

An Overview of Research on the Effects of ICT and Convergence on SLA

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Abstract

Information and Communications Technology together with its Convergence is radically impacting human consciousness, language, society, and the habitable environment. The effects on the field of Second Language Acquisition are significant, and evident in EFL/ESL pedagogy. This overview of my recent research concerning these effects is intended to make the research more accessible, identify general themes that emerge, and integrate these various facets into a comprehensive structure while raising implications for future enquiry. Thirty-two papers from 2006 onwards are subsumed; all have been published at Linguistics or ICT conferences and/or in related journals, or world congresses on Asian Studies. Papers that overlap as a consequence of presenting research to diverse audiences are organized into thematic clusters, which are then summarized.

Keywords:– ICT, Convergence, SLA, EFL, CALL, iPad, blended learning, ubiquitous computing.

1. Introduction

A central theme of my research has been the rapidly evolving role of Information and Communications Technology (ICT) in language education, together with its critical Convergence. The Internet Industry Association (IIA) Convergence Virtual Taskforce, cited in Stollenmayer (2005), has defined Convergence as being about *the collapse of disparate technology, equipment and services into a set of common and ubiquitous technology, equipment and services*. Convergence, according to Stollenmayer, has multiple meanings: in telecommunications it refers to the combination of multiple services through lines of telecommunication from a single provider, such as the provision of integrated cable TV, VOIP and Internet. Triple Play, or even Quadruple Play which stresses the involvement of mobility, implies that all data, voice and video services will finally converge in an IP-based Next Generation Network. In technology, convergence refers to a trend for technologies having distinct functionalities to evolve to technologies that overlap. For example, the Asia-Pacific Broadcasting Union 47th General Assembly (ABU 2010) suggests that we are currently seeing the long-awaited convergence of television and the Internet, with content being published and broadcast to both. Bradley (2010) observes that computer technology, tele-technology and media-technology are considered to be the converging technologies. Her convergence model is structured with reference to Globalization, ICT, Life Environment, Life Role, and Effects on Humans, and offers four levels of analysis: individual, organizational, community and societal.

The role of ICT in language acquisition is well illustrated in regard to personal communication devices. Some years ago, Keirnan & Aizawa (2004), Thornton & Houser (2005) and Meurant (2006a) argued for a revisioning of the role of cell phones in the classroom. Over a year ago, the impact of the iPhone was reflected in the shift in interest to smart phones and Apps. In 2010, the sudden and dramatic impact of the iPad (still delayed in Korea at the time of writing) is resulting in renewed interest in tablet computing in education (Meurant 2010g). The significance of the cell phone was that it unexpectedly provided an immediately accessible (albeit rather limited) form of readymade ubiquitous computing, as the public and students in particular adopted its use *en masse*. The cell phone also often offered still and video cameras, SMS texting, and limited Internet access. Teachers did not have to pressure their institutions to purchase expensive hardware; it was already in students' hands, just waiting to be exploited.

Then the smart phone introduced the multi-touch screen interface. This constituted a major advance in interface technology because of its intuitive user-friendly and essentially non-verbal user interface. Smart phones also introduced Apps, so that suddenly enormous resources became literally available at one's fingertips. These resources could be stored in the smart phone's RAM, but could also access online databases - so that up-to-the-moment information content such as

foreign exchange rates, share values, weather forecasts and breaking news could be accessed. Apps software could be frequently and conveniently updated through online stores. During this period there has been a dramatic increase in the provision of Wi-Fi sites, many of which in Korea are free such as campuses, cafés, fast-food outlets, 24/7 convenience stores, and public spaces such as subway stations and airports.

Now, remaining form-factor limitations of small screen display and inconvenient keyboard have been overcome with the Wi-Fi tablet - which together with ongoing Wi-Fi networking of campuses suddenly provides effective and affordable ubiquitous computing that is available anywhere, at any time. This finally puts the Internet firmly into the hands of its users.

1.01. Similarity and diversity

Similar ideas occur in a number of these papers. This is as a consequence of wishing to present a given body of research to a diverse range of audiences, whether pure or applied linguists, ICT research scientists and engineers, or a more general scholarly public. These papers have been differentiated to suit their audience, and accordingly diverse aspects of the research have been developed in each. In this overview, papers with significant overlap are organized into thematic clusters. The overview attempts to redress broadness in presentation and eliminate redundancy by combining related papers, summarizing their cluster, and seeking to integrate these clusters into a more comprehensive structure. From the perspective of this overview, several papers (and therefore clusters to which some of them belong) could be considered as outliers, as they bear lesser relation to the main body of research.

2. The papers by cluster

2.01. Mobile telephony in the L2 classroom

The first cluster of papers of significance to the general themes researched concerns the intentional use of the cell phone in the EFL classroom. (It is indicative of the rapid pace of change that this particular research already appears to my eyes somewhat dated, and this trend is accelerating: I have recently observed that later papers would benefit from weekly and even daily updating as new technology is announced). While there has been enormous uptake of digital devices and computer-mediated consumption of information and communication in public, the SLA classroom has often remained a place where minimal intentional use of new technologies has been employed. This is particularly the case for native teacher classrooms. In Korea, the primary limitations have been teacher and administrative conservatism (which limitations persist within institutions), and a (presumed) lack of resources and sometimes expertise. Meanwhile, students presume the right to personal use of their cell phones during class, frustrating teachers who regard this as disruptive. This is complicated by the understandable difficulty teachers have in determining whether incidents of cell phone use are legitimate (e.g. in accessing electronic bilingual dictionary Apps), or not (e.g. in L1 social texting of friends on irrelevant matters).

Meurant (2006a, 2007k) therefore argue that cell phones in class provide potential for ubiquitous computer-mediated Second Language Acquisition (SLA). Existing research provides a general orientation and conceptual framework, and identifies their relevance to task-based learning, potential for distributed practice, and suitability for encouraging classroom interactivity. An important usage of cell phones in the L2 classroom is the capturing of SMS into a database that is displayed on a message board that can be viewed online by all. Teachers can then use computers to send SMS to students; this can be of advantage for administrative purposes. But the challenge is to ensure that permitting cell phone use in class does not open a Pandora's box.

2.02. Online learning strategies of Second Language students

The second cluster of papers relevant to the general theme of the research sprang from a realization that at that time little research attention had been paid to the strategies actually used in accessing online resources, notwithstanding Oxford's pioneering insight into the importance of learning strategies to language education. A number of theorists had suggested qualitative differences exist between traditional and online learning - and between the learners involved,

notably Prensky's Digital Immigrants versus Digital Natives. Meurant (2006b, 2007b) therefore identify the potential for empirical research into the online language learning strategies (LLS) that are actually used by students to complement traditional L2 learning. A research proposal subjects theoretical schema to empirical research. Think-aloud protocols would be conducted together with interviews and subsequent analysis. Specific research questions that would be addressed are: whether connected/collaborative learning strategies and cognitive styles are evident, whether more active participation and autonomous interaction are taking place, whether new metacognitive LLS are being evolved that favor nonlinear cognitive behavior, and just what relationships obtain between traditional and online Internet-based learning LLS. Formulating these research proposals provided a growing appreciation of how such research could and should be effectively conducted online to exploit the computer-based Internet environment.

2.03. Spatial play in Language Acquisition

My prior background as an architectural theorist, graphic designer and experimental geometer had led me to appreciate that spatial play is of vital importance to diverse disciplines concerned with developing spatial intelligence, and awareness of the formal languages used to address space. Spatial language ability is a critical aspect of spatial intelligence and play, but little research attention had been paid towards its First Language (L1) or Second Language (L2) acquisition in such contexts. Meurant (2006d, 2007j) therefore review the research literature, identify a significant shortfall, and suggest avenues for further research. The nature of spatial play should be clarified, and its role in facilitating language acquisition addressed. Multi-sensory spatial play helps experiential and linguistic learning, and language acquisition should relate to existent spatial language ability. Discovery during spatial play may helpfully destabilize spatial inter-language, inhibit fossilization, and allow development. Collaborative spatial play stimulates spatial language play and thus language acquisition. Knowledge of design philosophy may prove beneficial in developing an adequate spatial language acquisition theory. Recently, the ready availability and intuitive user-interface of CAD software such as the free Google SketchUp suggests also employing computer-mediated virtual spatial play for developing spatial language ability.

2.04. Surveys of college student use of digital devices and online resources

The lack of research material on online language learning strategies was one factor that encouraged further enquiry into student use of digital devices and online resources. This resulted in my undertaking a number of surveys that were formulated as learning tasks for students to whom credit was given. The surveys initially provided helpful exploration of Internet-based assessment systems, as they were based on online tests that were not designed for such purposes but were adapted for use. (After completing the research more effective online survey systems have become widely available, a useful and readily accessible one being Google Docs Forms. Assessment software such as Cognero and Learning Management Systems (LMS) such as Moodle now include opinion scale/Likert questions, where a statement can be provided for which students rate their opinion or agreement, and where there is no correct answer.) These learning tasks later provided helpful exposure to online LMS. The surveys also helped identify what was at that stage merely an emerging theme: that of the relevance of fostering L2 digital literacy in English.

Recognizing that cell phones and SMS in the classroom offer an immediately available form of ubiquitous computing to facilitate second language acquisition, Meurant (2007a) presented the results of an initial survey of college student use of cell phones, electronic dictionaries, SMS, Email, Computers and the Internet. This investigated use of the target L2 English, questioning whether such resources were used for L2 learning, and to what extent the target L2 was used. The survey was refined and repeated in the following semester, the results of which are presented in Meurant (2007i), together with suggestions for future improvement. Subsequent surveys conducted over several years further refined the questionnaire, but are not yet published.

2.05. Making cell phone videos for an L2 social networking site and responding to them

During this period, the challenge of integrating computer-mediated tasks and learning into the second language classroom became stronger, as a technological imperative arose to exploit new

cyberspace environments, social networking sites, and digital devices. This imperative developed naturally from my interest in the use of the cell phone, online LLS, and digital use surveys.

Recognizing that the high penetration of student cell phones in East Asia, with built-in features that included bilingual dictionaries, SMS, Email, Internet access and videocams, already offered ubiquitous computing facilities for pedagogical applications, EFL tasks were designed that required college freshmen to use their cell phone videocams to make L2 English video guides of their campus. These tasks are described in Meurant (2007f, 2008a, b). Videos were emailed to the instructor, and after file conversion, uploaded to a vblog on US.Cyworld.com, an English language social networking site that paralleled the Korean language Cyworld site that students knew well. Students were instructed by email to view the videos there, and to post responses in the homepage guestbook. This required the use of English to set up a personal account, navigate the social networking site to view the videos, and compose and post responses. The task was key in identifying the developing critical importance within EFL pedagogy of L2 Digital Literacy.

2.06. Using LMS to develop critical L2 Digital Literacy

During this period, I was experimenting with the use of Internet-based tasks and assessment (quizzes and exams). I was also seeking to integrate grading and course information, and perhaps inevitably became interested in online Learning Management Systems, in part because of the limitations I was then experiencing with dedicated online assessment systems (notably ExamView). As a consequence of a variety of experiences in implementing hybrid language education, I realized the language learning potential of mandatory use of English as a meta-language in the EFL student cyberspace environment, a parallel to the native teacher electing to use only English in her traditional EFL class while encouraging students to use L2 English exclusively in class.

Now more confident of the emerging importance of L2 Digital Literacy within EFL in Korea, I speculated that such literacy would evolve to eventually be regarded as the most critical component of overall L2 English Literacy. Computer-based Internet-hosted LMS, such as the popular open-source Moodle, are rapidly being adopted worldwide for distance education, and are also being applied to blended education. Recognizing this, Meurant (2009c, f, 2010e) argue that they have a special potential in EFL Education: simply by setting the LMS to force English to be used exclusively throughout a course website, the meta-language is made the target L2 language. Students of necessity develop the ability to use English to navigate the Internet, access and contribute to online resources, and engage in computer-mediated communication. Students would develop their L2 Digital Literacy through such pragmatic engagement with English.

2.07. The Korean need for L2 Digital Literacy in English

In this cluster of papers, the emerging recognition of the importance of L2 Digital Literacy in English in EFL - particularly in Korean EFL - became fully formed. Although digital resources play an increasing role in SLA, Korean learners of English are provided with little intentional instruction in L2 Digital Literacy. But three key factors had by now become apparent:

1. The predominant use of English by non-native speakers will increasingly be in communication with other non-native speakers, and not with native speakers as might have been expected.
2. The emergence of English as a global language means that desired online resources and discourse are and will likely remain mainly in English.
3. A critical threshold is fast approaching whereby the majority of interpersonal communications will have become computer-mediated, rather than face-to-face. This last factor is of particular significance, and will likely have profound consequences.

Meurant (2009d, e) therefore address literacy, digital literacy, and L2 digital literacy. Together with Meurant (2010j), they argue that the predominant use of English by non-native speakers will be firstly in navigating English language digital resources, in locating, consuming, editing, and contributing to online content in English; and secondly in computer-mediated communication with other mainly non-native speakers of English. That both of these envisaged predominant uses of English by non-native speakers are computer-mediated has profound implications for SLA, and specifically for Korean learners of English: in Korean EFL we should therefore nurture and develop L2 Digital Literacy in English.

2.08. Korean face and cultural dimensions

Transformations of the magnitude of modernization, globalization, and digitization inevitably affect a society's tradition and are likely to influence and bring change to its cultural dimensions. Kohls' popular guide to living and working in Korea presents Koreans as being people-oriented and group-centered. Meurant (2007e) presents a critical review of a section of his work from a perspective of intercultural communication, having regard to face and cultural dimensions. Kohls critically identifies *face* as a key concept to understanding Korean society, but does not distinguish negative and positive face, nor identify face-work strategies that might help the reader save or give face. Korean society is high-context, with high degrees of collectivism, power-distance and uncertainty avoidance, with long-term orientation and an interdependent construal of self. Some of these cultural dimensions are changing under the impact of modernity and globalization. Although Kohls does discuss *kibun*, indirectness and harmony, he does not identify Korea as exhibiting a high-context culture and communicative style in comparison with low-context American society, as might be expected. He also fails to identify another key Korean-American cultural differential, that of large versus small power-distance.

2.09. A hybrid exploration of treating English prepositions as degenerate verbs

Hybridization in genetics refers to the process of combining different varieties or species of organisms, and in Globalization theory, to an ongoing blending of cultures. It is also commonly observed in ICT, as a means by which Convergence often takes place. It also provides a timely reminder of the inherently multidisciplinary nature of reality that is not adequately dealt with through excessive specialization (see 2.15). In linguistics, hybridization usually refers to the process of one language variety blending with another variety, but linguistics can also be considered in concert with other disciplines that might at first be considered to be quite distinct. Prepositions share properties with verbs: they act as operators that often relate subject and object noun phrases, and they assign theta roles and case to their nominal objects. In a hybrid exploration of geometry and linguistics, Meurant (2007d) addresses syntactic parallels in the English language between verbs and prepositions, while noting significant areas where they differ. Mathematical degeneracy denotes a limiting case in which a class of objects changes its nature to become simpler. Degenerate structure is discussed, using two-dimensional geometrical examples, and ways are identified in which degeneracy gradience might be applied to lexical categorization. The syntactic role of prepositions is examined. Prepositions and verbs are compared, to identify significant similarities and critical differences. The treatments of prepositions in Chomsky's and Jackendoff's competing theories of syntactic feature sets are reviewed. The syntactic evidence indicates English prepositions could indeed be subsumed as a degenerate form of verbs. This may have potential implications for computational linguistics and artificial intelligence.

2.10. Custom computerization of the Oxford Quick Placement Test

These papers evolved from research that I was conducting as Second Researcher for Gavin Austin's PhD research for the University of New England on syntactic, phonological and semantic variability in L2 inflectional morphology. Students needed to be screened for interview by means of the Oxford Quick Placement Test (OQPT) prior to being interviewed. As access to the proprietary computer version of the test was not available, paper-and-pen versions of the OQPT were adapted to computer-based testing via Internet hosting. Initially, this was done using FSCreations ExamView, with which I have had substantial experience. However, I experienced serious hosting problems that I had previously never encountered, which disrupted planned quizzes and exams. This experience, together with eventually (and inadvertently) learning of the intended termination of the hosting service, led to my converting the tests for use with the popular computer-based LMS Moodle. (Subsequently, OUP has substantially revised their online OQPT test service, and FSCreations has relaunched ExamView). I then tested 317 sophomores online to screen for interview, and to encourage their L2 digital literacy. While acknowledging that the specific OQPT tests were not designed for that use, Meurant (2009a, b) then argue that computer-based Internet-hosted L2 aptitude tests prove effective strategies for hybrid implementation of LMS in L2 tertiary education. They have the potential to provide a convenient

measure of student progress in developing L2 fluency, and offer a more objective and relevant means of teacher- and course-assessment than student evaluations, which tend to confuse entertainment value and teacher popularity with academic credibility and pedagogical effectiveness.

2.11. The 3:5:4 Initiative to refocus tertiary EFL resources

The emergence of English as a Global Language has profoundly revolutionized global society. Asian societies recognize the global importance of English, and place considerable emphasis on raising the level of English ability. In Korea, tertiary students are required to study EFL, having also studied it at elementary, middle and high school levels. But my experience here suggests that this process can, at times, be somewhat ineffective. Critical real-world constraints emerge, of which important constraints are that significant numbers of Korean Learners of English are poorly motivated and/or have low aptitude. These constraints are generally unrecognized, or at least poorly acknowledged. Obviously, there are also limited resources with which to teach English. Rather than addressing the political dimensions of this issue - which means have demonstrably proven ineffectual - Meurant (2010f) advances the **3:5:4 Initiative**, intended to raise the level of English in Asian societies through improving educational output.

This would be achieved by providing a more effective use of resources. The need for such optimization is evident as the global economy suffers serious recession, while the quality of English demanded from graduates rises. I develop a straightforward mathematical model from first principles of the relative proportioning of deployment of resources, making qualitative and then quantitative restructurings of relative resource deployment. Calculating the efficacy of resource deployment under two alternative scenarios indicates that significant potential gains in efficiency in educational value could be achieved: simply redeploy teaching resources from students with lower motivation and/or aptitude, to students with higher motivation and/or aptitude.

2.12. EFL/ESL textbook selection in East Asia

Every few years, EFL/ESL departments select new textbooks, but it is not uncommon for the selection process to become shrouded in secrecy, and for inappropriate texts to be chosen as a consequence. Students and teachers then suffer from this poor choice of texts for several years. It was becoming clear from previous research together with first-hand experience at international conferences that non-native speakers will use their L2 English mainly to communicate with other non-native English speakers. This implied that an American accent was increasingly becoming an irrelevant factor in preparing Korean students for their use of L2 English. Furthermore, L2 English will mainly be used in computer-mediated communication, which implied the developing importance of L2 Digital Literacy. The radical impact of the Convergence of Information and Communications Technology on Second Language Acquisition is resulting in some teachers already integrating web-hosted Assessment and LMS into their classrooms and courses. These phenomena imply that EFL/ESL textbooks need to be compatible with blended learning, prepare students for a globalized world, and foster autonomous learning. Meurant (2010c) therefore reviews research on EFL/ESL textbook evaluation, and includes a variety of relevant source material for adaptation. Textbooks - together with the presence of the native teacher - offer for most students the major source of contact with the target language, so selection is an important decision. Educators therefore need to be systematic and objective in their approach, and adopt a selection process that is open, transparent, accountable, participatory, informed and rigorous. To this end, it would help local EFL administration and teaching to gain an appreciation of Web 2.0+ thinking, which is well accepted in Western science and pedagogy. This might serve to encourage the subordination of narrow political interests to the actual educational needs of students. This paper was presented to an international conference in Japan.

2.13. The iPad as a tool to develop EFL Digital Literacy

It has become clear that in future, the uses of English by non-native speakers will predominantly be online. Firstly, non-native speakers will use their L2 English to access, process, consume, produce, edit, and publish English language digital resources. Secondly, they will use their L2 English to engage in computer-mediated communication with other non-native speakers of English,

who in general will not share the same L1. Both uses are computer-mediated: this has profound implications for Korean learners of English. For Korea to be competitive in the global economy, its EFL should develop L2 Digital Literacy in English. But how best is this to be achieved?

With its fast Internet connections and high level of broadband penetration, Korea is arguably the most wired nation on Earth. But my experiences with ICT facilities in educational institutions here indicate that they would benefit greatly from drastic reorganization. The opportunities for computer-mediated second language learning need to be substantially increased, particularly for native teacher English classes. Meurant (2010d, g, h, i) therefore argue that multimedia capable, mobile web solutions need to be provided that put the Internet firmly into the hands of all students and teachers. An effective way to achieve this is through three interrelated initiatives: Firstly, provide high-speed Wi-Fi networking to all campuses. A number of institutions have implemented this, which allows just about any campus space to act as a wireless classroom. Secondly, provide a teacher's computer console with high-speed Internet access and OHP in every classroom. Some institutions already have this. The teacher's classroom computer would also act as a local server for backup of student files and software if storage in the cloud is not to be employed. Thirdly, provide all students with adequate computing facilities, that are available anywhere, at any time. Finally, this has now become feasible through issuing every student on enrollment with a Wi-Fi+3G enabled Apple iPad. The educational institution would load the e-Texts and Apps required for study, and regularly update them by Wi-Fi. Subsequent to my realizing the potential ubiquity of Wi-Fi networked iPads and writing the first few of these papers, I discovered that a similar solution has been implemented by Fraser Speirs at the Cedars School of Excellence in Scotland, which he discusses on his insightful blog (Speirs 2010). This solution is also proposed for Seton Hill University in Greensburg, Pa. (Brown 2010), and in Korea, for the ChungKang College of Cultural Industries in Icheon City, Gyeonggi-do (Yu 2010). I am of the opinion that those educational institutions who are early-adopters of this technology will be inundated with students who are eager to take advantage of this bold initiative, though naturally it will require effective implementation.

2.14. Dematerialization and deformatization of the EFL/ESL textbook

As previously argued, the rapid development and critical convergence of ICT is radically impacting education. This has particularly implications for the language classroom, where the availability of multimedia content and the immediacy of distance communication offer specific advantage for interactive participation. As the language classroom evolves to integrate computer-mediated learning and communication with traditional schooling, digitization and the Internet are resulting in the textbook evolving from inert hard copy that is consumed, to dynamic e-texts that students participate in and with. Such e-texts should ideally integrate online links and multimedia, and foster autonomous learning. The emergence of English as a Global Language together with the primary role of English on the Internet means that the transition from fixed hard copy to fluid online digital environment is particularly evident in EFL/ESL. Meurant (2010b) therefore reviews research, traces this transition, and speculates on how, under the impact of ICT and its convergence, the EFL/ESL textbook will reform. Eventually, the textbook itself may even disappear as a stand-alone entity.

2.15. Revisioning of the Hierarchy

The transition from fixed hard copy to fluid online digital environment is indicative of a change in worldview that is an inevitable consequence of the transition from traditional face-to-face reality to a predominantly online and thus virtual means of information management and communication. The modern Western *Weltanschauung*, affirming an empirical view of the world, has tended towards a singular analysis of complexity (though I now wonder if this may be changing, as digital natives effortlessly multitask). Compartmentalization and dissociation are emphasized, and reinforced by the structure of the Simple Hierarchy that the *Weltanschauung* promotes. Within human institutions, this structure characteristically gives rise to discriminatory political environments. But the network which is often advocated as an alternative appears severely limited in its capacity to structure complexity, and may be indicative of a loss of sense of qualitative structure to the world.

Meurant (2007c) therefore presents a critique of the Simple Hierarchy. The potential of hierarchical structures is discussed, with reference to the Traditional perspective. A revised appreciation of the hierarchy indicates its potential for human development, in concert with the network. It suggests that problems stem not from the hierarchical structure *per se*, but from the specific types of hierarchy that are commonly used, and how these are understood and applied.

2.16. Metaphysics and Multimedia

One aspect of ICT is the digitization of Multimedia, which has transitioned from the physical (e.g. ritual, festival) to the virtual. The effects of multimedia on users are profound, and affect their relation to physical reality and their metaphysical perspective. Within the electronic environment, the multimedia user experiences spatio-temporal freedom from certain important physical constraints of the real world. Electronic configurations are free from constructional, material, structural and gravitational constraints operating in the physical world. This freedom is liberating: the imagination is given a powerful tool with which to explore externalized representations of ideal environments. But a potentially destructive potential arises. External tools of the imagination become increasingly sophisticated at the expense of the ability to master the internal imagination. Meurant (2007g) therefore argues that we externalize at the price of inner vision. There is a possibility of greater alienation from the physical world and from the spatial and structural intuition with which we inhabit reality. A loss of these critical relationships to physical reality may mean we encounter a loss of metaphysical lucidity to the world.

A paper I intend writing in the near future will develop a similar thesis for the excessive politicization of society experienced in the contemporary world: the dangers of a concern with power being that it obscures apprehension of the Real, and hence provokes the evident loss of authenticity in modern society.

2.17. English as a Celestial Language

Under the impact of ICT and Convergence, literacy and the nature and stature of books is changing, as language itself undergoes qualitative transformation. I believe that, barring global catastrophe, large scale manned Space exploration and settlement is inevitable. It will bring with it further major linguistic transformation. Meurant (2006c) argues that the emergence of English as a Global Language implies that the eventual intensive exploration and settlement of Space will make use of English as a Celestial Language. (To be objective, it should be noted that currently the US is maintaining a lower profile in manned space exploration than in the past, while Chinese efforts have intensified). Key aspects of Microgravity, artificial intelligence, isolation, confinement, and the silence of Space will inevitably transform the language's structural features as it expands into the Cosmos.

2.18. On the obliquity of Ubiquity

Ubiquitous computing - such as that promised by the advent of the Wi-Fi networked iPad - undoubtedly offers exciting potential, and will likely extend to more comprehensive ubiquitous service, as demand grows for the ability to access desired services anywhere, at any time. However, these are not new notions, and somewhat similar visionary proposals were put forward in the 1960s. The etymology of *ubiquity* derives from a metaphysical premise of the spatial and temporal omnipresence of the divine, and the notion extends through traditional religious thought far back into prehistoric belief. While ubiquity is clearly a highly desirable notion, it bears the danger of becoming an overly indulgent wish fulfillment, where all human needs and desires demand immediate satisfaction. Clearly, this represents an unhealthy extension of the idea. Meurant (2007h) argues that what is called for instead is Wisdom Ubiquity: the wise provisioning of ubiquitous services, which within realistic parameters accommodate an appropriate level of human satisfaction. In this regard Toderian (2009) notes Prince Charles's committed efforts to foster sustainable development. Certainly ubiquitous computing is a key means of satisfying a fundamental challenge of humanity, that of providing sustainable energy, which may now be met through the Smart Grid. As Albrecht, Adrian, Hans & Friedemann (2010) argues, the great potential for creating sustainable energy that arises through an increase in decentralized

energy provision, ranging from energy harvesting in devices to personal green power plants, brings with it the cost of a higher complexity of distribution network and storage mechanisms, which ubiquitous computing can help manage.

The imperative for adequate computing facilities for language learning students is a component of the drive towards ubiquitous computing. The intention here is not an indulgent satisfaction of students' or teachers' whims, but the provision of an adequate technology that is transparent - it is effortlessly there, when needed, and to all intents and purposes invisible, when not. One simply merges with the digital mindstream when such involvement is called for, and lets it float to the periphery, or quietly separates from it, when not.

3. Conclusion

The general thrust of the research over this five year period is therefore as follows: We are in the midst of a historic, radical and profound shift that is taking place from traditional face-to-face to mainly computer-mediated interpersonal communication. The digital revolution is resulting in an overwhelming preference for resources to be published, edited, stored, accessed, consumed, and responded to online. Discourse also is moving online to take advantage of such factors as ease of access, economy, distance communication, immediacy of communication, ability to store and to review prior correspondence, ability to network and collaborate, capacity for multimedia communication, etc. In education, the textbook is evolving from inert hard copy to dynamic e-texts that facilitate interactive participation and autonomous learning. In EFL/ESL, it is recognized that non-native English conversation will increasingly be primarily with other non-native speakers. Online resources and discourse will continue to be preferred in English because of the emergence of English as a Global Language, and the historic development of the Internet in native English-speaking countries.

These various factors then have implications for EFL/ESL in East Asia and in Korea: it is critical that L2 digital literacy be fostered. Teachers are encouraged to favor blended learning, and to utilize Learning Management Systems and e-texts. Web 2.0+ philosophy suggests that teachers should be systematic and objective in textbook selection, and adopt a process that is open, transparent, accountable, participatory, informed and rigorous. Educational institutions need to be proactive in implementing ubiquitous computing, so that all students and teachers have access to adequate computing anywhere, at any time. Korea has a special potential for this as a consequence of its status as arguably the most wired nation on the planet. Ubiquitous computing has now become feasible through firstly comprehensive Wi-Fi campus networking; secondly installation of teacher's computer consoles in all classrooms with fast Internet access, printers and OHP; and thirdly and most importantly providing every student on enrollment with a Wi-Fi+3G iPad tablet. Institutions would load and regularly update these with the e-texts and apps required for creating, sharing and consuming content and for communicating.

Finally, it may be helpful to bear in mind that from one perspective, natural language can be considered as simply one form of "natural" ICT that has evolved (alongside other natural forms such as art, architecture, music, dance and ritual) as a symbol system whose primary function has become to enable information management and communication. I therefore see enormous potential for further applying ICT methodology to language and to linguistics. And in the far future, it may be that humanity evolves ICT meta-technology that directly integrates consciousness, and that regards natural language as an amusing relic from a distant past.

4. Acknowledgements

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