

Combining Speech Recognition and Created Realities VXInteractive™ System to Create A Japanese Language Program That Promotes Student-Directed Language Learning

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Abstract:

The potential now exists for the creation of an Internet-based Japanese Language program that will provide a more interactive and motivating learning environment than is possible in the traditional classroom or with current on-line and individualized language programs. *Ohayoo: Japanese Language Program* revolutionizes the learning of Japanese as a foreign language (JFL) by breaking with the teacher-centered/method-centered paradigm. The program combines current multimedia, Internet, natural language processing, and intelligent tutoring technology into a single interface that enables learners to achieve their desired level of proficiency in Japanese in the most effective and engaging manner and gives instructors the most interactive and flexible tool to deliver their individual JFL programs. We hope to demonstrate with this program that student-directed language learning (SDLL) is far superior to any of the current foreign language (FL) teaching methods and we hope to ultimately expand the program to other languages.

Overview:

Current approaches to foreign language (FL) and second language (SL) learning stress the importance of communicative activities. The most effective of these activities actively engage the learner to successfully accomplish meaningful tasks by using culturally appropriate language in authentic contexts. Instructors have recognized the effectiveness of communicative approaches to language learning and have increasingly adopted more authentic and student-centered activities into their classrooms. Even so, JFL learners are still dissatisfied with the time it takes to reach proficiency and the gap between what is taught in the classroom and their real-life experiences using Japanese (Jorden & Lambert, 1992).

With an eye firmly set upon meeting the increasingly diverse needs of JFL learners, experiments in open and distance education (ODE) and individualized instruction (II) have been attempted. Although these programs have met with varying rates of success,¹ the

¹ Many universities in the United States, Australia, New Zealand and Europe have experimented with online, distance and individualized study programs for foreign languages, unfortunately they only transpose current materials (text and tape) to an online format (devoted mainly to communication with the instructor) and for this reason many JFL programs that originally embraced these programs have discontinued offering them. One of the more successful JFL individualized instruction program is at Ohio State University. Students work with multimedia materials at their own pace and meet with an instructor who evaluates the learners' progress. The students in this program are highly motivated and reach high levels of proficiency rapidly.

traditional classroom still remains the dominant medium through which JFL is taught and learned. Within the classroom, instructors have acknowledged the usefulness of using multimedia and Web-based activities in JFL classroom in contextualizing language; however, the products that have appeared to date are at best only supplements to current practices in the classroom.² Clearly the introduction of communicative activities, multimedia and other technology alone are insufficient in meeting the needs of JFL learners.

Background and Needs Analysis:

During the last three decades of the twentieth century, Japanese was the fastest growing language studied by foreign and second language learners around the globe (Japan Foundation, 2000). Educators linked this phenomenal growth to learners' desire to use Japanese for business purposes. Surveys, however, have shown this to be a false assumption. In spite of the prolonged economic downturn in Japan over the past ten years, the number of JFL learners has continued to increase. When queried about their reasons for learning Japanese, learners consistently state a general interest in Japanese culture, the desire to learn about a foreign culture and the desire to make Japanese friends as the most important motivations for beginning their study (Jorden & Lambert, 1992). The demographics of JFL learners also continue to change. While JFL continues to grow at modest rates in institutions of higher learning, the most dynamic growth in the twenty-first century is taking place at primary and secondary schools and outside the traditional schooling system. For example, in the five countries with the largest numbers of JFL learners, over 80 per cent of the learners are at the primary and secondary level (Japan Foundation, 2000). In addition, the number of students wanting to learn outside of educational institutions also continues to increase.

At the same time, we must account for the high attrition rate of JFL learners compared to learners of other FL/SLs. The number of JFL learners who abandon their study of Japanese at an early phase in their study is markedly higher than the rate among learners of other languages (Jorden and Lambert, 1992). Educators and administrators assume that the dropout rate is high because Japanese is an inherently "difficult" language or the writing system is too "complex." This is such a widely held opinion among Japanese scholars and JFL educators, that it has attained the level of an axiom, beyond the need for any research that would either substantiate or disprove its truth claim. The axiom simply stated is this, learners whose L1 is closer to Japanese will achieve higher levels of proficiency more quickly than learners whose L1 is more distant from Japanese. Anecdotal evidence from the classroom would seem to support this assumption, however, as Krashen and Terrell (1983) point out, the disparity in rates of achievement are due not to any characteristic of the language, but due, in fact, to long-established methods of teaching that focus learners' attention upon the unique differences between the L1 and the target language, instead of promoting true acquisition (42).

² Almost every JFL program at an institute of higher learning has a web page devoted to giving learners practice with the writing system or pronunciation. We have conducted a review of the current web sites that are devoted to JFL (both academic and for-profit) and found the following types (with examples): 1) Written language, 2) General cultural information, 3) Language courses (Japanese Online, Easyweb Japanese, Learn Japanese Online, Real Japanese.com, YesJapan.com, Nihongoweb,), 4) Dictionaries (Jim Breem's Japanese-English Dictionary), 5) Realia/Photo galleries (Washington University), 6) How-to sites (MIT's Japanese Language Site), and 7) Miscellaneous (Japanese Text Initiative, Association of Teachers of Japanese).

Moreover, these assumptions by instructors and directors of JFL programs about the difficulty of learning Japanese are often transferred to their teaching styles and consequently exacerbate student anxiety in the classroom (Kitano, 2001). Learners tell us that the reason that they are studying Japanese is because they are interested in Japanese culture, language and writing system (Jorden & Lambert, 1992; Japan Foundation, 2000). Teaching methods, however, intensify students' fears of negative evaluation and their self-perceived ability to speak Japanese when compared to native speakers. Instructors' methods reinforce these anxieties. Drills and pattern practice make native models the yardstick against which learners evaluate their own utterances and continual error correction, though shown repeatedly to have a negative affect on acquisition (Corder, 1967; Fanselow, 1977), continues to be the standard practice in JFL classrooms.

While teachers' assumptions about learners have a significant impact on how learning takes place in the traditional classroom, learners point to different factors that influence their decisions to end their study of Japanese. JFL learners report that the most significant drawback to studying Japanese is the amount of time that it takes them to be able to use their Japanese language skills. This is exacerbated by their feelings that the Japanese taught in the classroom is inapplicable to real-life situations and the irrelevance of classroom activities to their own interests (Jorden & Lambert, 1992). It is an all too common scenario that teachers and program directors are mainly preoccupied with proving that a particular method of teaching JFL is the most effective while ignoring the desires and needs of learners. Thus, it is clear that there must be a serious reconsideration of the JFL classroom, teaching materials and methods in order to meet the needs of all JFL learners.

How, then, can we bridge the divide between instructors' methodologies and learners' needs? As we have already hinted, traditional foreign language learning methods have increasingly come into question among FL/SL researchers and educators. Experts note that simply learning forms and structures is insufficient practice for learners who will find themselves in a variety of situations in which they will be required to communicate in culturally appropriate ways (Rivers, 1983). Although this seems a common sense learning goal of FL/SL, the original impetus for reform in language learning came from educators in fields other than second language acquisition. Their research tells us that the most effective learning comes only when the learners take control of their own learning (Altman, 1980; Holec, 1979; Holec, 1987; Dickenson & Carver, 1980; Carver & Dickenson, 1982). Student-directed learning focuses upon the development of the learner to find his or her most effective mode of learning. The focus of SDL is not on the teacher or method but upon the learner in society, how he or she will use what he or she has learned in social situations and apply these learning strategies to life-long learning. As Holec notes, the learner needs to "acquire the ability to act more responsibly in running the affairs of society in which he lives" (1).

FL/SL education experts have recently applied the principles of SDL to the teaching of foreign languages. They have shown that the most successful learners are those who are engaged with the subject matter and use the target language in meaningful contexts (Dam, 1995; Huttenen, 1986; Dam & Gabrielsen, 1988; Dam & Legenhausen, 1996). Student-directed FL learning focuses upon specific objectives that are not related to mastery of rules

and structures, but rather are objectives specifically related to the learning process. Studies in learner strategies supports the claims of SDLL, and show that the most successful language learners are those learners that use a variety of strategies to deal with the learning problems that they encounter (Rubin 1975; Naiman et al. 1978; Huttunen 1993). Language learning in the future must address ways in which we as educators can assist FL/SL learners to plan, monitor and evaluate their own language learning. These techniques must include a combination of individualized instruction, constructive learning, cooperative learning, simulation and role-play.

One way instructors have sought to remedy the classroom-real life divide is by introducing technology and multimedia to their classrooms. Technology has always held an important place in foreign language education. JFL educators have recognized that technology and multimedia hold great potential for helping learners achieve high levels of proficiency. For example, audiotapes have been the core of most language programs even before the era of Audio-Lingualism. Video and CD-ROMs have supplemented audiotapes in the last two decades and more recently educators have made use of the Internet by creating a variety of Web pages.³ All of these technologies can be effectively used in the traditional classroom. Web-based, student-centered activities, for example, draw students into the language learning process; increase their motivation for learning Japanese and help them to achieve their goals. Video and CD-ROM can also be useful in attending to the problem of contextualization of the language that the students are practicing (Pawling, 1999). Unfortunately, even with the addition of all of these forms of technology and multimedia, learners are still dissatisfied with the outcomes of this education.

It is clear, therefore, that the introduction of multimedia alone is not a panacea. Technology and multimedia in the classroom must be firmly based upon sound pedagogy. Murray and Barnes (1998) propose a framework, stated in a series of questions, for the integration of multimedia software into the FL/SL learning context. They caution that use of multimedia must be carefully considered, and not adopted simply because it is the latest fad. They ask educators to carefully consider the same types of questions that they do when adopting new teaching methods or modifying the curriculum. Much of the current technology and multimedia in JFL has been developed and implemented in a less than optimal manner because it is not sufficiently grounded in a clearly defined concept of learning methods. Where technology and multimedia should radically change the way JFL is learned, the current tools continue to support the traditional JFL pedagogical paradigms and methodologies. JFL programs remain centered on the classroom with the textbook as the main medium of learning and computer software, web sites and other media are introduced only as supplements to the classroom.

Current development and implementation of multimedia and technology in the JFL learning process have failed to consider a key issue in the use of computer: the interface. Amichai-Hamburger (2002) directly address some of the problems that arise when learners use

³ Most major JFL textbooks in use today include both video and CD-ROM media to be used in conjunction with the textbook.

a computer interface, such as the need for closure, the need for control, and the amount of risk that learners are willing to take. She argues that Computer mediated communication (CMC) via the Internet has failed in its promise to innovate learning and reinforces instructional rather than constructivist paradigms. We can, however, use technology and multimedia effectively by first recognizing that CMC is a fundamentally different form of interaction than face-to-face (FtF) communication (Appel & Mullen, 2000; Ingram et al., 2002; Salaberry, 2001; Schwienhorst, 2002; Harnington & Levy, 2001). Jonassen and Hyug (2001) analyzed learners' attitudes when engaged in group problem solving tasks over the Internet. What they found is encouraging in the implications it has for SDLL. The learners in their study who were engaged in the group problem-solving activity over the Internet reported more satisfaction with the process and stated that they applied greater personal reflection and critical thinking to the task. Studies such as this tell us that there are immense possibilities for creative modes of learning over the Internet. But to take advantage of this medium we will have to seriously reconsider our notions of language learning. Internet technology will provide the greatest opportunities for SDLL in the future.

Although instructors in other subjects have embraced many aspects of SDL to help learners to develop their own learning strategies; foreign language instruction perpetuates the outmoded transfer paradigm in spite of the growing body of research that shows this to be an ineffective learning method. Successful experiments in SDLL have made this clear (Abe et al., 1975; Charmot & O'Malley, 1987; Ravindran, 1996; Ravindran, 1998). New settings for language learning will require new ways of interacting with students and expanding the understanding of the preparation of learners who will work independently. Teachers will be expected to advise learners on the choice of learning materials and guide learners to their location. Teachers will also become counselors who will help language learners manage the problem of learning independently and changing learners beliefs about their role as learners and making the decisions necessary to assume responsibility of their learning (Gremmo, 1985; Sturtridge, 1997; Kelly, 1996; Riley, 1997).

What is needed is a program that meets the demands of a variety of educational situations and promotes constructive and learner-centered learning for an increasingly diverse population of JFL learners with equally diverse learning styles. We envision that the most effective system is one that integrates all the available technological and multimedia tools in a single interface as the most effective way to address the individual needs of JFL learners and attend to their varying learning situations and styles. First, learners need to have a way to practice Japanese in real-life, contextually authentic situations that are task-based and reduce anxiety associated with the JFL classroom. Second, learners must have an input-rich environment to increase their rate of acquisition. Third, learners also need an environment in which they can explore Japanese culture in an interactive and open-ended manner. Fourth, educators need to have the tools to help students develop their individual language learning skills. Finally, educators and administrators need a flexible program that can be customized to their unique curriculum and teaching situations.

Proposed Solution:

Ohayoo: Japanese Language Program is the most effective tool to achieve all of these goals. The program will revolutionize the way that JFL is learned and taught. It will give learners the most powerful tool with which to learn and practice their Japanese language skills in a fully interactive environment delivered over the Internet. The program will make use of the latest technologies in multimedia education and create a virtual environment in which learners, teachers and others can interact in multiple modalities using Japanese and learning about and experiencing Japanese culture. In addition, as the program is a network-based system, it will facilitate interaction between multiple learners that will maximize the potential for constructive and learner-centered education.

The core of the program is based on recent advances in 3D graphical MUD (on-line virtual environment or created realities) technology that overlays audio, user audio, textual interactions, electronic mail, video, whiteboard, overhead presentation and other types of multimedia capabilities within a single integrated interface. This means that the program holds at its core the potential for fulfilling the needs of both traditional classrooms and a variety of ODE situations. The 3D interface maximizes learner ability to learn Japanese through community building, problem solving, communication, and interaction.

Ohayoo: Japanese Language Program also attends to two of the most important learner-factors contributing to their success in Japanese by increasing the number and quality of opportunities that they have to use and practice their Japanese in authentic contexts, and it will also increase their motivation to learn Japanese. The system will also give teachers a flexible tool able to reach a maximum number of JFL learners in a wide variety of learning situations.

Description of the System and Its Potential Uses:

We envision that *Ohayoo: Japanese Language Program* will ultimately support a number of different learning styles. Here, we discuss how the program will work for a learner who is studying Japanese in a traditional classroom JFL program. The registered learner will log onto the computer program and choose from a menu the scenario that he/she chooses to work in, for example, a restaurant scenario. The learner will become an avatar in the created environment and interact with artificial intelligences (AI) in the scenario. The learner will be given a rich source of input before he/she has a chance to practice using his/her Japanese in the scenario. While waiting to be seated, the learner has a chance to look around the restaurant and view videos of people ordering in a restaurant. The learner can also look at the menu and click on the items to get an explanation of them in English. (Later, the user will be able to ask his/her waitperson directly about the menu items as in RL.) The learner can choose from the program menu to do a listening activity, mainly focused upon vocabulary in the scenario. These activities will be simple recognition activities such as a waitperson explaining different items on the menu. The learner simply clicks on the answer and is given immediate feedback from the program. The learner can also choose to do drills with vocabulary and structures that are central to the scenario. Frequently updated links to external websites will also direct learners to other appropriate sources of authentic input.

Once the learner has been seated in the restaurant, he/she will have a chance to practice ordering in the restaurant. The learner's goal is to successfully use Japanese in the scenario to complete a number of tasks. If the learner's utterances are determined to be correct by the speech recognition/natural language system, the conversation with the AI will precede smoothly just as it would in a real-life situation. If the learner's utterances are incorrect, the AI will respond just as a RL native speaker would in the situation, it will ask the learner to repeat or clarify his/her utterance. The scenario will proceed as a conversation in RL until the learner has completed the task. If, for some reason, the student is unable to complete the task, he/she can at anytime go out of scene to learn how to express in Japanese what he/she wishes to say and then return to the scene and practice what he/she has learned. The learner will be able to repeat the scenario with any number of pre-programmed variations during the practice phase until they feel confident enough to perform the conversation in the evaluation phase. In this phase, either the program or a live instructor will do the evaluation. Once the learner has successfully completed the task, he/she can continue to a different scenario.

In addition to conversation practice, the program will also have drills and pronunciation practice. The learner can easily access these modes by choosing from them from the program menu. Drills and pronunciation will also be facilitated by the speech recognition/natural language system and will enhance current audiotape-based drill and other multimedia or web-based pronunciation software. While many of these are quite sophisticated, they still rely ultimately upon the learners' judgment as to their accuracy. The speech recognition system will be able to provide not only native models of the target language, but also will be able to give instant feedback as to the accuracy of the learners' utterances.

The program also incorporates the other three skills: listening, reading and writing. Within each scenario, the student will be able to engage in listening tasks appropriate to his/her level and the specific scenario. Again, by choosing listening from the menu, the student will hear and see conversations. He/She will then be given aural or written questions about the scenario that he/she can answer either by choosing from a selection of multiple choice answers or answering verbally. Reading and writing practice can similarly be chosen from the menu. The instructor can easily load different assignments into the program that will then be completed and sent to the instructor for evaluation.

Culture is also an integral part of the program. Each scenario will also have cultural notes that use audio, visual, and textual modalities. For example, in the restaurant scenario, the learner can choose the culture notes from the program menu to explore objects in the virtual environment. In addition, created environment could allow students to learn about Japanese traditional culture, by visiting temples and shrines and experiencing festivals and traditional performing arts. Native speaking people can also be supported on-line to answer questions about culture in these environments.

The potential of *Ohyaoo: Japanese Language Program* to be a truly interactive learning tool in contrast to current audiovisual materials is clear in that it delivers the same materials as these older technologies while placing the learner in a environment that is easy to use and is

contextually based. From the standpoint of educators, the program is also superior to audiovisual materials in that it can be updated and modified easily and at minimal expense. The program also will greatly enhance classroom teaching. Instead of being limited to the confines of the four walls of the traditional classroom, the instructor will be able to take the students on virtual field trips, conduct conversations and role-plays in authentic contexts and teach students about Japanese culture. Instructors can also hold office hours online, grade written assignments, and give individualized instruction. Finally, the program will foster community-building and cooperative learning. The program will allow students to meet online and work together on assignments.

ODE and online learning of Japanese remains a relatively untapped market for educational institutions. While this area remains uncharted because of persistent notions by educators and learners that language acquisition is the development of skills or behaviors that they believed are transferred from the native/near-native speaker to the learner in FtF communication, the appearance of websites devoted to Japanese language learning suggests that there is an increasing need for Japanese instruction that does not take place in academic classrooms. *Ohayoo: Japanese Language Program* fulfills the needs of these learners as well, by providing a rigorous and pedagogically sound environment based upon standards and performance outcomes delivered in a program that can be used to learn Japanese at any pace.

Research Questions:

A major point of developing the Japanese Language Program is to test a number of hypotheses about foreign language learning and the interface between learners and technology, specifically the 3D graphical created reality environment or MUD. We will be testing these hypotheses throughout the development phase and in a number of pilot programs conducted in cooperation with university and secondary JFL programs in Japan, the United States, and other countries. Both qualitative and quantitative methods will be rigorously used in all phases.

Our four main hypotheses are the following:

1. *The practice of Japanese in simulated contexts of the created environment increases the proficiency of JFL learners.*

The first hypothesis is general in nature and scope. Recent studies have indicated that simulation and gaming used in language learning applications increases learners' communicative competence by aiding students develop their abilities to communicate in appropriate ways (Garcia et al., 2001; Jones, 1995). We hope to show that learners using a created environment to practice Japanese will achieve higher rates of proficiency than learners who only practice Japanese in the classroom. We will test this hypothesis by administering standardized proficiency exams, such as the Japan Foundation's Japanese Proficiency Test and the ACTFL OPI to both the test groups and the control groups.

2. The computer interface in the created environment reduces the affective filter.

Krashen first introduced the Affective Filter Hypothesis over twenty years ago (Krashen, 1981). Simply stated, the Affective Filter hypothesis claims that the lower the affective filter (attitudinal variables such as self-confidence, motivation and anxiety) the greater the learner's language achievement will be. Since that time, testing of the Affective Filter hypothesis has been a major focus of inquiry for FL/SL researchers (Gardner, 1979; Gardner, 1985). In general, these studies have supported Krashen's original hypothesis and Horowitz et al. (1986) proposed a Foreign Language Classroom Anxiety Scale (FLCAS) that clearly showed that anxiety in the foreign language classroom was specific and independent of other types of anxiety, especially pronounced during oral performance activities. Since then, numerous studies have repeatedly shown a negative relationship between learner anxiety and success, but they have been limited to the traditional classroom.

Recent studies on virtual reality indicate that virtual environments have positive effects on users attitudes and anxiety (Schwienhorst, 2002). We propose, therefore, to test the Affective Filter Hypothesis using 3D created reality environments. We hope to show that learners who use the created reality environment have a lower affective filter and consequently achieve higher levels of proficiency than users who only participate in classroom activities. The tools we will use to measure the students attitudinal variables will be questionnaires and the FLCAS, which will be compared to the same students' scores on standardized proficiency examinations.

3. The created reality environment increases the amount of comprehensive input and leads to a higher rate of language acquisition.

Krashen makes the clear distinction between language learning (overt knowledge about language) and acquisition (internalization of the language rules through use). He proposes that learners will acquire a second language more rapidly when they have comprehensible input and where learners are focused on the meaning of the language rather than the form of the message (1982: 21). Created environments have recently been shown to hold vast potential for instructors to give learners access to a wide variety of comprehensible input in various media impossible in the traditional classroom (Ingram et al., 2000; Harper et al., 2000). We will test the created reality environment to see if it increases the quality and quantity of input and the effects that this increased input has upon learner acquisition. The tools that we will use to test this hypothesis will include both questionnaires and standardized achievement test.

4. The created reality environment increases cognitive language learning.

Although the main focus of our research will be on learners acquisition of Japanese, recent studies of virtual reality and language learning suggest that the use of created realities by learners of FL/SLs increases language learning as well as acquisition. Antonietti and Cantora (2000) came to three conclusions. First, virtual reality induces users to assume a meta-perspective. Second, virtual reality prompts users to conceptualize experience at an abstract level. Third, virtual reality stimulates a free and integrative elaboration of inputs evoked from previous experiences. We hope to show that using MUD environments for FL/SL learning not only increases the communicative competence (ability to communicate in appropriate ways in specific situations) but also increases the learner's ability to monitor their language use. The tools that we will use to test this hypothesis will be questionnaires and standardized proficiency tests.

The Technology Behind the Program

The core technology is based on the Created Realities Group (CRG) VXInteractive™ interface. This interface creates an immersive 3D environment that places the learner in the instructional context. With the addition of collaborative tools such as chat, audio, overheads, whiteboard and other interfaces on-line instruction can range from real-time discussions to pre-programmed scenario that contain artificial intelligence. The use of state-of-the-art real-time rendering on consumer personal computers can allow students and instructors to have a 'lean-forward' seamless educational experience.

Current on-line language learning systems are principally offered using the World Wide Web and HTML technology through a personal computer-based web browser such as Netscape or Internet Explorer over the Internet. The degree of information presentation, interactivity, and feedback varies greatly. It can range from simple hyper-linked text with graphics to more advanced use of multi-media clips, animations, audio, and interfaces that require the user to have high-speed Internet access via cable modem or DSL. The approaches are similar in that language educators are seeking ways to expand access to a wider audience that cannot otherwise travel to school.

The creation of a useful and integrated virtual classroom for distributed learning has long been an elusive goal. There have been numerous attempts over the years to build user interfaces to deliver realistic environments that create a context for communications, but few have reached wide use and adoption. The concept has always been a compelling one for education; however, the problem has been the availability of technology that could attain seamless peer-to-peer interactions at a price to make its integration successful. The Created Realities Technology approach provides this integration. The technology is available today and can be deployed for use on most personal computers. It is possible to deliver this because of two factors - lower cost of better performing personal computers and better access to the Internet. In the last two years, the price/performance plateau has been reached on a personal computer that supports the required technology that the average consumer purchases. In 2001,

personal computers with the required 3D video graphics cards were installed in over 70% of all new personal computers sold (NT and Windows). Both of these trends will continue and will make the technology for presenting a virtual on-line learning in this manner even more compelling.

Many of the latest web-enhanced instructional systems are geared toward users and institutions that can access the newer and higher bandwidth Internet connections. However, a growing number of people do not have access to these newer higher speed connections and they will continue having problems gaining access in the future. As computer technology and networking become increasingly important to economic and social success, many people in inner cities and isolated rural areas are failing to acquire the new technology as rapidly as their more affluent neighbors. This is commonly referred to as the Digital Divide (Benton Foundation, 2001). The benefit of creating the virtual 3D rendered environment is that it is highly bandwidth efficient. Since the instructional context is rendered and not retransmitted the initial bandwidth is minimum supporting those without access to newer Internet connections, but the system can grow to accommodate higher-bandwidth and more multi-media objects as access to faster Internet occurs over time. Users can view environments in real-time using a 28.8k modem connection to the Internet. This is possible because a rendered textured geometry of an object is much smaller than a high-resolution photo or transmitted video. Thus, fast performance over thin-client Internet connection is ensured by small file sizes and incremental rendering that only renders active visible areas on the visitor's screen.

Integrating speech recognition with natural language processing software as module to the Created Realities Server provides on-line language support as discussed in this paper. Recent advances in speech recognition/natural language processing and higher performing computers allow the Created Realities Technology the ability to incorporate both contextual instructional environments with speech capability for language learning. No longer do speech systems require an extensive pre-recorded vocabulary that has limited capability. These newer speech systems support multiple languages and allow for advance grammar parsing. The speech system selected by Created Realities Group now supports over thirty-two languages.

The choice of IBM enterprise server side tools allows CRG solution to be very flexible in its support of potential custom implementations. The addition of language support is one example. The solution also provides a high degree of scalability, reliability, and maintainability that is critical in educational deployments. With the ability to easily scale, we can support any possible-sized solution that a group might wish to deploy.

Summary

We have reached a critical turning point in the history of FL and SL education. Internet and communications technology (ICT) holds limitless potential for transforming the way in which language programs can be delivered to an increasingly diverse population of learners unbounded by geographical, societal or economic limitations. Language learners have always been hindered in their acquisition of a second or foreign language by access to the target language, either by their inability to physically immerse themselves in the target culture or by mediated access to the target language and culture in the traditional classroom. *Ohayoo: Japanese Language Program* attends first and foremost to the central issue of access to the Japanese language and culture. The program creates limitless opportunities for the learner to explore, practice and use Japanese in a motivating and stimulating environment. In addition, *Ohayoo: Japanese Language System* serves a wide range of needs, supplementing current classroom based education by giving learners self-directed practice, making teacher use of classroom time more efficient, and providing a authentic environments where students can work collaboratively. Moreover, the program focuses upon both acquisition and learning thereby giving distance educators a pedagogically sound, flexible and scalable tool to deliver their programs to those learners who are unable to attend classroom courses.

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