Application of the principles of design in the new media environments for learners of English as a second or foreign language

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Abstract

This paper investigates the application of design principles from the fields of graphic and industrial design for the development of language learning materials for learners of English as a second or foreign language. Since the issues regarding an object's characteristics in terms of its function, appeal, and the message conveyed through the object's design are addressed adequately in graphic and industrial design, discussion of the principles in these fields potentially provides useful implications for the investigation of language learning tools, especially in the age of new technologies. In fact, scholars in the field of language and literacy (e.g., Kress, 2003; the New London Group, 2000; Shetzer & Warschauer, 2000) have already adopted some concepts related to the realms of design

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to the discussion of new literacy since the value of the visual is growing with the digital age. In this paper, these relevant concepts are explored more from the interdisciplinary viewpoint. The design principles, namely the theory of affordances, aesthetic principles, and the principles in combining design elements are discussed in relation to concepts in second language acquisition and new literacy. The purpose is to gain a more profound understanding of the nature of language learning materials and provide important considerations for designing, selecting, or using these tools to facilitate English language development.

Keywords: English as a second or foreign language, educational media, materials development, materials design, new literacy

บทความนี้ศึกษาการประยุกต์หลักการออกแบบจากสาขาวิชาการออกแบบเรขศิลป์และการออกแบบผลิตภัณฑ์อุตสาหกรรมเพื่อพัฒนาสื่อการเรียนรู้ภาษาสำหรับผู้เรียนภาษาอังกฤษเป็นภาษาที่สองหรือเป็นภาษาต่างประเทศ เนื่องจากประเด็นเกี่ยวกับลักษณะของวัตถุหนึ่งๆ ในด้านการใช้งาน การดึงดูดผู้ใช้ และข้อมูลที่สื่อสารผ่านการออกแบบของวัตถุได้มีการกล่าวถึงอย่างเพียงพอในสาขาวิชาการออกแบบดังกล่าว การอภิปรายเกี่ยวกับหลักการในสาขาเหล่านี้จึงน่าจะมีนัยที่เป็นประโยชน์ในการศึกษาเครื่องมือการเรียนรู้ภาษา โดยเฉพาะในยุคของเทคโนโลยีสมัยใหม่ อันที่จริง ผู้เชี่ยวชาญในด้านภาษาและการอ่านออกเขียนได้ (เช่น Kress, 2003; the New London Group, 2000; Shetzer & Warschauer, 2000) ได้นำหลักการบางอย่างที่เกี่ยวข้องกับการออกแบบมาอภิปรายในเรื่องความสามารถในการเข้าใจและสื่อความหมายในยุคใหม่บ้างแล้วเนื่องจากเรื่องของสื่อทัศน์มีความสำคัญมากขึ้นในยุคดิจิตัล แต่บทความนี้จะศึกษาหลักการที่เกี่ยวข้องจากมุมมองที่เป็น

สหสาขามากยิ่งขึ้น จะเป็นการอภิปรายหลักการจากสาขาการออกแบบ ซึ่งได้แก่ ทฤษฎีตัวบ่งบอกการใช้งาน หลักการทางสุนทรียศาสตร์ และหลักการในการรวมองค์ประกอบในการออกแบบ โดยเชื่อมโยงกับแนวความคิดในการรับรู้ภาษาที่สองและความสามารถในการเข้าใจและสื่อความหมายในยุคใหม่ จุดประสงค์คือเพื่อให้เข้าใจธรรมชาติของสื่อการเรียนรู้และเรื่องสำคัญที่จะต้องพิจารณาเมื่อออกแบบ เลือก หรือใช้เครื่องมือดังกล่าวเพื่อส่งเสริมการพัฒนาภาษาอังกฤษ

คำสำคัญ: ภาษาอังกฤษเป็นภาษาที่สองหรือเป็นภาษาต่างประเทศ สื่อการศึกษา การพัฒนาสื่อการเรียนรู้ การออกแบบสื่อการเรียนรู้ ความสามารถในการเข้าใจและสื่อความหมายในยุคใหม่

Application of the principles of design in the new media environments for learners of English as a second or foreign language

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In the age of new communications and technologies, we are surrounded by various representational modes (e.g., text, image, sound effects, music, video, animation) in a wide range of media (e.g., books, DVDs, audio CDs, CD-ROMs, the Internet). It is what Kress (2003, p. 168) calls "the environments of multimodal representation in multimediated communication". In this context, language teachers and learners are provided with more resources for teaching and learning that seem appealing and motivating to them. In particular, there seem to be new ways to support and engage learners who are struggling in their process of learning a language that is not their mother tongue. Though many educators are excited about the possibilities new technologies can bring, cautions have been raised against the unsound use of such tools. For example, McKenzie (2001, para. 1) warns teachers against "a fondness for tools that transcends purpose and utility" whether it is due to teachers' personal preference or because of the current trend. As new technologies offer a wide range of resources, it is important that we understand the characteristics of different learning tools and know how to select and use them to suit our purposes. Since the issues regarding an object's characteristics in terms of its function, appeal, and the message conveyed through the object's

design are addressed adequately in the realms of graphic[2] and industrial[3] design, the discussion of some principles in these areas of study might have useful implications for creating, selecting, and using learning tools in the context of language teaching and learning. It can be useful to look at a tool's "design" –the way that something has been planned and made, including how it works and its appearance (Summers, 2003). According to George Nelson, a designer and architect who was one of the founders of American modernism (1975, as cited in Thiel, 1981), a design may be beautiful but it has to do something. So, when we talk about the design of a tool, aesthetics is one of the factors taken into consideration, but we cannot ignore the tool's functions. Also, especially when it is a learning tool, it usually disseminates learning content to users, so, in a learning environment, we should also look at the ability of a particular tool in communicating content to learners. Therefore, in this paper, some of the design principles that are related to function, aesthetics, and the meaning communicated will be discussed to seek useful implications for the context of language teaching and learning, especially for teachers and learners of

[2] Graphic design is "the art of arranging pictographic and typographic elements to create effective communication" (Evans & Thomas, 2004, p. 4)

[3] Industrial design is "the professional service of creating and developing concepts and specifications that optimize the function, value, and appearance of products and systems for the mutual benefit of both user and manufacturer" (Industrial Designers Society of America, as cited in Borja de Mozota, 2003, p. 3)

English as a second or foreign language[4], who are seeking ways to enhance their teaching and learning practices in today's world where English is used as an international language.

In fact, scholars in the field of language and literacy have already adopted some concepts related to the realms of design to the discussion of new literacy. For example, Kress (2003), in his article "Design and Transformation: New theories of meaning", discusses the necessity of a theory which deals adequately with the processes of integration and composition of the various modes in multimodal texts. He states that a new goal in literacy practice is related to the concept of *Design* as it takes for granted full competence in the use of resources which includes a full understanding of the affordances–the communicational potentials of these resources. Besides Kress, the New London Group (2000) also discusses the concept of *Design* under the Multiliteracies framework. The concept of *Design* as used in the Multiliteracies framework refers to the idea that we are both inheritors of patterns and conventions of meaning while at the same time active designers of meaning. In this framework, there are six design elements in the meaning-making process: linguistic, visual, audio, gestural, spatial, and the multimodal patterns of meaning that relate the first five modes of meaning to each

[4] Learners of English as a second or foreign language do not learn English as their mother tongue. Learners of English as a second language refers to those who learn English in a context where English is used as the dominant language such as the United States and the United Kingdom, while learners of English as a foreign language refers to those who learn English in places where English is not used predominantly such as China and Thailand. .

other. Along the same lines, Shetzer & Warschauer (2000) talk about new literacy and how it involves the creative use of text together with graphics, audio, and video. Warschauer (2011) also uses the term "affordances", which is also used in the field of industrial design, in the context of online learning, to refer to what online learning can offer learners, such as opportunities to carry out an interactive task, receive rapid feedback, learn from customized instruction, and be in contact with a wide range of people and resources.

In this paper, the concepts mentioned are explored from an interdisciplinary viewpoint. The concepts are examined to see how they are used in the fields of graphic and industrial design and the implications they have for language learning. The design principles, namely the theory of affordances, aesthetic principles, and the principles in combining design elements for effective communication are discussed in relation to concepts in second language acquisition and new literacy to gain a more profound understanding of the nature of language-learning materials and provide important considerations for designing, selecting, or using these tools to facilitate English language development.

The theory of affordances

The term *affordances* is used in graphic and industrial design as well as human-computer interaction, psychology, and literacy education (Kress, 2003; Lamy & Hampel, 2007; Lidwell, Holden, & Butler, 2003; McGrenere & Ho, 2000). In this section, the concept of affordances as originally defined by psychologist James Gibson (1977, 1979) and later adapted in the field of design by Norman (1988) will be discussed, followed by the implications for the context of

teaching and learning English as a second or foreign language.

Originally, psychologist James Gibson (1977, 1979) introduced the term *affordances* to describe all action possibilities posed by objects in relation to the action capabilities of the actor. Gibson (1979) defines the *affordances* of the environment as "what it offers the animal, what it provides or furnishes" (p. 127). For instance, a flat rigid surface *affords* ("offers" or "allows") support for an average man. It is important to note that, as Gibson's affordances exist relative to the actor's action capabilities, a given surface that provides support for one actor may not provide support for another actor (McGrenere & Ho, 2000). So, the flat surface mentioned above may support an average man, but not a man with excessive weight, for example.

Later in 1988, Donald Norman appropriated the concept of affordances for the design of everyday artifacts with a different focus in meaning. While Gibson focuses on the action capabilities of an actor, Norman stresses the action properties that are perceivable by the actor. For Norman, an affordance is the design aspect of an object which suggests (and not just "allows") how the object should be used (1988, as cited in McGrenere & Ho, 2000). To see the differences between Gibson's and Norman's affordances, we might consider the hypothetical situation of an adult and a young child of about 3 years of age in a room with a small ball and a big encyclopedia. The original Gibsonian notion of affordances would allow the possibility that the adult throws either the ball or the encyclopedia because that is physically possible but the child would be able to throw only the ball due to the child's limited capacity. In the same situation, however, Norman's affordances would be able to account

for the tendency that the adult is more likely to throw the ball, but not the encyclopedia. Norman's affordances are perceived properties that "provide strong clues to the operations of things" (Norman, 1988, as cited in McGrenere & Ho, 2000, p. 181) as when a ball, but not an encyclopedia, "affords" throwing, meaning that it "suggests" or "invites" throwing, rather than just "allows" throwing. This could be due to the physical characteristics of the ball (i.e., the size and shape of the ball) that make it fit in the hand and suitable for throwing. It is also likely that the adult's past experience influences his/her action and makes him/her know that a ball is to be thrown while an encyclopedia is not supposed to be thrown in a normal situation. As Norman points out, "affordances result from the mental interpretation of things, based on our past knowledge and experience applied to our perception of the things about us" (1988, as cited in McGrenere & Ho, 2000, p. 180). So, for Norman, our past knowledge and experience also play an important role in making an object "suggest" a particular action.

Table 1. The differences between Gibson's and Norman's affordances in the example of throwing a ball vs. an encyclopedia.

	Actor	**Throwing a ball**	**Throwing an encyclopedia**	**Focus of definition**
Gibson's affordance	Adult	ü (An adult is capable of throwing a ball.)	ü (An adult is capable of throwing an encyclopedia.)	capabilities ("allow")

Table 1. The differences between Gibson's and Norman's affordances in the example of throwing a ball vs. an encyclopedia. (Cont.)

	Actor	**Throwing a ball**	**Throwing an encyclopedia**	**Focus of definition**
	Child	ü (A child is capable of throwing a ball.)	r (A child is not capable of throwing an encyclopedia.)	
Norman's affordance	Adult	ü (An adult would throw a ball.)	r (An adult would not throw an encyclopedia in a normal situation.)	perception ("invite"/ "suggest")
	Child	ü (A child would throw a ball.)	r (A child could not and would not throw an encyclopedia.)	

Another example of a case where the actor's knowledge and experience are influential is the case of the image of a trash can icon (Recycle Bin) on a computer screen. In this example, a common physical object in the real world (a bin) is used in the design to enhance the usability of the icon. The image of this common item connects with our knowledge of how it functions in the real world and suggests its function in the software environment (Lidwell, Holden, & Butler, 2003). The graphic image of a trash can affords ("suggests") throwing unused files in it and the image of the recycle symbol suggests that the unused files might be retrieved later. It is seen that the knowledge of affordances exists in the mind of the perceiver based on experience with the physical item

of a bin in the real world and the user's previous knowledge of the recycle symbol.

This computer graphic icon can be considered an effective design. As Lidwell, Holden, & Butler (2003) state, when the affordance of an object corresponds with its intended function, the design will perform more effectively and will be easier to use. The icon of a recycle bin is designed to be a location for unused files and its features suggest that the user place unused files in it. On the other hand, if an affordance conflicts with its intended function, the design will perform less efficiently. Take a case in industrial design as an example: a faucet that has to be pressed down but is designed with a knob could lead a number of people to try turning it. In this case, the affordance of the faucet conflicts with its function, which is to be pressed down to release water. But if we replace the knob with a flat plate, then the affordance of the flat plate will correspond to the way in which the faucet can be used and the design will be improved.

In the context of language teaching and learning, the notion of affordances has some important implications for creating, selecting, and using appropriate learning tools. Firstly, the implication of Gibson's concept of affordances is for teachers and learners to explore the action capabilities of a learning tool –what a particular learning tool offers us that will help us achieve our learning goal(s). A learning tool might offer some useful functions that are not always readily perceived. Therefore, it will be useful to thoroughly examine the features that a particular learning tool provides and what the students can do with them. The relevant questions are: what are the affordances of this particular tool for this

particular learner or group of learners and how can we make the most of the affordances this tool offers? If we do not consider a tool's affordances, it is likely that we will not gain the most out of it. For example, Beatty (2003) mentions a common example: teachers who post lecture notes on the web without considering making links to further resources or taking advantage of the computer's ability to offer images, animation, sound, video or interaction. In this case, it would be useful if teachers keep in mind that the Internet affords the incorporation of hyperlinks and multimedia as part of electronic text. With hyperlinks, students can conveniently go to other websites to gain more useful information and authentic language input. And with multimedia modes of meaning, electronic text could be made more interesting and the linguistic input could be made more comprehensible with the help of visual and/or audio modes. According to Stephen Krashen (1985), the input in the target language that is made comprehensible at the level a bit above the learner's level (not too easy, not too demanding) is essential in second language acquisition.

Besides the features of hyperlinks and multimedia, the Internet also allows for (or "affords") users' interaction that is not restrained by time. In the case mentioned earlier of teachers posting lecture notes, the teachers might consider posting the notes on a blog or a discussion board, where the students could respond to the postings or ask questions. The asynchronous feature (not happening at the same time) of these online tools affords the possibility for students to ask questions and get more useful input at any time outside class. This is evident in a case study of Thai undergraduates

learning English through the blending of classroom instruction with electronic discussion boards (Author, 2010). The students in this study referred positively to the opportunities to ask questions anytime they liked. Learning could be done through *scaffolding* (Bruner, 1985) from the teacher and peers such as asking and answering questions, pointing out aspects of a problem, and recruiting interest (Freeman & Freeman, 2001; Wood, Bruner, & Ross, 1976).

It is seen that, in this example of the Internet for language learning, if we are aware of what this medium offers (its affordances) such as hyperlinks, multimedia features, and the possibility of interaction without the limits of time and space, then we can utilize the affordances that this tool offers to suit our purposes and make the most out of the tool to support the students' development of the English language. As Warschauer (2011) has pointed out, "computer-mediated communication and online learning can have powerful affordances for learning" (p.97), which, he states, include learners' opportunities to carry out an interactive task, receive rapid feedback, and learn from customized instruction, for example.

It is important to note here that, as pointed out earlier, Gibson's affordances exist relative to the actor's action capabilities. So, we have to consider whether the actors in our context (i.e., our learners) are capable of using the features of a learning tool or not. Gibson's notion of affordances highlights the importance of designing the learning tools to suit learners' capabilities (e.g., small buttons or controllers in interactive learning software for young children). Then, if learners are physically capable but just do not know how

to use the tool's affordances, the necessary information or assistance from the more capable others will have to be provided.

With regard to Gibson's notion of affordances, McGrenere & Ho (2000) point out that Gibson does not adequately address varying degrees of an affordance. McGrenere & Ho observe that Gibson's affordances are binary; the affordances either exist or they do not –a staircase is climbable by a particular actor or it isn't, for example. They remark that Gibson does not address the gray area where an action possibility exists but it can only be achieved with difficulty such as a badly designed staircase that is climbable but only with difficulty. Another example is the case of square wheels mentioned in Lidwell, Holden, & Butler (2003). Square wheels can be rolled but only with difficulty because of their physical characteristics. Round wheels are better suited for rolling than square wheels. Therefore, McGrenere & Ho (2000) propose that an extended definition of affordances is needed to explain an action possibility that is achieved with varying degrees of difficulty in different tools. Then, in the case of square wheels vs. round wheels, we can say that although both types of wheels "afford" rolling (in Gibsonian terms), only one kind (round wheels) "better" affords this action. In short, as Lidwell, Holden, & Butler (2003) put it, objects are more suitable for some functions than others.

With McGrenere & Ho's extended definition of affordances, another question that we can ask ourselves when selecting and using a particular learning tool should be added: Do the affordances of this tool allow for results that better serve our purpose than the other tools available?

So, it is not just a question of what a particular tool offers us, but whether it can do this job well and is more suitable than other tools.

This added question directs our attention to the strengths of a particular tool and also warns us against what McKenzie (2003) calls "technology presumption" –the belief that new tools will always be effective in any class. We might have witnessed instances when teachers try to get new technologies to do things that are better achieved through other means. In fact, as McKenzie puts it, new technologies "should sit comfortably alongside older technologies such as books and paper. They should take a back seat when other modes of learning excel" (McKenzie, 2002, p. 36). Along the same lines, Clements & Nastasi (1993) point out that either traditional learning tools or the newer ones may be the most appropriate medium in a given situation. They stress that teachers play an important role in determining the manner in which the learning tools are used to create the most suitable learning environment for a particular learner or group of learners for a particular purpose. According to Lamy, M. & Hampel, R. (2007, p. 46), teachers have a responsibility to select the most appropriate tool for a job and to "make the most creative use of the affordances of the tool that they have chosen".

It is seen that Gibson's concept of affordances, together with McGrenere & Ho's extended definition, provide useful directions in creating, selecting, and using learning tools. Norman's concept of affordances also provides us with important implications. As described earlier, Norman's affordances refer to action possibilities that "provide strong

clues to the operations of things" (Norman, 1988, as cited in McGrenere & Ho, 2000, p.181). These affordances are thus readily perceived and will invite an actor to perform the intended function. Norman's definition is significant in that it provides us with another consideration. For the design of a tool to be more effective, the features of a particular tool should be suggestive of their intended function. Usability (ease of use), and not just utility (a tool's usefulness) is thus a factor that should be considered in industrial design. In the context of teaching English as a second or foreign language, when we design or select a learning tool for our students, usability should be taken into account in order to prevent students' frustration as they are trying to learn. A tool that is "user-friendly" for students can be said to have features that scaffold learning. Also, as Norman highlights the role of the actor's past knowledge and experience, it is important to be aware that a particular tool might be "user-friendly" for one group of people, but not others, depending on individuals' background and experience. Therefore, we need to know the background and experience of the users, our students in this case, and see whether the design of the tool in question will match their perception. This attention on the user of a tool in Norman's concept of affordances is congruent with Wertsch's idea (1998) that an individual user who has brought skills and experience with him/her also plays an important role in using a tool to accomplish a certain task.

It is seen that the notion of affordances offers some insight into the design, selection, and use of learning tools not only in the realm of industrial design, but also in the field of language learning and teaching. Besides the concept of

affordances, other principles of design that can be applied to learning environments are discussed in the sections that follow.

The principles of aesthetics

While it can be seen from Norman's concept of affordances in the previous section that usability is considered important, Norman (2002) makes it clear that he does not denounce aesthetics. For him, good design means that beauty and usability are in balance (2002). Norman directs our attention to the merits of aesthetic appeal in his article *Emotion & Design: Attractive Things Work Better*. He points out that pleasure derived from the appearance or functioning of a tool in normal situations "increases positive effect, broadening the creativity and increasing the tolerance for minor difficulties and blockages" (2002, p. 41).

Along the same lines, in Lidwell, Holden, & Butler's "Universal Principles of Design" (2003), the factor of aesthetics is mentioned in their discussion of the aesthetic-usability effect, which is evident in several industrial design experiments. The aesthetic-usability effect refers to the phenomenon in which aesthetic designs are perceived as easier to use and are more readily accepted and used over time than less-aesthetic designs.

In light of the above, the issue of aesthetics should be taken into consideration when designing or using learning tools. Parrish (2009), in his article *Aesthetic Principles for Instructional Design*, suggests that instructional designers broaden their concerns beyond immediate learning

outcomes and take into account all the qualities of designed experiences, including the aesthetic qualities of learning experiences, which can potentially expand learning impacts.

In language learning environments, aesthetic designs can be useful since the learner will perceive the tool with an aesthetic design to be easier to use and will see the learning experience as more pleasant, less stressful, and more interesting. In the field of Second Language Acquisition, learners' affective states are considered important. Learners need to be free of stress before they can focus on the learning task (Ellis, 1994). According to Krashen's affective filter hypothesis (1985), affective factors such as anxiety and boredom can interfere with second language learning. Thus, in designing or using a learning tool, aesthetics should be taken into account since it can help create an engaging environment for learners.

An example showing that aesthetics is one of the influential factors in the context of teaching and learning English as a foreign language is a case study in which Thai undergraduates participated in two discussion boards (Author, 2010). One was a discussion board in a learning management system (LMS) and the other one was an open-source discussion board with some features that were different from the LMS discussion board such as a wide variety of colorful emoticons and avatars for users to represent themselves with images. The results from the questionnaires given to nineteen students have shown that, overall the students responded to the use of the open-source discussion board more positively than the LMS discussion board. The students were also asked to provide an explanation, and from their answers, it was found

that appeal was one of the influential factors. There was one student who referred positively to the graphic features on the open-source discussion board and three students reported that the LMS discussion board was not appealing to them. This shows that aesthetics in the design of the open-source discussion board played a role in fostering the students' positive attitudes towards the learning tool. It is also interesting that eight students mentioned ease of use in their explanations for their positive response to the open-source discussion board. The open-source discussion board, but not the discussion board in the LMS, was reported as user-friendly. So, both aesthetics and usability were important factors here. This supports Norman's suggestion mentioned earlier that both usability and aesthetics should not be overlooked. He adds that "to be truly beautiful, wondrous, and pleasurable, the product has to fulfill a useful function, work well, and be usable and understandable" (2002, p. 42).

With regard to the term "aesthetics", it is important to note that the term could have a meaning beyond being "beautiful". Parrish (2009) states that while the word is often used to describe only the sensual qualities of an object or designed experience, in fact aesthetics can develop when we are deeply engaged in an activity. So, for Parrish, aesthetics can be experienced in activities in which a person is immersed such as enjoying a good mystery novel or learning to do something. Roth, Vorderer, & Klimmt (2009) also discuss different realizations of aesthetics. In particular, they talk about aesthetic appeal in interactive storytelling computer programs. For example, aesthetic pleasantness may occur

not only because of "beautiful" imagery, but it can also be generated through creative plot development, character attributes, dialogue evolution, or puzzle tasks. Thus, aesthetic pleasantness may be observed in users "entering the world of the story" as well as in users who remain "outside of the story" and analyze it as a piece of art (Oatley, as cited in Roth, Vorderer, & Klimmt, 2009).

In creating or using learning tools with learners of English as a second or foreign language, it is also beneficial to consider "aesthetics" on a deeper level –the experience of being immersed or deeply engaged with something. This is a desirable condition for learning. It is related to learners' intrinsic motivation in learning, which, according to Ellis (1997), is a kind of motivation found in learners who find learning the target language enjoyable in itself. In developing a second language, motivation is regarded as a crucial factor (Ellis, 1994).

In fact, in the new media environment, a wide selection of media tools can potentially be used to stimulate students' aesthetic experience on a deep level. Both traditional and newer media tools, if designed and used properly, could generate aesthetic pleasantness in learners through immersive experience. For instance, in a study of pre-schoolers learning English as a second language in an early childhood literacy program through multiple types of media (Author, 2005), storybooks, videos, audio recordings, and computer programs were found to have potential in engaging learners. For instance, a DVD of an episode of the educational show *Blue's Clues* (Twomey & Chanda, 2002) that was used in the study serves as a good example of a media tool that could engage the child

learners through immersive experience. With a combination of moving images and sound, the characters in the show were made alive and a problem was posed in the engaging and meaningful context of the story. The characters often looked at the child audience and talked with an engaging tone of voice, varying facial expressions and gestures. Animation and a variety of production techniques such as zooming and blinking were also utilized to involve the child viewers. It was observed that the students were involved with the show as they actively helped the characters solve the problem by shouting out their thoughts and were excited when the problem was solved successfully. It was interesting that they even addressed the characters with the pronoun "you". For example, when the characters wanted to use the green color for painting but the color palette contained only the colors yellow, blue, and red, one student shouted, "You can MIX it" and another student added, "Yeah. You can mix yellow and blue". Figures 1 and 2 below show screenshots from the show (reproduced in Author, 2005).

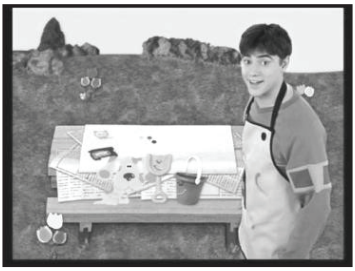

Figure 1. "Do you wanna add some more friends to our painting?"

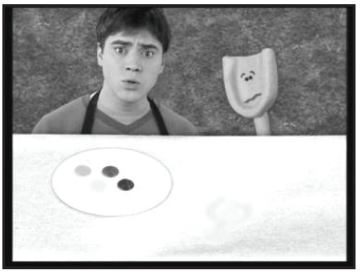

Figure 2. "Ooh…That is a problem!"

It can be said that the child viewers in this study experienced "aesthetics" both because of visually attractive production features and also because of the deeper level of aesthetic appreciation that was triggered by elements such as the plot, the characters' attributes, and the dialogues that invited them to "enter the world of the story" in Oatley's terms (cited in Roth, Vorderer, & Klimmt, 2009). As the child viewers were deeply engaged with the show, they were intrinsically motivated and thus learned from this involving audiovisual experience.

The case of students watching *Blue's Clues* is an example of the video medium with high-quality production. In the digital age, there are also other resources that have the potential to engage learners. For example, *Dora Candy Land* is an on-line interactive computer game that can attract child learners with beautiful graphics, the immersive context of an adventure story, and interactivity. In this game, the child players click on the virtual stack of cards and then move to the nearest block that has the matching color with the card that they get (Figure 3). As they move along the path in this "Candy Land", sometimes they will have to confront problems to solve such as helping the character pick a letter of the alphabet (Figure 4).

This on-line computer game offers an involving audio-visual experience like the video medium but the difference lies in the computer's distinctive feature of interactivity. This affordance of the computer allows the child user to respond and get feedback from the computer. For example, when the child learner is asked to click on the letter "G", if the child gets it right, Dora will say "good job!" and Benny the cow

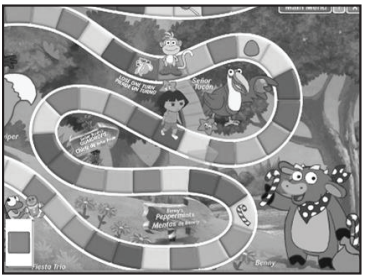

Figure 3. "Click on that 'blue' square in front of you on the path."

Figure 4. "Click on the Candy Cane letter 'G'."

Figure 5. "Good job!"

will move to the position under the letter chosen to collect it (Figure 5). With this added feature, the child learner can be deeply engaged as s/he tries to solve the problems posed in an engaging context, and thus, s/he will experience aesthetic satisfaction on a deeper level as well.

From this section, it is seen that the principles of aesthetics have implications for creating and choosing learning tools. In a general sense, it is suggested that, while being aware of a tool's utility and usability, the factor of appeal should also be taken into account to attract learners. In addition, on a deeper level, aesthetic satisfaction should be triggered through an engaging

learning experience. In order for a learning tool to generate aesthetic appreciation at both levels, several elements in the design of the tool such as text, images, sound, and animation should be combined in a way that is appealing to learners and elements such as creative plot development, dialogues or interactive tasks should also be considered in our quest to engage learners in a meaningful learning experience.

Principles in combining elements of design for effective communication

When material is used for the purpose of teaching and learning, the ability to communicate an intended message is also an important factor. In the field of graphic design, the issue of combining elements for effective communication has been addressed adequately.

According to Evans & Thomas (2004), design is "a visual language that is built on fundamental principles and elements" (p. 3) and graphic design is "the art of arranging pictographic and typographic elements to create effective communication" (p. 4). They add that the principles provide a structure for combining the common elements of design. They suggest comparing design elements with the ingredients in a recipe, the parts of a machine, or the materials used to build a house. While these components have limited use individually, they can work together to form something useful when skillfully combined, and will also be pleasing if creativity is added.

Samara (2010) compares a designer with a chef. As a chef tests various methods and ingredients until the dish is finished, a designer tests conventions of page structure, column grids, and pictorial options, for example, and then experiments with color palettes, typefaces, patterns, and photos to arrive at "a visual meal" (p. 9). Samara adds that a good designer is like a good chef in that s/he is aware not only of how each kind of ingredient is similar or different, but also of "which delivers one message in contrast to another, and which will combine to create experiences that are harmonious or jarring, neutral or metaphorical, financial or medical" (p. 9).

What is stated regarding combining design elements to create meaning in the field of graphic arts mentioned above is actually congruent with the recent concept of multimodal literacy put forth by scholars in the field of new literacy. For example, Kress (2003, p. 117) talks about "the new grammars of multimodal texts", referring to the arrangements of multiple modes in making meaning. According to Kress (1998, 2003), the shift has been from an older organization of text that is mainly linguistic to a newer organization of the resources a culture makes available as means for making meaning –what he calls "representational modes" (speech, writing, image, gesture, music, and others). Relevant questions arise as to how the meaning-making elements cohere in the space of the page or screen and what meaning derives from their particular arrangement. Kress stresses that it is important to understand the potentials of the resources – what these different modes are and what they can best do in meaning making, just as the designer must know what

resources will best meet the demands of a particular design. For Kress, the focus on language alone neglects the potentials of representational modes –"semiotic modes have different potentials, so that they afford different kinds of possibilities of human expression and engagement with the world" (Kress, 2000, p. 157).

Another scholar in the field of literacy, Lemke (1993), also points out that literacy should not be seen as merely linguistic practices. He observes that texts are as much the product of nonverbal visual semiotic codes as of linguistic ones. Therefore, Lemke suggests that it is important to have an understanding of multimodal communication, particularly of the cultural conventions for combining verbal and nonverbal elements in multimedia texts, and also extend those conventions to take full advantage of the communicative resources that new technologies provide.

In fact, scholars in the New London Group (2000), who put forward the notion of Multiliteracies, have already seen the connection between meaning-making and the design process. They talk about "the concept of Design" in the Multiliteracies framework to refer to the idea that we are both inheritors of conventions of meaning while at the same time active "designers of meaning". In the meaning-making process, for the New London Group, the design elements include the linguistic, visual, audio, gestural, spatial, and the multimodal patterns of meaning that relate the first five modes to each other. The Multiliteracies framework emphasizes the active role of learners in making design decisions to successfully create meaning.

In light of recent concepts in literacy, it is important that students are provided with the opportunity to practice comprehension and production skills through different modes –language as well as other modes of meaning. Taking the concept of design into consideration, for students' comprehension of multimodal text, the media tools for learning should be designed in a way that the elements in the tools are chosen from the resources of multiple modes of meaning to effectively convey the intended message and produce the desired impact on students' learning. In the online interactive computer game *Dora Candy Land* previously mentioned, elements such as graphics, animation, sound effects, characters' voice, and production features (e.g., zooming and blinking) are combined to communicate the intended message and direct the child learner. For instance, as shown earlier in Figures 4 and 5, when the child learner is asked to help Benny pick the letter "G", the combination of the audio mode ("Click on the Candy Cane letter 'G'") together with the graphic of Benny waiting under the tree full of letters of the alphabet invites the child learner to pick the letter from the tree. If the child clicks on the right letter, s/he will hear the audio feedback "great!" or "good job!" along with the visual mode –Benny the cow will move to the position under the chosen letter, lift up his bag, and collect that letter, which will fall into Benny's bag (Figure 5). There is also the "whoosh" sound effect as the letter is falling. It is seen that at this moment of providing positive feedback, the character's voice, sound effect, graphic and animation, as well as text (the letter "G") contribute in communicating to the child learner that it is correct to call this letter "G". After the child finishes clicking on all the G's in this part, the intended

learning content should have been effectively conveyed to the child learner. In this example, multiple design elements are combined to create a comprehensible learning experience for the child learner. They work together to direct child learners in playing the game, teach them by providing feedback, and engage them with aesthetically pleasant multimedia elements. Another example of a more traditional learning tool is a textbook for students learning English as a foreign language. Figure 6 below shows a page from the book *Inside Out* for upper intermediate level (Kay & Jones, 2001, p.39).

I know it's bad for me, but I still can't stop

Three packs of cigarettes were lying there on the pavement. I hopped down from Yefim Shubentsov's office doorstep, picked them up and pocketed them. Later, in a bar, when I opened the first pack, I found – to my delight – the twenty cigarettes intact.

I'm still at the bar, telephone in one hand and the cigarettes in the other. I'm dialling Shubentsov, who told me to call the moment I felt the urge to smoke. I feel it, feel it even stronger than I felt Shubentsov's healing energy. That's saying something, since Shubentsov is known around the world for curing smokers of their nasty habit, using a mystical method. He transmits his healing energy from his fingertips, he tells me – something he picked up from another bloke in Russia. 'I help you for free,' he told me in his muddy accent. 'Just call me whenever.'

I went to see Shubentsov because I think it's time to stop. Time to stop because I'm getting old, and I can't keep doing this to myself. But here's the real problem. I should quit, but like a lot of you struggling with the same habit, I really don't want to. At least, not yet.

Smoking has been very good to me. Cigarettes have never let me down, never abandoned me on lonely, desperate nights. Smoking clears my head, helps me think. Smoking has started conversations, driven away annoying people. Smoking helps me celebrate victories, get over losses, comfort the comfortless. It also chases away the mosquitoes.

I will quit. Soon. My body and my mind are demanding that I do, daily.

I claim to smoke for pleasure, but I realise that slowly, steadily, I'm losing control of this close, special friend. I hate that, I realise it's not just a 'habit'. I'm hooked.

So here I am, attempting to give up again, at Shubentsov's place. I've tried all the other quitting techniques available. Any time the urge to smoke strikes, he said, just call him immediately and he'll help. The funny thing is, I realise that I'm not phoning him to stop me from lighting up. I'm phoning him so I can. If I call, I'll have done my part. Then I can smoke this cigarette. Besides, I know that at 9.30 on a Friday night, I'll get the answering machine. I do. 'The office is open from ten to four. Call me back then. This machine does not take messages.'

I put the phone down and I can honestly say I'm relieved. You see, it's not Shubentsov's fault or anyone else's fault that I'm still smoking. It's mine.

Now if you'll excuse me, I'm going to smoke this cigarette. Whether I'll really enjoy it, though, is another story.

Figure 6. A page from the book Inside Out (upper intermediate)

On this page, the reading passage "I know it's bad for me, but I still can't stop" is presented with the image of a cigarette that has been destroyed. This image also includes the message "It takes a lot of strength to do this," positioned near the cigarette. The design elements on this page work together to communicate the message that it is difficult to stop smoking. Taking a close look at the image, the word "this" in the sentence "It takes a lot of strength to do this" is inextricably tied to the photo of the cigarette that has been destroyed. If there were only the photo of the cigarette or only the text in this part, the message would not have been effectively conveyed. These two elements interact to create the meaning that supports the title and the content in the passage, which is about a smoker who tried to stop smoking but found it difficult to do so. The title of the passage is connected to the image as the word "stop" can be linked with the action referred to in the image. The sentence "I know it's bad for me, but I still can't stop" does not specify which action the speaker is talking about. With the picture, the meaning of the sentence suddenly becomes clear and the impact becomes stronger. It will then be clearer to the students as they read the text in the passage. So, it is seen that the design elements on this page work together in helping students with their understanding of the passage and also increasing the emotional impact. This is considered an effective design as text and graphics are combined to create effective communication.

Also, the arrangement of the design elements on this page from *Inside Out* follows a number of basic principles in graphic and communication design such as proportion and

contrast that help in creating more effective communication. According to George-Palilonis (2006), good proportion can be achieved through different sizes and shapes of design elements in relation to one another or the overall space. This will help create a sense of hierarchy and order among the elements. For contrast, differences in color, shape, or typographic texture can be used to emphasize important information. In Figure 6, it can be observed that the visual elements are proportionate to one another. Varying sizes of font are used to indicate different headings and the text passage. The use of different colors is employed to create contrast. For instance, the color red is used for the word "stop" to emphasize the meaning of the word and create a strong impact on the reader.

From the examples of the computer game and the textbook, it is seen that the design elements in learning tools can be chosen and integrated in a way that makes the language and the content more meaningful and comprehensible to learners.

Besides receiving input from multimodal text, learners should also have the opportunity to practice skills in producing multimodal text as well. Baker's study (2000) of a fourth-grade classroom where literacy instruction and technology were integrated serves as a good example of how students learned to communicate through different media types and multiple modes of meaning. In this study, the students could access materials from different media such as CD-ROMs, the Internet, videotapes, books, and magazines. They had to decide which of these media types and modes of meaning (e.g., text and graphics) would best illustrate the meanings

they hoped to convey. It was observed that the teacher in the study provided instruction about the need not only to "find meat" (i.e., the important information) in various media sources but also to create products that communicated that "meat" and not just produce a "flashy" work. One student simply scanned a page of different American flags to show the class in a slide show but when the teacher asked about the flags, she couldn't explain why they had different numbers and configurations of stars, or what the stripes represented. So, the teacher provided instruction regarding the necessity of the "meat". In this case, the student needed to develop the ability to use multiple modes of meaning to communicate the "meat" effectively. She needed to know the function of both the visual and the linguistic modes of meaning in understanding and communicating messages. This refers to what Kress (2003) calls the potentials of each mode. By having the opportunity to practice making meaning through multimodal texts, students in the study seemed to be learning the new literacy needed in the world of new communications and technologies. Even though this study was about native English-speaking students learning English literacy, the study's implications can also be applied to students learning English as a second or foreign language as well. As they are also learning language in the new media learning environment, it is important that they have a chance to practice the target language together with other modes of meaning. In order to provide them with this opportunity, teachers could assign them to do projects or presentations using the resources of multiple media similar to the case mentioned above and provide assistance in the students' process of learning.

Conclusion

With the principles from the fields of graphic and industrial design regarding an object's function, appeal, and the arrangement of design elements, language teachers and learners can gain a more profound understanding of the nature of language learning materials and what to consider when designing, selecting, or using these tools to facilitate English language development. It is seen that any tool, whether new or more traditional learning material, or a combination of both, can be appropriate in a given situation due to the match between its affordances and learning purposes, its ease of use, its ability to attract and motivate learners, and its ability to convey an intended message. We need to consider how we can create or utilize its features so that it can benefit learners, rather than just using a particular tool because we like it or are pressured to use it because it is new technology.

In a particular learning environment, it is also important to be aware of the fact that in using different kinds of media to support English language development, there are some other relevant issues and concerns that are beyond the scope of this paper, such as the quality of the interaction between the teacher and students or among students themselves as they are using language learning materials, the suitability of the content for the students' level, the possibility of cultural mismatch in the choice of media content, as well as limitations such as cost and availability of the tools and teachers and students' varying skills in using media tools. It is significant that, as we make decisions regarding learning media and materials, we do not ignore the various factors in a particular learning environment. Then, when all the factors are taken

into account and appropriate learning tools are designed, chosen, and used, it is expected that learners' development in the target language will be facilitated and that it will be an engaging and worthwhile learning experience for them.

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