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Computer Literacy: Sine Qua Non for Digital Age of Language Learning & Teaching

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Abstract—With the widespread and development of Information and Communication Technology (ICT) in our daily lives, technology provides numerous opportunities and challenges for language teachers and learners. The popularity of learning a foreign language and integrating technology for educational purposes showed the demand for computer or electronic literacy for both language teachers and learners. The literate teacher and learner is the one who can use different technologies as educational devices in their teaching and learning processes. This paper reviews the related literature on new literacies, as well as the relationships between computer/electronic literacy and language learning and teaching.

Index Terms—literacy, computer literacy, electronic literacy, language learning and teaching, digital world

I. INTRODUCTION

Our new digital tools play important roles in our daily lives. Portable devices like cell phones transfer text and multimedia messages, connect us to the Internet, provide visual contacts, allow us to check our emails, enter the chat rooms, surf the websites, blogs, wikis, and discussion forums, and learn from MOOCs. By these digital tools individuals even can change their authorship, identity, community, etc.

Today's in our evolving digital world, we depend upon an augmented knowledge and skills. This digitalized world obliges learners and teachers to formulate knowledge in nonlinear settings mediated by different digital tools and devices. "... it would be wrong to think that we live in The Digital Society... We have made the Information Society and the Digital Age for ourselves" (Martin & Grudziecki, 2006, p. 249).

Our real communication environment has changed to today's virtual environment in which casual writing and speaking is superior to formal (Hampel & Hauck, 2006). Kress and van Leeuwen (2001) mentioned that the "new technologies' emphasis on multimodality, three-dimensionality, and interactivity can be seen as a return of many of the things that were lost in the transition from 'orality' to 'literacy'" (p. 92).

To define "literacy", we have to consider learning changes based on world changes. Different models have been proposed for defining literacy (Béisle, 2006): (1) The functional model considers literacy as the proficiency of simple cognitive and practical skills, from the least complex idea of literacy as mechanical skills (that is, reading and writing) to the most developed approaches (UNESCO, 2006). (2) The socio-cultural practice model deals with the fact that literacy is only significant in a social context given, and consequently to be literate is to have access to the different cultural, economic and political structures of society (Street, 1984). (3) The intellectual empowerment model states that "literacy can bring about the transformation of thinking capacities, particularly when new cognitive tools, such as writing, or new processing tools, such as those relying on digital technology, are developed" (Martin & Grudziecki, 2006, p. 250).

Dudeney, Hockly and Pegrum (2013) counted 21st-century skills, for which these authors highlighted skills like creativity and innovation, collaboration and teamwork, critical thinking, problem-solving, autonomy, flexibility, and lifelong learning. This set of new skills needs another key factor which is an ability to interpret, manage, share and create meaning in the growing range of digital communication channels which is called digital literacy or computer literacy. The leaders believed that all the people should know something about computers. The meaning of computer literacy has changed over time, and the specific definition has never been clear. Basically, computer literacy means a level of understanding which enables students to talk about computers. Son, Robb and Charismiadji (2011) defined 'computer literacy', in general, "as the ability to use computers at an adequate level for creation, communication and collaboration in a literate society" (p. 27). Computer Assisted Learning (CAL) provided another perspective which shows that the computer could teach students. From educational perspective, this definition changes to "the development of knowledge and skills for using general computer applications, language-specific software programs, and Internet tools confidently and competently" (Son, Robb & Charismiadji, 2011, p. 27).

II. MOVING FROM LITERACY TO NEW LITERACIES

The changes mentioned in the Introduction section have resulted in a shift in the concept of literacy from “the ability to read and write in a predominantly printed context” (Goodfellow, 2011, p.131) to the new literacies. Literacy theorists have acknowledged the virtue of the digital sphere in constructing the contexts for literacy to be properly understood. As Warschauer (1999) highlights, “technological developments alone cannot account for changing conceptions of literacy. Rather, we must also take into account the broader social, economic, and political context” (p. 8). Different terms are coined for new literacies: ‘*multiliteracies*’ (Gee, 1992; Luke, 1992; Kress, 1993), ‘*multimedia literacy*’ (New London Group, 1996), ‘*technological literacies*’ (Lankshear et al., 1997), ‘*silicon literacies*’ (Synder, 1997), ‘*electronic literacy*’ (Warschauer, 1999), ‘*technoliteracy*’ (Erben, 1999), ‘*new literacy/literacies*’ (Salaberry, 2000; Lankshear & Knobel, 2003), ‘*multiple literacies*’ (Kellner, 2002), ‘*electracy*’ (Ulmer, 2003), and ‘*Online literacy*’ (Snyder & Beavis 2004).

TABLE 1.
VIEWS OF LITERACY

Type	Literature
Computer literacy	Corbel, 1997
Cyberliteracy	Gurak, 2001
Digital literacy	European Commission, 2003
Electracy	Ulmer, 2003
Electronic literacies	Warschauer, 1999
eLiteracy	Martin, 2003
ICT literacy	Educational Testing Service, 2005
Media literacy	Kubey, 1997; Livingstone, 2003; Potter, 2004
Multiliteracies	Cope & Kalantzis, 2000; Unsworth, 2001
Multimedia literacy	New London Group, 1996
Multiple literacies	Kellner, 2002
New literacies	Lankshear & Knobel, 2003
Online literacy	Tuman, 1996
Silicon literacies	Synder, 2002
Technoliteracy	Lankshear & Synder, 2000; Luke, 1997
Visual literacy	Curtis, 2004; Moore & Dwyer, 1994

It is possible to define a range of distinct but interrelated literacies. ‘Basic computer literacy’, defined as “the learning of specific hardware and software applications” (US National Research Council, 1999, p. 9; Council of Australian University Librarians, 2001, p. 2), is a sine qua non for new literacies. Students, at least, should be able to work with their personal computers to effectively participate in our digital society. ‘Cyberliteracy’ refers to the ability to sort fact from fiction, to identify extremism from a debate, and to identify aspects such as gender bias, commercialism or imitation, together with other aspects of written language that may entail significant problems when communicating online (Gurak, 2001). “Digital literacy” is “the ability to use ICT and the Internet becomes (European Commission, 2003, p. 3). Moreover, Ulmer (2003) described *electracy* as “the kind of literacy or skill and facility necessary to exploit the full communicative potential of new electronic media such as multimedia, hypermedia, social software, and virtual worlds” (as cited in Konan, 2010, p. 2568). Warschauer used the term ‘electronic literacies’ in 1999 as the activities occur among language-learning students and computers. Electronic literacy is broader than information literacy and “it also encompasses how to read and write in a new medium” (Shetzer & Warschauer, 2000, p. 173). Martin (2003) coined the term ‘eLiteracy’ which means “the awarenesses, skills, understandings, and reflective-evaluative approaches that are necessary for an individual to operate comfortably in information-rich and ICT-supported environments” (p. 18). ETS (2007) defined ‘ICT literacy’ as “using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society” (Educational Testing System, 2007, p. 2). ‘Media literacy’ is the “ability to access, analyze, evaluate, and create messages in a variety of forms” (Aufderheide, 1993; Christ & Potter, 1998, Livingstone, 2004, p. 4). According to New London Group (1996), multimedia literacy is the ability to interpret and produce knowledge in multiple media and modes. Kellner (2002) used the term “multiple literacies” which “points to the many different kinds of literacies needed to access, interpret, criticize, and participate in the emergent new forms of culture and society” (p. 163). ‘Online literacy’ would refer to the “reading and writing one does at a computer” (Tuman, 1996, p. 27). The influence of hypertext and computer technologies on textual practices and understandings is called “silicon literacies” (Snyder 1997; 2002). ‘Technoliteracy’ “targets the integration of technology skills, computer-based cognitive tools and literacy practices to increase the learners thinking in the critical dimension. Design, then, becomes the shaping metaphor for both knowledge construction and the balanced integration of the four dimensions in that model” (Kimber, Pillay & Richards, 2007, p. 62).

It is obvious that there is significant overlap between the definitions of literacies mentioned above. Tyner (1998) identified the necessity to refer to multiliteracies in a plural form but prefers to recognize groups of associated literacies while maintaining “literacy” as an overall concept (pp. 63-68).

III. COMPUTER/ELECTRONIC LITERACY AND LANGUAGE LEARNING AND TEACHING

Digitization and globalization have reformed the field of language education and literacy. A demand for new literacy called “Computer literacy”, “IT literacy” or “ICT literacy” has been aroused since the late 1960s. The significance of students and teachers’ computer literacy has been quite widely discussed (e.g., Atkins & Vasu, 2000; Cunningham, 2000; Johnson, 2002; Lam, 2000; Oh & French, 2007; Park & Son, 2009; Shin & Son, 2007).

The merits of educational technology revise how language and literacy in the classroom are understood, taught, and tested. In second or foreign language teaching contexts, teachers have been averse to endorsing and applying these new dimensions of literacy. Valdés (2004) believed that second/foreign language teachers have the inclination to conceptualize language in their teaching as a single literacy rather than multiple literacies (p. 79). Adapting a new movement towards multimodal literacies in the second and foreign language classrooms is a difficult task (Tan & McWilliam, 2009; Valdés, 2004; Warschauer, 2008b). Even in well-equipped technological infrastructures, second/foreign language learning and teaching contexts have been shown to be undervaluing the merits of such technologies (Ware, 2008).

Reinking (1994) proposed four criteria for activities which aimed at developing electronic literacy in educational contexts:

“First, they should relate to conventional print-based literacy in meaningful ways... A second criterion is that activities designed to promote electronic literacy should involve authentic communication and meaningful tasks for students and teachers... Third, activities should engage students and teachers in higher levels of thinking about the nature of printed and electronic texts as well as about the topics of their reading and writing.... Fourth, activities should engage students and teachers in ways that allow them to develop functional strategies for reading and writing electronic texts”. (Reinking, 1994)

Martin in 2003 mentioned three phases for computer literacy: a) The Mastery Phase (up to the mid-1980s): In this phase, the focus is on achieving specialist knowledge and competence to master computer, which includes computer basics like how the computer works and how to program it. b) The Application Phase (the mid-1980s to late-1990s): As the name suggests, the emphasis of this phase is on practical competence. One of the applications of computer in this phase is for educational purposes as an educational technology. c) The Reflective Phase (the late-1990s on): The focal point of the third phase is on more critical, evaluative, and reflective approaches to using IT. “ICT literacy [or computer literacy] is the interest, attitude and ability of individuals to appropriately use digital technology and communication tools to access, manage, integrate and evaluate information, construct new knowledge, and communicate with others in order to participate effectively in society” (Martin & Grudziecki, 2006, p. 251).

Along with developing in a digital world, the idea of what we mean by a ‘computer literate’ is unavoidably expanded (Reinking, 1994). In addition, one of the main issues in the area of language education is how to become computer literate to improve and develop language learning and teaching (e.g. Son, 2004).

Computer literacy is a necessity for students because it: (1) lays the foundations for developing a critical understanding of the Information Age; (2) helps students make effective use of digital technology, both in classroom and workplace settings, improving attitudes and reducing frustration; (3) shapes a proactive view with respect to the undeniable role of technology in our current society; (4) assists ‘technophobic’ to overcome fears of increasing computerization of all aspects of daily life; (5) develops solid skills among students, so that we can collectively pursue more creative uses of computers in the syllabus; (6) extends the personal enjoyment thanks to keeping in touch by regular email exchange, for instance; (7) provides ‘realia’ for all those terms related to hardware, software, the Internet, and in general the whole online culture (Corbel & Gruba, 2004, pp. 5-6).

Preparing students to well-function in the digitalized society is the major role of language education. In ESL/EFL classrooms, where English is the lingua franca, although some students already have computer or digital literacy in their own cultures and languages, they have the challenge of finding and responding to the massive amount of English language data available on the Internet. Warschauer and Healey (1998) specified two indispensable domains for language teachers: (1) Finding, evaluating, and critically interpreting net-based information, and (2) Effective online writing. For the former domain, they suggested teachers to “go beyond how to decode texts, or understand them, and pay increasing attention to how to explore and interpret the vast range of online texts” (p. 65). Moreover, for the latter one, they recommended second language teachers “to teach students effective online writing skills [which] include both the genres of electronic communication as well as the relationship of texts to other media” (Warschauer & Healey, p. 65).

To blend technology successfully into the language classrooms, teachers required to construct their “working knowledge and skills in online environments” (Rilling, Dahlman, Dodson, Boyles & Pazvant, 2005, as quoted in Son, Robb & Charismiadji, 2011, p. 27) and have technical ability to apply several computer applications for educational targets (Cunningham, 2000). Hence, in CALL, the augmentation of language teachers’ computer literacy is one of the most significant facets to consider (Hong, 2010), acknowledging the request for technology-proficient language teachers (Hubbard, 2008). Computer literate teachers and students will receive greater professions than those who lack this literacy.

There are some notes on the significance of electronic literacy for language learners. Hall (2001) mentioned that “How well we prepare learners of additional languages to meet the social, political, and economic challenges of the next

several decades will depend in part on our success in integrating technology into the foreign language curriculum” (p. 60). By this statement, we should not interpret it as integration any technological tools or devices, but he meant those technologies which would be suitable for language learning and teaching. Also, this author stated that “all domains and modes of communication are likely to involve not only conventional written and oral modalities but, given the influence of technology in our lives today, electronic ones as well” (Hall, 1999, p. 38).

As Kern & Warschauer (2000) remind us, computers like any other educational tools in the classroom for language teaching and learning do not in and of itself bring about enhancement in learning. However, teachers and learners should know how to use it in order to improve their language teaching and learning (p. 2).

In order to apply computer-assisted language learning (CALL) in language learning and teaching environments, language teachers and learners are needed to construct their knowledge and skills for implementing computers and enhance their competency in doing several kinds of CALL activities (Son, Robb & Charismiadji, 2011). Son, Robb and Charismiadji’s (2011) study was to study the current level of computer literacy of 73 Indonesian in-service teachers of English as a foreign language (EFL) and explore all those factors that may affect their use of computers in face-to-face lessons. A questionnaire was applied in order to collect data. The instrument composed of items regarding participants’ background, use of computer applications, computer-related questions, computer knowledge test, and factors affecting the use of computers. Although data analysis showed that most teachers felt that their level of computer literacy, Internet literacy, and typing skills were adequate or higher, there were also great individual differences in the level of computer literacy. Son, Robb & Charismiadji (2011) concluded that “these differences bring about a need for a different approach to teacher training for a different background group of teachers, which allows teachers to improve their personal level of computer literacy and competency and gain online experience contextually relevant to their teaching situations” (p. 34).

In order to specify the levels of teachers’ computer literacy, Konan (2010) conducted a study on 506 teachers in Turkey. The gather data via researcher-made questionnaire were analyzed using t-test and one-way analysis of variance. The results showed a significant difference between the levels computer literacy in terms of their gender, experience, and education level. The overall computer literacy of teachers was medium. Moreover, male, novice, highly educated, and subject teachers were more literate, in terms of computer, than female, experienced, low educated, and class teachers. Konan (2010) suggested teachers increase their computer literacy by achieving some international licenses like European Computer Driving License (ECDL).

Warschauer (2008) conducted a 2-year multi-site case study in order to investigate literacy practices in 10 schools in California and Maine, the US, with one-to-one computing programs based on a sociocultural framework of literacy (Gee, 1996). Data collection included observation (650 hours), interviews (with 61 teachers, 32 school staff members, 67 students, and 31 parents), surveys (from 35 teachers and 877 students), and document reviews (teaching materials, student assignments, and student test scores). Collected data were analyzed through standard qualitative methods. The findings of the study were categorized in three main domains: reading, writing, and ICT literacy. For the purpose of this text, we have considered only ICT literacy. The findings revealed that, the ongoing access to new technology in one-to-one programs permitted both teachers and students to go beyond focusing on the mechanical aspects of ICT literacy like how to copy and paste information. In addition, regular access to the Internet allowed more exhaustive skills and competencies (Warschauer, Knobel, & Stone, 2004) such as a) more “just-in-time” learning, b) more individualized learning, c) greater ease in conducting research, and d) more empirical investigation (Warschauer, 2008b, p. 61).

IV. CONCLUSION

Globalization and the increasing range of ICT for communication led to the digital turn or “social turn” (Gee, 2000, p.180). Nowadays the meaning of literacy expanded from an ability to read and write to a broader definition which includes an ability to read and write both printed and electronic texts. In the 21st century, students need to promote their skills based on the time needs. The computer is an integral part of our daily lives; editing texts and photos, shopping, traveling, studying, etc. The computer technology becomes widely available and rapidly advanced. By this rapid progress, new literacies such as “computer literacy” and “electronic literacy” are brought up. Language teachers and students must develop their skills, prepare themselves for the future, and update themselves constantly. To be a competent individual in this information-based world, students and teachers should be aware of ways to access to information and actively making use of it. These qualities are achievable if they get familiar with new technologies and be a computer literate.

Students should learn how to assess their educational technologies from different point of views or subject positions (Selber, 2004). They should develop their multiple literacies in which how to use a technology by functional literacy, questioning technology by critical literacy, and finally producing or influencing technology by rhetorical literacy. These types of literacies are complimentary to each other, and all of them are necessary for language learners and teachers. “A considered focus on computer literacy in the classroom provides both teachers and students with a skill set to make better use of both CALL and productivity applications” (Corbel & Gruba, 2004, p. 7).

The Internet and all other computer-related texts suggest to educators, scholars, and students, a new adoption to new literacy which integrated into the educational context. Although printed materials are still the dominant media, the student should adapt themselves to new media; and therefore learn its literacy.

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