

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/274370145>

# Infographics: A new competency area for teacher candidates

Article · March 2015

---

CITATION

1

READS

1,182

2 authors, including:



ulaş Ilic

Pamukkale University

29 PUBLICATIONS 12 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Computational Thinking [View project](#)



LeaPInqS: Learning to Plan Inquiry-based Science [View project](#)



# Cypriot Journal of Educational Sciences



Volume 10, Issue 1, (2015) 32-39

[www.awer-center/cjes](http://www.awer-center/cjes)

## Infographics: A new competency area for teacher candidates

**Hakan Islamoglu \***, Computer Education and Instructional Technology Department, Faculty of Education, Recep Tayyip Erdogan University, Cayeli, Rize, Turkey.

**Osman Ay**, Computer Education and Instructional Technology Department, Faculty of Education, Anadolu University, Eskisehir, Turkey.

**Ulas Ilic**, Computer Education and Instructional Technology Department, Faculty of Education, Anadolu University, Eskisehir, Turkey.

**Baris Mercimek**, Computer Education and Instructional Technology Department, Faculty of Education, Anadolu University, Eskisehir, Turkey.

**Pelin Donmez**, Computer Education and Instructional Technology Department, Faculty of Education, Anadolu University, Eskisehir, Turkey.

**Abdullah Kuzu**, Computer Education and Instructional Technology Department, Faculty of Education, Anadolu University, Eskisehir, Turkey.

**Ferhan Odabasi**, Computer Education and Instructional Technology Department, Faculty of Education, Anadolu University, Eskisehir, Turkey.

### Suggested Citation:

Islamoglu, H., Ay, O., Ilic, U., Mercimek, B., Donmez, P., Kuzu, A. & Odabasi, F. (2015). Infographics: A new competency area for teacher candidates. *Cypriot Journal of Educational Sciences*, 10(1), 32-39.

Received September 07, 2014; revised November 03, 2014; accepted February 08, 2015.

Selection and peer review under responsibility of Prof. Dr. Huseyin Uzunboylu & Assist. Prof. Dr. Cigdem Hursen, Near East University.

© 2015 SPROC LTD. Academic World Education & Research Center. All rights reserved.

### Abstract

Changes in technology have a growing influence on daily-life activities and the information-processing habits of individuals. As information and communication devices evolve to deliver richer content rapidly, regardless of time and place, new media presentation formats emerge. Infographics provide an example of such formats, and they have increased in popularity due mostly to their visual appeal and capacity to effectively present information. Infographics are also promising cognitive tools; however, their applications in educational practice are limited at best. Therefore, the aim of this study is to raise awareness about the opportunities that infographics provide for education and suggest ways to integrate infographics knowledge and skill development in teacher education. In line with that, first, a brief introduction to visual literacy is made. Then, infographics and their capacities for teaching and learning activities are discussed. Finally, as alternative ways for teacher education institutions and schools to offer infographics, training opportunities were proposed.

Keywords: infographics, teacher education, visual literacy, teacher candidates

\*ADDRESS FOR CORRESPONDENCE: **Hakan Islamoglu**, Computer Education and Instructional Technology Department, Faculty of Education, Recep Tayyip Erdogan University, 53200, Cayeli, Rize, Turkey.

E-mail address: [hakan.islamoglu@erdogan.edu.tr](mailto:hakan.islamoglu@erdogan.edu.tr)

## 1. Introduction

As media and information technologies become a regular part of daily life, they change how people access and use information. Libraries are no longer the first places to start an inquiry. In the fast-paced and constantly changing world we live in, search engines and web pages address most people's need for up-to-date information. Furthermore, recent advancements in mobile communication technologies have allowed people to seek information whenever they want and wherever they go. These significant shifts in the ways to access information have also affected the preferred information presentation formats, with 21st century citizens, often called digital citizens, favoring visually appealing information resources with concise textual content (Ghode, 2012). Such changes in format preference have natural implications for teaching and learning activities. As teachers need to design learning environments that enrich the learners' experience (International Society for Technology in Education, 2008), they should be able to choose, develop, and integrate visually rich learning materials in their teaching. Thus, visual literacy skills are becoming an increasingly important piece in the toolbox of any digital-age teacher. The aim of this study is to raise awareness about the opportunities that infographics provide for education and suggest ways to integrate infographics knowledge and skill development in teacher education. In the following sections, the importance of visual literacy for 21st century citizens, and the defining features and educational affordances of infographics will be explained. Then, suggestions for teacher training institutions and directions for future research will be discussed.

## 2. Visual Literacy Skills for 21st Century Citizens

Visuals have been an important means for humans to express themselves since the early ages. Changes in society and emerging communication tools have resulted in a widespread use of visuals in virtually every area of human activity. Despite the ever-growing exposure to visual stimuli, new generation of learners do not always have sufficient visual literacy skills to engage with visuals effectively (Hattwig, Bussert, Medaille & Burgess, 2013). As a consequence, learners cannot benefit from visuals in either academic or daily life. Visually literate learners have an advantage in reading and understanding the visuals, processing knowledge visually, and thinking in a visual way (Hortin, 1980). Therefore, providing learners with visual literacy training is of importance, especially for message designers such as teachers.

Multiple definitions of visual literacy exist in the literature. These definitions stem from different disciplines that have contributed to the foundation of the visual literacy concept (Avgerinou, 2012). Hortin (1980) defined visual literacy as the ability to understand and use images and to think and learn in terms of images. Another definition came from Case-Gant (1973), who described visual literacy as a group of skills that enable an individual to read, interpret, and compose visual messages in personal communications. Yenawine (1997) made a brief definition by stating visual literacy is the ability to find meaning in imagery. Johnson (2006) expressed visual literacy as an ability to see and understand the messages conveyed through images. He further extended the definition of visual literacy as having the ability to utilize, modify, and generate visual cues and images. In yet another definition, Metros (2008) referred to visual literacy as the ability to make meaning from visual messages and also to be able to encode and compose meaningful visual communications. Even though scholars define visual literacy from different perspectives, there exist similarities in these definitions including thinking and learning with images, making meaning from visual messages and using images in communications. These commonalities can be considered as core visual literacy skills that both learners and teachers should have.

Pre-service teachers, as emerging professionals, have an important role concerning visual literacy in education. They are responsible for achieving competency in visual literacy, enriching their lessons with visuals, and promoting learners' visual literacy skill development. To do this, teachers should follow developments in the use of visuals in education, and make themselves aware of emerging visualization methods and tools. Infographics are notable examples of such recent tools to represent information visually.

### 3. Infographics

Data visualization and information visualization are two well-known and broadly used terms that refer to generating visual representations of information, ideas, and complex concepts. On the other hand, the term infographic (coinage for information graphic) denotes a relatively new form of data visualization that has become very popular due to its effectiveness in conveying information both in print and digital settings. Smiciklas (2012) defined an infographic as a type of picture that blends data with design, through which individuals and organizations concisely communicate messages to their audience. Newsom and Haynes (2004) gave a similar definition for infographics, emphasizing the functions and areas of use of infographics: "Infographics are graphic visual representations of information, data and knowledge. These graphics present complex information quickly and clearly, such as in signs, maps, journalism, technical writing, and education" (p.236). The main ingredients of an infographic are words, graphics, and design elements. An infographic is a composition of textual information varying in length, pictures at different levels of detail ranging from abstract to naturalistic, and graphical means such as arrows, movement lines, zoom boxes, and highlighting devices (Holsanova, Holmberg & Holmqvist, 2009).

Since the main intent of using infographics is to convey an idea as a single structure with the minimum number of words and graphics, Golombisky and Hagen (2010) used the phrases "maximum information" and "minimum space" to describe infographics. This description can be extended with the "minimum time" phrase because people read and interpret infographics faster than separate text and graphics. Wisniewski and Fichter (2007) specified that the functions of infographics are to instruct, inform, illuminate, and communicate complex concepts. They also implied the minimum time aspect of infographics by saying that infographics are fast and easy to understand. Ghode (2012) considered the minimum time property as a necessity because new media users want to consume much more information within a very short time.

The terms data visualization and infographics are used interchangeably in many sources because of their similarities in purpose. However, infographics have some distinct features that extend beyond the classical notion of data visualization. Data visualization is a visual representation of raw data, such as statistics (Uyan, 2014), whereas infographics demonstrate a certain subject using a variety of graphical elements and text simultaneously in a story-like presentation. Infographics follow the introduction, key message, and conclusion parts of a story format (Krum, 2013), while data visualization only gives a snapshot of a moment in a story. An infographic tells a complete story conveying a message with words, graphics and design elements, whereas data visualization is a technique to transform statistical data into a visual form. In other words, an infographic is a more complete product telling a story while data visualization is one of the methods employed to produce infographics (Krum, 2013).

Holsanova, Holmberg and Holmqvist (2009) stated that the general purpose of using information graphics is to illustrate and clarify difficult issues, so that the readers can more easily conceptualize and understand complex structural aspects, stages of a process, and causes and effects of an action. Lamb and Johnson (2014) refined this general purpose into five special purposes: (a) organizing ideas in a useful way; (b) showing complex relationships in a visual way; (c) comparing information in an effective way; (d) making data meaningful with analogies, examples, and themes to transform data into information; and (e) telling a story to convey the ideas with visuals and words in an exciting way rather than using only words. Krum (2013) considered the objectives of infographics to be similar to the objectives of public speaking and divided them into three categories: to inform, entertain, or persuade the audience. Like public speeches, infographics start with introductions to get the readers' attention, so the readers know why they should take the time to study the infographics. They end with conclusions and call for action, so the readers have some indication of what they should do with the information they have just learned. According to Lankow, Ritchie and Crooks (2012), appeal, comprehension, and retention are the three main objectives of infographics, and the relative weight of these objectives varies depending on the purpose of an infographic (academic/scientific, marketing, editorial).

At this point, a critical question comes to mind: Can all kinds of topic be represented with infographics? The answer to this question is about the nature of infographics and principles of good infographic design. All infographic definitions in the literature imply that an infographic should visualize an idea, a story or a process and explain complex information clearly with an eye-catching design. Thus, any topic that is to be represented as infographic should be suitable to be presented visually (Lamb & Johnson, 2014) and tell a story and/or give a message.

Infographics present the same information that can be traditionally presented with words alone or both words and images. If infographics and conventional materials deliver the same content, what are the advantages of utilizing infographics instead? According to Krauss (2012), representing data and ideas visually engages more parts of the brain; therefore infographics allow individuals to see a problem from multiple perspectives. Smiciklas (2012) searched for the answer to this question in the time required to process images and text. Smiciklas argued that infographics allow learners to process text and pictures at once rather than in isolation. Ghode (2012) pointed out that the inherent features of infographics attract the curiosity of learners and motivate them to study further. Holmqvist and Wartenberg (2005) examined the role of local design factors in newspaper-reading behavior using an eye-tracking technique and found that information graphics increased the overall time spent on reading a newspaper more than any other type of visual. Since infographics may attract the curiosity of learners at first and keep them reading the text longer than any other type of visualization, they promote the understanding of the content and message.

Well-designed infographics do not restate information that is depicted in the pictorial component by providing only complementary verbal information in close proximity. This approach eliminates visual search, facilitates the integration of verbal and visual information, and, as a result, reduces unnecessary loads being placed on limited working memory resources (Mayer, 2009). Thus, well-designed infographics support a learner's big-picture thinking and holistic understanding of the content.

### *3.1. Infographics as a learning tool*

Infographics are promising learning tools that can be adapted to any learning setting to enhance students' learning experience. Some of the learning benefits associated with infographics include: (a) improved comprehension of information, ideas and concepts; (b) enhanced ability to think critically and develop organized ideas; and (c) improved retention and recall of information (The Institute for the Advancement of Research in Education at AEL, 2003).

Infographics are often used to present content in a compact form. In addition, the efficient presentation style enables teachers to prepare various learning activities including warm-up sessions and unit summaries to engage students more deeply with the subject and increase chances for interaction (Vanichvasin, 2013). Furthermore, asking students to create infographics in assignments is likely to improve students' visual communication skills including thinking, learning, and expressing themselves visually, and more general learning skills such as information organization and collaboration. Student-generated infographics can be seen as reflections of students' knowledge and ideas through the means of design and technology. Hence, infographics can be utilized as an alternative assessment tool, enabling the students to demonstrate their higher-level achievements (Schrock, 2014). Supporting children's social and moral development is another potential area of use for infographics in education. Since infographics simultaneously address visual and verbal learning styles, they offer alternative methods in character education to internalize moral values and provide new opportunities to reveal students' moods and attitudes.

The effectiveness of infographics as a visual learning tool can be explained with the help of Mayer's (2009) cognitive theory of multimedia learning (CTML) and spatial contiguity principle. CTML has been developed as a result of studies on how people learn and how meaningful learning occurs. According to CTML, visual and verbal stimuli are received through two qualitatively different channels that have limited processing capacity, and meaningful learning

occurs only when the appropriate cognitive processes to select, organize, and integrate information are performed. The spatial contiguity principle recommends instructional designers present corresponding words and pictures in close proximity to help learners build better semantic connections. It simply proposes that designers should “align words to corresponding graphics” (Clark & Mayer, 2011). Thus, in order for an infographic to be effective, it should be in accord with CTML and its spatial contiguity principle.

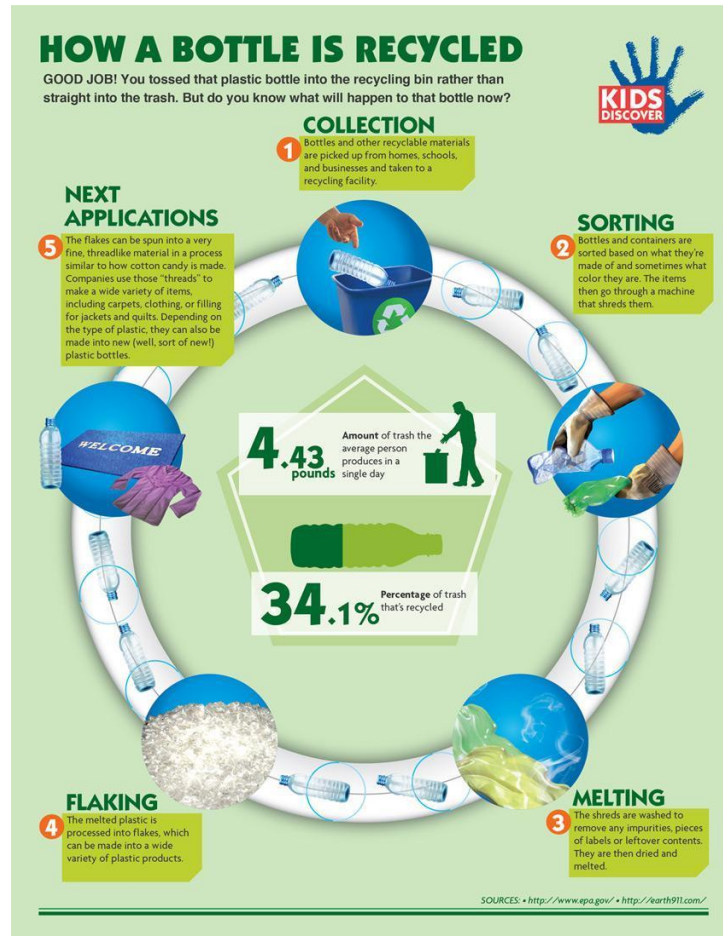


Figure 1. Sample educational infographic: How a bottle is recycled.  
Retrieved from: <http://www.kidsdiscover.com/infographics/reduce-waste/>

An educational infographic depicting the recycling process of a bottle is provided in Figure 1. In the figure, the entire process was represented using a circular pattern. As Holsanova, Holmberg, and Holmqvist (2009) mentioned in their definition, both textual information (paragraphs) and graphical means (circles) are used. Each phase of recycling is represented by an illustration accompanying a brief paragraph explaining the phase. In the middle section, there are two key messages with a short text and a relevant picture emphasizing the importance of recycling. A story is also being told, the recycling of a bottle, through which infographics go beyond traditional data visualization (Uyan, 2014; Krum, 2013). By embedding relevant infographics into their lessons, teachers can activate students' visual and verbal processing channels and help them integrate verbal and visual mental models to foster meaningful learning.

### 3.2. Infographics for teacher education

The compact, informative, and versatile nature of infographics offers a lot of usability options for educational practice. However, none of these options are likely to be realized if teachers do not have enough knowledge and skills to use them effectively. Therefore, 21st century teacher education should include infographics training to a large extent. Infographics skills can be taught in multiple ways. In this section, we will provide a couple of suggestions for teacher education institutions. First of all, most teacher education programs offer at least a course in computer literacy or visual literacy or both. Therefore, institutions may choose to extend content coverage of such courses with infographics for the sake of feasibility rather than creating a brand-new course for infographics. Nonetheless, in doing so, emphasis should be placed on covering infographics in sufficient detail. In Turkey, for example, the Council of Higher Education determines framework programs for teacher education institutions. According to the latest programs (Council of Higher Education, 2007), all pre-service teachers have to take successive Computer I and Computer II courses, which aim to help teacher candidates obtain computer and information literacy skills. Even though another course titled Instructional Material Design (IMD) is available, the content of the course is not broad enough to include infographics. Moreover, IMD is not a mandatory course for some teacher education programs such as Music Education. In Turkey's case, it would be a better approach to update the IMD content with an emphasis on infographics and mandate it to all teacher education programs. By emphasis, it is meant that infographics are not only presented as a single topic in a unit but they are also integrated with assignments and projects in the following units. Better yet, the use of infographics in assessments can also be extended to other courses to promote deeper transfer of skills. Pre-service science teachers, for instance, may be required to embody infographics in their microteaching activities. Another course-based approach would be to design a separate course specifically on infographics and allow all teacher candidates to take it after fulfilling prerequisites such as IMD. In this way, both future and senior candidates can benefit from advancements in the program of study, regardless of their term of college entrance. Finally, teacher education institutions may collaborate with local schools to provide workshops and other training opportunities for in-service teachers so that a broader application of infographics can be attained.

## 4. Discussion

Research to date has focused mostly on the interpretation aspect of infographics in an educational context. However, teachers should also be able to represent information using infographics. In other words, teachers need not only to decode infographics but also to encode information by means of infographics. In the future, representing concept maps as infographics can be studied. Learners can be provided with isolated concepts, for example, and then asked to create an organized body of information depicted through infographics. During such a process, students would have an active learning experience, in which they need to synthesize their prior knowledge with the content, make adjustments to their mental schemas, and create new associations among the given concepts.

Despite the growing number of scholarly studies, the instructional capacity of infographics has been poorly investigated. Consequently, literature lacks sound theoretical frameworks and practical evidence for the instructional affordances of infographics. Future studies should establish themselves within not only cognitive theories but also the affective theories of learning in order to accommodate representational and affectional characteristics of infographics. This study also revealed a need for an effective classification for infographics within an educational context. Even though a number of studies have proposed different classifications, these were mainly based on the design elements or the nature of presented information. However, an educationally effective classification should mainly focus on the cognitive skills and processes (e.g. taxonomies and comparisons) rather than the individual design elements.

Future research should also thoroughly investigate infographics' pedagogical affordances within hands-on settings. Although infographics are promoted for their presentational capacities, engaging students with hands-on activities is yet another option. Creating an infographic is an engaging but also a cognitively challenging task for students, which requires them to represent the maximum amount of information within time and space constraints. These endeavors allow students to develop new literacies, realize their potential, and nurture their interests within several fields. Research focusing on design, development and evaluation of such endeavors is critical to realizing the educational potential of infographics.

In conclusion, this paper was an attempt to explain what infographics have to offer for education. Specifically, some practical ways to use infographics during instruction and course-based training solutions for teacher education were considered. Finally, suggestions for future research activities to examine and increase the effectiveness of infographics in an educational context were given. We hope that this study will benefit practitioners, researchers, and policy makers alike in developing better learning environments for the learners of the digital age.

## References

- Avgerinou, M., D. (2012). *What is "Visual Literacy?"*. Retrieved November 16, 2014, from: <http://www.ivla.org/drupal2/content/what-visual-literacy-0>
- Case-Gant, A. (1973). *Visual literacy: An exciting environmental adventure*. Richmond, VA: Richmond Public Schools. Retrieved from ERIC database (ED071448).
- Clark, R., C., & Mayer, R., E. (2011). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning* (3rd ed.). San Francisco, CA: Pfeiffer.
- Council of Higher Education (2007, June). Egitim fakultesi ogretmen yetistirme lisans programlari. Ankara, TURKEY: Council of Higher Education. Retrieved November 20, 2014 from: <http://acikarsiv.yok.gov.tr/handle/YOK/81?show=full>
- Ghode, R. (2012). Infographics in news presentation: A study of its effective use in Times of India and Indian Express the two leading newspapers in India. *Journal of Business Management & Social Sciences Research*, 1(1), 35–43. Retrieved November 5, 2014, from <http://borjournals.com/a/index.php/jbmssr/article/view/122>
- Golombisky, K., & Hagen, R. (2010). *White space is not your enemy: A beginner's guide to communicating visually through graphic, web & multimedia design*. Burlington, MA: Focal Press.
- Hattwig, D., Bussert, K., Medaille, A., & Burgess, J. (2013). Visual literacy standards in higher education: New opportunities for libraries and student learning. *Portal: Libraries and the Academy*, 13(1), 61–89.
- Holmqvist, K., & Wartenberg, C. (2005). *The role of local design factors for newspaper reading behaviour: An eye-tracking perspective*. *Lund University Cognitive Studies* 127. Retrieved October 26, 2014 from: <http://www.lucs.lu.se/LUCS/127/LUCS.127.pdf>
- Holsanova, J., Holmberg, N., & Holmqvist, K. (2009). Reading information graphics: The role of spatial contiguity and dual attentional guidance. *Applied Cognitive Psychology*, 23(9), 1215–1226.
- Hortin, J., A. (1980). Visual literacy and visual thinking. Retrieved from ERIC database (ED214522).
- International Society for Technology in Education (2008). *ISTE standards for teachers*. Retrieved November 24, 2014, from: [http://www.iste.org/docs/pdfs/20-14\\_ISTE\\_Standards-T\\_PDF.pdf](http://www.iste.org/docs/pdfs/20-14_ISTE_Standards-T_PDF.pdf)
- Johnson, L. (2006). The sea change before us. *EDUCAUSE Review*, 41(2), 72–73.
- Krauss, J. (2012). Infographics: More than words can say. *Learning & Leading with Technology*, (February), 10–14.
- Krum, R. (2013). *Cool infographics: Effective communication with data visualization and design*. Indianapolis, IN: John Wiley & Sons, Inc.
- Lamb, A., & Johnson, L. (2014). Infographics part 1: Invitations to inquiry. *Teacher Librarian*, 41(4), 54–58.
- Lankow, J., Ritchie, J., & Crooks, R. (2012). *Infographics: The power of visual storytelling*. Hoboken, NJ: John Wiley & Sons, Inc.
- Mayer, R., E. (2009). *Multimedia learning* (2nd ed.). New York, NY: Cambridge University Press.



Islamoglu, H., Ay, O., Ilic, U., Mercimek, B., Donmez, P., Kuzu, A. & Odabasi, F. (2015). Infographics: A new competency area for teacher candidates. *Cypriot Journal of Educational Sciences*, 10(1), 32-39.

Metros, S., E. (2008). The educator's role in preparing visually literate learners. *Theory Into Practice*, 47(2), 102–109.

Newsom, D., & Haynes, J. (2004). *Public relations writing: Form & style* (7th ed.). Belmont, CA: Wadsworth Publishing.

Schrock, K. (2014). Infographics as a creative assessment. Retrieved December 21, 2014 from: <http://www.schrockguide.net/infographics-as-an-assessment.html>

Smiciklas, M. (2012). *The power of infographics: Using pictures to communicate and connect with your audiences*. Indianapolis, IN: Pearson Education, Inc.

The Institute for the Advancement of Research in Education (IARE) at AEL (2003). *Graphic organizers : A review of scientifically based research*. Retrieved October 25, 2014 from: <http://www.inspiration.com/sites/default/files/documents/Detailed-Summary.pdf>

Uyan, D., B., I. (2014). Data visualization and infographics in visual communication design education at the age of information. *Journal of Arts and Humanities*, 3(5), 39–50. Retrieved October 25, 2014 from: <http://www.theartsjournal.org/index.php/site/article/view/460>

Vanichvasin, P. (2013). Enhancing the quality of learning through the use of infographics as visual communication tool and learning tool. In *Proceedings ICQA 2013 International Conference on QA Culture: Cooperation or Competition* (pp. 135–142). The Office for National Education Standards and Quality Assessment. Retrieved November 6, 2014 from: [http://www.icqa2014.com/downloads/Proceeding\\_29.pdf](http://www.icqa2014.com/downloads/Proceeding_29.pdf)

Wisniewski, J., & Fichter, D. (2007). Saying it visually. *Online*, 31(6), 57–60.

Yenawine, P. (1997). Thoughts on visual literacy. In J. Flood, S., B. Heath, & D. Lapp (Eds.), *Handbook of Research on Teaching Literacy through the Communicative and Visual Arts*. New York, NY: MacMillan Library Reference.