated in depth in different knowledge domains. For example, the current scientific literature boasts a wealth of research on the cognitive characteristics of these representations, specifically the processes involved in perception, interpretation, and learning with VRs, especially in multimedia and the natural science domains. Mostly, these studies examined the VRs' impact on viewers' knowledge acquisition, comprehension, and transfer. Much of this research pinpointed the complexity and challenges inherent in creating and interpreting VRs accurately.

Implications of the Duality of Teachers as Learners and as Teachers

Although some dualities and aspects have been better recognized and investigated than others, one particular area has clearly been neglected: the explicit dual means for preparing teachers to interpret displays of VRs in instructional materials as learners, and to use VRs effectively as teachers. Research has not yet sufficiently investigated how teachers learn and teach with multimedia, what in the current visual world is necessary to achieve comprehension and communication, or how to smoothly integrate these cognitive and metacognitive skills into teacher education curricula. Inasmuch as VRs constitute core components of present-day instructional materials and teaching-learning processes, I hope in this book to narrow this gap by specifically addressing the development of visual literacy in the teaching profession, in its dual functions.

I believe that for learners to attain the competencies of visually literate persons in the twenty-first century, teachers must develop visual literacy themselves, as learners and consumers, and also must concurrently undergo explicit training to enhance such competencies among their students. It cannot be taken for granted that teachers will spontaneously acquire the necessary abilities, knowledge, and understanding of visual literacy independently, nor can they be expected to possess intuitive knowledge of ways to effectively develop their students' visual literacy and related attitudes.

Yet, unfortunately, teachers today are not necessarily or intentionally exposed to the vast body of publications that may potentially be of assistance in improving their dual visual literacy. Investigating many domains related to VRs as described previously, these numerous publications have reported general findings about various VRs' shortcomings and advantages, about

what might cause learners' cognitive overload, about the difficulties involved in learning from multimedia, and many other empirical outcomes (e.g., Freedman, 2003; Gilbert, 2007b; Gilbert, Reiner, & Nakhleh, 2008; Kosslyn, 2006; Kress & Van Leeuwen, 2006; Mayer, 2001, 2005a; Phillips, Norris, & Macnab, 2010; Reed, 2010). However, the question remains: How can these eye-opening materials reach teachers, be translated into pedagogies, and promote teachers' dual abilities as teachers and as learners? Furthermore, how can organized systematic learning of this declarative and procedural knowledge about visual literacy be implemented into the already overloaded preservice and in-service teacher education programs? This is what the current book is all about – integrating available knowledge on dual visual literacy and making it accessible to researchers, teacher educators, and teachers. The book aims to present: (a) reported findings that may guide teachers in how to select and apply VRs in their classrooms and may guide curriculum developers in how to design textbooks; (b) theories that can promote teachers' and teacher educators' ability to construct their own VRs for teaching, in ways that are more beneficial for students; and (c) guidelines to help teachers and other individuals in the educational system apply this knowledge while constructing new knowledge in the course of their learning and everyday lives.

The design and selection of VRs during teaching and curriculum planning requires mindful decision-making processes. Such abilities are not acquired spontaneously but rather require explicit intentional learning and practice in a broad range of variations and situations. In the role of consumer and learner, student teachers frequently encounter VRs while studying a particular subject-matter domain and its pedagogies (e.g., maps in geography) or while consuming different mass media. However, representations in such settings are regarded as "given," without any consideration of relevant questions for planning the use of VRs. I uphold that preservice as well as in-service teachers must be encouraged and stimulated to raise questions concerning VRs, such as:

- Why is this specific information being presented using this particular VR rather than other VR types?
- What information is lost because of the choice to present it using this particular representation type?
- What other kinds of representations could be used to present this specific information and how would it change the message?
- What is the potential of such a representation for students' learning?
- What are the possible misinterpretations of a particular VR that may create difficulties or impede learners' understanding?

- Does a specific VR contain manipulations of which one should be aware?
- When and how should VRs be adapted to particular learning-teaching circumstances?
- When and how should new VRs be generated for promoting understanding among particular students?
- What cognitive, affective, and sociocultural considerations apply to VRs appearing in diverse learning materials?

Without practice in posing and answering such questions as both learners and instructors, teachers may experience difficulties in identifying VRs' benefits and problems, choosing the most effective representation for particular teaching-learning situations, and preventing the development of fallacies in their students' understanding or interpretations. For example, the dynamic, multicultural nature of student populations in Western societies, which are becoming increasingly heterogeneous as a result of global demographic changes, calls for culturally sensitive VRs in the learning experiences of students from diverse backgrounds (Eilam & Ben-Peretz, 2010).

Summary and Food for Thought

The concurrent interdependent tasks facing preservice teachers, of acquiring and developing their own visual literacy as well as their ability to teach visual literacy to others, call for teacher education programs' dual but distinct consideration of both these tasks. Like Janus was believed to open doors to a new beginning, I contend that granting cognizant visual literacy through comprehensive teacher preparation programs will afford teachers new understandings and open doors to empower them to become fully participating members of the present and future visual worlds. In view of the accumulated critical mass of knowledge concerning VRs and their growing status in instructional materials, I believe that a relevant visual literacy curriculum should be mindfully incorporated into teacher education programs at this time, integrating theories with practical experiences. As will be seen in the guidelines and recommendations throughout this book, teacher preparation programs would therefore do well to focus explicitly on what kinds of materials should be supplied and taught to enhance dual visual literacy, what pedagogies should be implemented to train teachers, and how to promote teachers' development of their own pedagogies for teaching visual literacy to their students. Simultaneously, research that examines issues related to visual literacy for teachers and teaching must be expanded.