Internet-Based Real Time Language Education: Towards a Fourth Generation Distance Education

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ABSTRACT
Through the examination of the development of distance education for foreign languages, this article puts forward a theory on the emergence of a fourth generation of distance language education, challenging the generally accepted three-generation theory. It is argued that with the use of Internet-based real time technology distance language learning becomes synchronous for the first time and that the immersion of distance and campus-based education into a new education system is inevitable.

KEYWORDS
Distance Education, Generation, Correspondence, Interaction, Computer-Mediated Conferencing (CMC), Real Time Technology, Internet, Web, E-Mail, Virtual Reality, Multimedia, Re-engineering, On-Line, Distributed Learning, Collaborative Learning, Synchronous, Asynchronous

INTRODUCTION
While distance education can claim its status as a separate mode of education (Holmberg, 1995), our research in this area shows that the development of distance education is, in fact, a process of simulating the traditional face-to-face mode of education. As education is essentially a form of communication, efforts have been made from the very beginning to improve communication and interaction between the education provider and the learner, as one generation gives way to another. A recurrent theme has been Holmberg’s concept of “guided didactic conversation,”

© 2001 CALICO Journal
Volume 18 Number 3 539
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which portrays distance education as a “conversation-like interaction between the student and the distance education provider, including the instructor, the counselor, the author, and so on” (Holmberg, 1986). This theme in distance education, including the area of language teaching, has remained unchanged throughout the development of distance education, although its quality and scope are constantly improved.

This article focuses on learning languages as one area of distance education, not distance education in general. Research in the area of language learning at a distance has occupied only a marginal status in the entirety of distance education research, both in terms of quantity and quality. This article, therefore, attempts to bridge some of the gaps in this area.

As far as language teaching at a distance is concerned, what distinguishes one generation of teaching from another is the improved capabilities brought about by different types of educational technology. The role of educational technology has become increasingly important since the 1980s, when computer technology began to be widely explored, and has now become indispensable to all areas of distance education. The use of advanced computer technology warrants a reappraisal of the distance teaching and learning paradigm, especially in the case of language learning. This reappraisal is due largely to the fact that language learning relies even more heavily on the use of technology than most other areas in distance education.

This article argues that with the development of Internet-based real time technology, the fourth generation of distance education is beginning to emerge. This argument is fundamentally different from the three-generation theory popular among scholars such as Garrison (1985), Chacon (1992) and Boyle (1995). Tables 1 and 2 provide a overview of the differences between the four-generation and three-generation theories.
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Table 1
Four-Generation Theory

<table>
<thead>
<tr>
<th>Generations</th>
<th>Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>Printed media, post system</td>
</tr>
<tr>
<td>Second</td>
<td>Older media: printed media, post system</td>
</tr>
<tr>
<td></td>
<td>New media: broadcasting, television, radio, telephone, audiocassettes, videocassettes, cable television, etc.</td>
</tr>
<tr>
<td>Third</td>
<td>Older media: printed media, post system, broadcasting, television, radio, telephone, audiocassettes, videocassettes, cable television, etc.</td>
</tr>
<tr>
<td></td>
<td>New media: Word processor, multimedia packages, e-mail, the Web, the Internet, etc.</td>
</tr>
<tr>
<td>Fourth</td>
<td>Older media: printed media, post system, broadcasting, television, radio, telephone, audiocassettes, videocassettes, cable television, word processor, multimedia packages, e-mail, the Web, the Internet, etc.</td>
</tr>
<tr>
<td></td>
<td>New media: Internet-based real time technology such as desktop videoconferencing, Internet telephoning, virtual reality, etc.</td>
</tr>
</tbody>
</table>

Table 2
Three-Generation Theory

<table>
<thead>
<tr>
<th>Generations</th>
<th>Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>Printed media, post system</td>
</tr>
<tr>
<td>Second</td>
<td>Broadcasting, television, radio, telephone, audiocassettes, videocassettes, cable television, etc.</td>
</tr>
<tr>
<td>Third</td>
<td>Computer</td>
</tr>
</tbody>
</table>

On the basis of the two tables, it is evident that our theory of the fourth generation conforms with the commonly held three-generation theory with respect to first and second generations. The differences appear in the divisions of the third and fourth generation. The four-generation theory also differs from the three-generation theory in that it stresses the combination of older media with new media in each generation.
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This article concentrates upon the emergence and capabilities of the third and fourth generation. In so doing, it clarifies the divisions between the second and third generation and between the third and the fourth generation. The article will then discuss the future of distance language learning with particular emphasis on the use of Internet-based real time technology.

By examining the different stages in distance education, the main purpose of this study is to gain insight into the following critical issues confronting language learning at a distance. What has been achieved so far with learning languages in a distance mode? With the aid of advanced computer technology, what can be achieved in this field? What is the future of this mode of language learning and teaching? In a word, what are the major implications of advanced computer technology for distance language education? A re-examination of the development of distance language education and the implications of technology for language learning at a distance should provide insight into the potentials of distance learning mode, especially for language learning.

DEFINITIONS

The Nature of Distance Education

To define the phases of the development of distance education, it is vital to understand the nature of distance education. Holmberg’s concept of “guided didactic conversation” is used in this paper as a framework to understand the nature of distance education. Numerous attempts have been made to define this mode of education, although without unanimity. Nevertheless, drawing on the work of scholars (e.g., Holmberg, 1997, 1986, 1995; Keegan, 1983; Cunningham, Tapsall, Ran, Stedman, Bagdon, & Flew, 1998), the nature of distance education can be summarized as follows:

1. physical separation of learner and educator (i.e. physical distance preventing face to face education (Holmberg, 1977; Keegan, 1983; Cunningham, et al., 1998),
2. mediated subject matter presentation (Holmberg, 1995),
3. mediated student-tutor interaction (Holmberg, 1995) or a student-tutor relationship (Dallois, 1984), in Keegan’s (1983) words, provision of two way communication,
4. use of technical media (Keegan, 1983).

Throughout the development of distance education, the fundamental nature of separation of learner and education provider has remained unchanged.
Mediated subject matter presentation and mediated student-tutor interaction are the two basic constituent elements of distance education (Holmberg, 1995). The content and scope of these two basic elements have been constantly enriched as one generation moves on to another, and the improved capability of the two elements serves as a yardstick for the replacement of one generation by another.

In addition, the use of technical media has continually improved the quality of the two elements such that it can be said that the technology used at different stages of distance education determines the characteristics of each generation.

The Definition of “Generation”

Few scholars have attempted to define the term “generation,” with the exception of Garrison (1985) who states,

Generation is used to suggest the building upon previous capabilities. The development of the generations of distance education represents, in systems terminology, a hierarchical structure with an increasing differentiation of technological capacity for integrating unique delivery systems. In other words, new media can be combined with older media to provide a greater range of choice for the design of effective distance education delivery systems.

This article has adopted the above definition to determine when one generation progresses to another. Essentially, the dividing line for each generation occurs when technology fundamentally improves the mode of subject matter delivery and learner-instructor interaction. These improvements do not change the fundamental nature of distance education (i.e., the physical separation of education provider and the learner) but instead create a qualitatively more favorable learning environment for distance learners. In other words, technology has brought revolutionary changes in distance education in the sense that it has constantly advanced the evolution of distance education both in terms of “presentation of learning matter” and “student-tutor interaction.” It is on the basis of this understanding of the term “generation” that this article proposes the emergence of the fourth generation in distance language education.
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THE FIRST GENERATION OF DISTANCE LANGUAGE EDUCATION

Mediated Subject Matter Presentation

It has been documented that the first advertisement offering distance courses to learn shorthand skills appeared in 1728, but more conclusive evidence of teaching of the distance nature was found a hundred years later (Holmberg, 1995). It can be argued that the first generation of distance education should be traced back to 1833 when an advertisement appeared in Sweden, offering an opportunity to study “composition through the media of the post” (Baath, 1980; 1985). Distance learning courses soon began to appear in England, Germany, the United States, and Japan (Holmberg, 1995). The earliest distance language school, documented by Noffsinger (1926), was established in Berlin in 1856 in which language curricula and learning outcomes were undocumented.

Printed materials and the postal system were used almost exclusively to present and deliver the teaching, which is why this period is also known as the correspondence generation (Garrison, 1985). The area or distance covered by such an education was limited due to the restrictions of the then prevalent communication system.

Mediated Student-Tutor Interaction

Limited data are available which match the ‘primitive’ nature of the technology, in terms of “guided didactic conversation.” The combination of printed matter and postal system could hardly offer any direct interaction between student and education provider, despite the existence of two-way communication. Such communication was very limited and often delayed by the poor communication system of this period.

Summary

The first generation of distance education lasted nearly a century, the longest generation in the history of distance education. However, due to its limited capabilities, distance education for languages in this generation did not develop as fast as other disciplines in the distance mode and remained a relatively neglected area.

THE SECOND GENERATION OF DISTANCE LANGUAGE EDUCATION

When technologies such as telephone, television, radio, and audiovisual cassettes, were brought into distance education in the 1970s, the presentation of learning materials and the interaction between students and tu-
tors underwent revolutionary changes. The significance of these technologies also lies in the fact that they not only helped to reduce the isolation of the distance learners but also opened up new possibilities for distance language instructors and learners. This generation witnessed a wealth of different modes of delivery of language learning materials, particularly in improving the four macro skills in language learning: listening, speaking, reading and writing. Improving listening and speaking skills had been a century-long problem because the distance between the learner and the instructor, and the limitation of media, had prevented spontaneous and effective interaction. In the second generation, distance language educators attempted to tackle these hurdles by using advanced educational technologies.

Changes in Mediated Subject Matter Presentation

In addition to printed materials, subject matter could be delivered in a variety of modes.

TELEPHONE

The use of telephone included teleconferencing networks, facsimile transmission of printed materials, slow-scan transmission of graphics, and photographs on to a television screen (Robinson, 1984).

Telephone conferencing allowed unrehearsed and spontaneous conversation between peers and tutors, and, thereby, improvement in the learner’s listening and speaking skills. Its low cost and ease of use also made it one of the most favored technologies for distance education. Nevertheless, the telephone was still not an ideal aid for language learning because of the absence of visual contact, nor was it suitable for mass instruction. (For more information on the advantages and disadvantages of using the telephone in distance education, see Robinson, 1984.)

AUDIOCASSETTES

If well designed and properly used, an audiocassette, “integrated with the text, is a low-cost, highly effective teaching medium for individualized study, with much greater flexibility than many other media” (Bates, 1984b). In addition to listening to recorded texts, language learners at a distance often use the cassette tape to record their speech and pronunciation and post the cassette tape to the instructor. After listening to the recording, the instructor is able to point out problems or areas for improvement or can record the same passage for learners to listen to and compare with their own recording. However, this medium has the following disadvantages:
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1. it can be very time consuming to listen to each recording and to record one's own voice;
2. it is not possible to ensure that students can pick up the difference between the correct pronunciation and their incorrect pronunciation; and
3. it does not offer spontaneous interaction.

VIDEOCASSETTES

Videocassettes are favored by distance language educators because of their provision of visual contact and authentic materials. They also have a low cost compared to that of broadcast television.

BROADCAST TELEVISION

While embracing advantages such as visualization of large volumes of learning materials, promotion of motivation, better publication of educational opportunities, and so forth, broadcast television also has greater limitations than other media employed in this generation. As broadcasting depends heavily on transmission schedules and presents materials in a linear way and at the same pace for all students, students have little control of their learning and can easily become frustrated (Bates, 1984a).

Among the media mentioned above, telephone and audiocassettes are the most popular media among distance language learners because of the relative ease of use and low cost (Boyle, 1995; Garrison, 1985).

Changes in Mediated Student-tutor Interaction

The quality of interaction between the learner and the instructor has greatly improved, and has become more efficient and direct. In a telephone conferencing learning environment, the learner may have real time interaction with each other and with the teacher; they can send their taped speeches for the instructor to check and compare their pronunciation with the instructor's or the taped authentic pronunciation. With live television broadcasting, learners may hear and watch the language being spoken at home. The use of technology not only improves students' language proficiency, but also reduces the sense of isolation common to most distance learners.

Summary

Despite the fact that technologies used in this generation are all single medium technologies, they had a revolutionary impact on distance lan-
Distance language learning proliferated in this phase; more languages were being offered than ever before. In Australia, not only were European languages offered, but Asian languages such as Indonesian, Japanese, and Vietnamese also became popular distance learning subjects (Williams & Sharma, 1988).

To summarize, the second phase of distance language learning enjoyed a closer link with technology. It witnessed revolutionary changes in the presentation of learning materials and more stimulating and effective student-tutor communication and interaction. The second generation model offered a more effective language learning environment in that, apart from reading and writing skills, it catered to the development of listening and speaking skills.

THE THIRD GENERATION OF DISTANCE LANGUAGE EDUCATION

Justification of a New Generation

While the first two generations are generally accepted divisions in scholarly research, existing literature does not offer a convincing dividing line between the second and the third generations. The term “computer generation” has been used by scholars such as Garrison (1985) to describe the third generation, but this term is too broad and vague to define precisely the features of this generation. The definition by Chacon (1992) cited in Boyle (1995) is even broader: “The second model of distance learning gave way to the third generation when access to computers changed the way in which teachers and students were able to process information, interact with, and communicate with one another.” It would be too simplistic to say that the third generation has been marked by the use of computers in distance education, not only because computers were employed in education as early as the 1960s but also because the use of computers in distance education has had a complex and evolving history. Barnes and Reid (1993) summarized the historical development of computers in teaching and learning (see Table 3).
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Table 3
Summary of Computer Technology Used in Education

<table>
<thead>
<tr>
<th>Term</th>
<th>Period</th>
<th>Human Interface</th>
<th>Educational Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Based Instruction</td>
<td>1965-1975</td>
<td>keyboard syntactic metaphor</td>
<td>Computers instruct like teachers and test precise content understanding.</td>
</tr>
<tr>
<td>Computer Assisted Instruction</td>
<td>1975-1984</td>
<td>keyboard syntactic metaphor &amp; menu choices</td>
<td>Computers act as tutors in the prescribed instructional process and test content understanding.</td>
</tr>
<tr>
<td>Computer Assisted Learning</td>
<td>1984-1992</td>
<td>mouse visual metaphor</td>
<td>Computers allow individual learning paths; students aim at and articulate goals in relation to curriculum.</td>
</tr>
</tbody>
</table>

Although the information in Table 3 provides a general account of the use of computers in education, it can serve as a reference to discern some trends in the use of computers in distance education. Table 3 shows that computers played a limited role in education from the 1960s to 1984. Only a privileged few educators used computers for the purpose of instruction. It was not until 1984 when the Macintosh mouse-based approach was introduced that computers offered “a clear opportunity for open learning providers” (Barnes & Reid, 1993). Although Garrison (1985) did not provide a distinctive beginning point for the “computer generation,” he mentioned that 25 years of research has proven that Computer-Assisted Learning (CAL) “can be a more efficient or effective means of instructional delivery than traditional face-to-face instruction.” Judging from the above, it can be argued that the third generation of distance language learning started in the early 1980s, and its characteristics can be best summarized by the acronym CALL (Computer-Assisted Language Learning). This acronym indicates that in this period, computers have only acted as an aid to the main teaching framework, not as the principal media of learning material presentation. Multimedia has become the catch phrase of this generation.
Changes in Mediated Subject Matter Presentation

In addition to print materials, this generation has witnessed two major delivery modes in languages at a distance: off-line delivery and on-line delivery. Off-line delivery refers here to delivery of course materials through multimedia software usually consisting of a multimedia package and a personal computer. On-line delivery refers here to the use of the Internet and web technology to present learning materials.

Multimedia packages

Multimedia packages have been the most popular media for course presentation in the third generation. Using CD-ROMs, distance learners have had greater freedom in choosing course materials that suit them best. For some languages, the whole course is presented on a CD-ROM, for others the CD-ROM is used to store supplementary material for learning a specific part of the target language, such as a multimedia package for learning Chinese characters or a Kanji package for learning Japanese characters (Wang, 1999). Numerous multimedia packages, ranging from exercises and tests to simulations and games using the target language, are being produced each year. The use of multimedia has enriched the language learning environment and has been readily accepted by learners.

Computer-Mediated Conferencing

Computer Mediated Conferencing (CMC) is another mode of delivery popular in this generation. Through e-mail, voice mail and other on-line tools, the Web can provide an interactive and collaborative learning environment for learners around the world. (For more information on Web-based instruction, see Khan, 1997; Jafari, 1997, Kubala, 1998.) Although it is still asynchronous at this stage, Poon (1993) believes that CMC “has emerged as a viable method to support distance education because it is low cost and readily accessible.”

In the early stage of this period, the Web has been used mainly by distance education administrators to publicize course information such as course outlines and notices to students. In the early 1990s, distance educators realized the potential of the Web for teaching as well and began to move part or all of their courses onto the Web.

A major advantage of using the Web over CD-ROM lies in the flexibility the Web offers. For example, course materials and information presented on the Web can be updated easily at any time. It has also a low cost, and it is user friendly, both to the instructor and the learner.
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The Internet is also constantly employed by distance educators and learners. E-mail has been proved to be a very effective and efficient means of learning and communicating (Peterson, 1997). Students can use e-mail to contact their instructor or communicate with a native speaker in the target language to improve their writing skills. A wealth of authentic learning materials is freely available on the Internet, and advanced language learners, in particular, can benefit enormously from these authentic materials.

More Access to Information

Students can access online libraries, authentic materials (e.g., newspapers, magazines, and radio programs in the target language) from home, unconstrained by barriers of time and distance.

Changes in Mediated Student-Tutor Interaction

Interactivity has been cited as one of the foremost advantages of CALL. Interaction between learners and tutors is more direct, varied, and lively. Through video clips, sound, and animation, learners can now visualize the teacher's instructional intentions, and thus feel closer to the teacher than with the printed media or tapes. Although e-mail communication is not synchronous, it does provide reliable and fast communication between learners and the instructor. More important, the scope of interaction has been expanded to include learner-native speaker, learner-computer and learner-learner interaction. The learner, not the teacher, has become the center of learning activities, thereby making learning a more effective and enjoyable process.

Summary

In this generation, the capability of distance education has been further improved both in terms of quality and scope. For the first time in the history of distance education for languages, students could enjoy a significant degree of freedom in choosing course materials and in managing their learning discourse. In this period, distance educators have explored various forms of computer-assisted learning and teaching in an attempt to create a more authentic language learning environment. This exploration has included CD-ROMs, Web presentation of course materials, e-mails, voice-mails, and so forth. As a result, the content of interaction has been enriched to embrace learner-educator, learner-learner and learner-native
speaker communication and interaction. Advanced computer technology has provided students with a closer contact with the real world, and the Internet has broadened the physical boundaries of distance education. Distance education can now reach more learners than ever before.

THE FOURTH GENERATION OF DISTANCE LANGUAGE EDUCATION

JUSTIFICATION OF A NEW GENERATION

We argue for the existence of a fourth generation of distance education for languages. Beginning in the mid 1990s when the Internet and Web technologies grew and matured, the advent and more extensive use of Internet-based real time technology in learning has ushered in this fourth generation of distance language education. The significant changes that computer technology have brought to distance education justify the creation of a new generation. Two reasons underlie this justification: (a) the use of advanced computer technology such as real time technology has enabled distance education to achieve higher levels, and (b) distance education is predicted to develop along a new path.

Among the innovations and changes that distinguish the fourth generation from the third, asynchronous to synchronous communication is the most significant one. In this process, “guided didactic conversation” has become real time for the first time. This change is especially crucial to learning languages at a distance since synchronous communication technologies facilitate virtual interactions that are truly conducive to language learning. In this generation, technology is no longer simply an add-on medium, instead “it touches the very substance of the university” (Tsichritzis, 1999).

Globalization now has a twofold meaning: the globalization of distance learning and the globalization of education as a whole. In response to this trend, we hear repeated calls to “re-engineer,” “redefine,” and “reshape” modern education. In his 1996 article, Dede’s speculation about how emerging technologies may reshape distance as well as face to face education generated a heated dialogue among the reviewers of his article. Dede depicted a new education system called distributed learning, consisting of knowledge webs, virtual communities, and shared synthetic environments. Today, this speculation has been more widely accepted as the future of education. Scholars are even announcing a historical convergence of distance educational system and traditional on-campus education toward a networked education based on research in the potentials of network technologies (Dede, 1996; Hall, 1998; Cunningham, et al., 1998; Tsichritzis, 1999). The above mentioned changes indicate a whole new kind of dis-
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tance education system with fundamentally improved capability. Judged by Garrison's (1985) definition of generation, it can be argued that Internet-based real time technology has pushed distance education into a new generation.

Changes in Mediated Subject Matter Presentation

The Internet and Web are still the media underlying distance learning. Different from the previous generation, Internet-based real time technology has become the trademark of this generation. To present an overall picture of the computer technology, Figure 1 compares the Internet and Web technologies used in the third and fourth generations.

Figure 1
Uses of the Internet and the Web in the Third and Fourth Generations

![Diagram](Image)
In fourth generation technologies, on-line delivery becomes more popular than in the previous generation with a variety of real time media available to both the instructor and the learner. A combination of asynchronous and synchronous presentation of materials constitutes the major form of computer delivery. Although virtual reality is receiving more attention than before, real time technologies, such as Internet telephoning and desktop video conferencing, are more mature and less expensive to use.

A MORE AUTHENTIC LEARNING ENVIRONMENT

At this early stage of the fourth generation, only limited data is available on Internet-based real time language learning. However, a great number of studies in the area of CMC indicates the direction of language learning at a distance (see Cuskelley & Gregor, 1994; Bullen, 1998; Fox, 1999; Peterson, 1997). Aided by real time technology, languages being learned have “come alive” (Chun, 1994). Learners may have spontaneous conversations in the target language with other learners, teachers, and even native speakers of the target language. For example, through desktop video conferencing or Internet telephoning, students can be exposed to virtual interpreting situations in which they can hear the target language being spoken, observe the body language of the speaker, and use the target language to communicate. Similarly, students can carry out simulated business negotiations in the target language with a native speaker. More important, language learning now takes place in a social context and becomes more meaningful than ever before. Students are exposed to a variety of dialects and accents in the target language and have an opportunity to develop language spontaneity and reflexiveness. In such a learning environment, better retention of learning material can be expected.

A WIDER COVERAGE

Since real time technologies use the Internet as its communication media, the coverage of the subject matter presentation is bounded only by the reach of the Internet. Moreover, since CMC also supports real time multi-user interactive learning environments, an unprecedentedly high level of student involvement in learning can be achieved. This wider exposure to the target language is instrumental to increased proficiency in the target language.

MULTIPLE MODES OF SUBJECT MATTER DELIVERY

It should be noted that although Internet-based real time technology has become increasingly popular and is an important delivery mode, it is
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not the only mode used by distance educators. In the fourth generation, as in most other generations, many language learning and teaching activities still retain technologies used in previous generations. These technologies include print matter, audiovisual cassettes, telephone, e-mail, and voicemail.

Changes in Mediated Student-Tutor Interaction

With the use of Internet-based real time technologies, the effect of physical distance on the interaction between learner and instructor can be reduced to the minimum. In other words, real time technology facilitates interactions nearly as effective as those of face to face communication. Such interactions are real time interactions with spontaneity as their defining feature. As a result, much less time is lost during the communication and interaction. On the other hand, Internet-based real time technology provides learners with numerous opportunities to engage in meaningful language learning.

In the previous generation, on-line reading materials and e-mail messages helped students improve their reading and writing skills, but not their listening and speaking skills because of the limitations of the technology. It would not be an exaggeration to say that as far as language teaching at a distance is concerned, achievement has come at the expense of quality. In other words, a fatal deficiency in distance education for second languages has been an incapacity to expose learners to spontaneous speaking activities. In the fourth generation, however, Internet-based real time technology can foster spontaneous communication and interaction, which aligns it more closely with modern conceptions of language teaching emphasizing communicative task-based learning models and learner autonomy.

Most important, the fourth generation also witnesses the merging of the presentation of subject matter and learner interaction into an interactive presentation of subject matter. Different from the previous generations, presentation of subject matter is no longer separated from interaction. This merging means that language teaching at a distance can become interactive and spontaneous, which is particularly important to language learning at a distance because language learning is a process of communicating and interacting.

Summary

As far as teaching languages at a distance is concerned, the first three generations had provided flexibility at the expense of quality. In the fourth generation, with the use of Internet-based real time technology, this disad-
vantage of distance language education can be neutralized, and the quality of education can be ensured for learners. This improvement is most significant because it meets the special needs of distance language learners, that is, cultivating listening and speaking skills. Real time technology, by effectively facilitating the development of these skills, removes the most serious constraints imposed by the physical distance in learning languages at a distance. At the same time, it supports interactions similar to those of face to face communication and a virtual social context in which the use of the target language occurs most naturally. Thus, real time technology brings the distance learner into the real world, both in the sense of reality and in the realm of virtual learning environment. Further, advanced technology is leading modern education to an immersion of learning at a distance and on campus. All these improvements justify the division of a new generation.

It should be pointed out that the fourth generation is still in its infancy; advanced educational technology and the possibilities it has opened are only comprehended or explored by a few. The majority of distance education institutions still remain in the second or the third generation. Since the pedagogical capabilities and soundness of real time technology are yet to be fully discovered and evaluated, distance language educators will need to further explore the use of this technology as it becomes more mature and widely used. At the same time, technology is under constant pressure to meet educational demands, just as the President’s Information Technology Advisory Committee (1999) suggests:

In addition to research to meet the scalability and reliability requirements for information infrastructure, improvements are needed in the software technologies to enable development of educational materials quickly and easily and to support their modification and maintenance.

In summary, the employment of Internet-based real time technology is revolutionary in that it has led to improvements in the presentation of course materials and further promotion of student-teacher interaction. The capacity and quality of distance education have been improved, compared with those of the previous generation. As a result, real time technology, while building upon the capabilities of the previous generation, opens a new era in the history of distance education. This generation can be summarized as a new learning environment with interaction, collaboration, and networked learning as its defining features.
CONCLUSION

This paper has discussed the four developmental stages in the history of distance education for languages in terms of Holmberg's (1995) framework of mediated subject matter presentation and mediated interaction. The case for the emergence of a fourth generation is supported by the use of Internet-based real time technology, thereby enriching the potential of Holmberg's concept of “guided didactic conversation.”

This article has reviewed the roles played by technology in the evolution of distance language education and attempted to determine the present situation and the future direction of this learning paradigm. In so doing, it has reached three major findings of relevance to the field of language education at a distance.

Mediated Subject Matter Presentation: From Single Medium to Multimedia

Technologies used in distance education are not just supplementary but, rather, necessary. This necessity is a distinctive feature of technologies used in distance education because distance learning presents a set of challenges to both teachers and learners different from those of the traditional classroom. Without the aid of technology, distance education would be impossible.

Compared to the first (correspondence) generation, technologies used in the second generation (e.g., telephone and television broadcasting) greatly improved the quality of distance education by providing better means of communication between the learner and instructor. The technologies of the third generation have largely overcome the deficiencies of those used in the second generation. Newer technologies (e.g., multimedia packages and text-based asynchronous computer conferencing) have largely solved the problem of time and place dependence typical of the second generation technologies. In the fourth generation, Internet-based real time technology provides synchronous presentation of subject matter and thereby brings the quality of distance education to a new height and makes distance education more appropriate for language learning. Technologies used in distance education have evolved from single medium to multiple media and from off-line to on-line. This process of “building upon previous capabilities,” as Garrison (1985) terms it, pushes distance education to advance from one generation to another. However it should be noted that no clear-cut set of technologies are used in each generation. Telephones and videos, even audiocassettes are still used in the third or even in the fourth generation together with computer technology. The distinction between each generation occurs only when newer technology becomes one of the dominant means of teaching and learning. As a result,
new possibilities (e.g., wider distance and content coverage, less time delay in communication and interaction, and higher language proficiency) are brought about by such technologies. The progression of distance education from one generation to another represents a process of continual improvement in its educational capabilities.

Mediated Interaction: From Two-Way Communication to N-Way Interaction

In the face to face mode, presentation of subject matter is essentially a process of interactive communication. Unfortunately, in distance education, due to the barriers of physical distance, learner interaction was separated from the presentation of subject matter for nearly a century. This separation is why the provision of interaction and two-way communication is regarded by distance language educators as the “ultimate goal.” It is a well intended goal but a rather problematic and difficult one to achieve. Nevertheless, as one generation gives way to another, the scope and content of interaction have been continually enriched.

In the first generation, communication through correspondence formed the only type of contact between learners and instructors. Interaction between learners and instructors did not occur until the second generation, when more advanced technologies were introduced into the distance education scene. Although interaction in this period of time was still limited, it became more active and varied. Telephone provided the most direct and immediate interaction, despite the lack of visual input. With the use of advanced computer technology, the Internet and Web technologies in particular, the scope of interaction in the third and fourth generations has been expanded from learner-instructor interaction to include interactions between the learners and computer, among the learners, and between the learner and native speaker. Interaction in the fourth generation has reached a real time level, similar to that of face to face education. Two-way communication is now replaced by n-way interaction.

The Creation of the Fourth Generation

Last, but most important, this article has put forward a theory of the fourth generation of distance education for language learning. Based on the characteristics of the first three generations, the article argues for a theory of an emerging fourth generation. The creation of a new generation advances and challenges the theory of three generations commonly held by members of the profession. This new division categorizes more precisely the roles played by different computer technologies in distance education for languages. Furthermore, the article depicts the present situa-
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...tion and the capabilities of today's educational technologies and suggests a total reconceptualization of distance education. The advancement in network technology and its extensive use in education blurs the distinction between distance education and campus-based education. It is hoped that this division will help distance language educators and learners better understand the capabilities and potential of distance language education and which technologies can be utilized to further improve the distance mode of language learning. The result of this research shows that the technology to support synchronous learning is in place, and it is improving and expanding rapidly. Gravener (1998) points out that “the real barriers to excellent Web-based education are not technological, but psycho-social, economic, and political.”

After all the eulogies on technology, a word of caution is in order. Not all Internet or Web technologies are appropriate for enhancing distance language learning. Educators need to examine the capabilities of the technology they contemplate employing before decisions are made. Not all the learners will readily accept the use of a new technology. After all, it is easier to remain in familiar comfort zones than to try something unfamiliar. Although a wealth of research focuses on the use of computer technology in distance education, a mode of instruction seemingly welcomed by most distance educators, the use of innovative technology has not been widely accepted in language teaching at a distance. Many distance learning programs are still using audio- and videocassettes and print media as the major instruction media. This article points out that while the technology is in place, changes at the institutional, conceptual, and practical levels are now needed to keep up with technological advancement.
REFERENCES


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Acknowledgment

We would like to express our gratitude to Associate Professor Mary Farquhar and Professor Nick Knight for their valuable comments on an earlier draft of this paper.
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