A Door Into Hindi:
Web-Mounted Elementary Language Instruction

North Carolina Center for South Asia Studies of the Triangle South Asia Consortium

Abstract

The Center for South Asia Studies of the Triangle South Asia Consortium (an educational cooperative of North Carolina State University, Duke University, the University of North-Carolina-Chapel Hill, and North Carolina Central University) proposes to develop a twenty-four lesson course in first year Hindi mounted on the World Wide Web. The course will be fully interactive multimedia presentation, which will integrate voice, audio, video, and writing tutorials in graded lessons that emphasize performance and proficiency in the language. Glossaries and reference grammar will be imbedded through hyperlinks, with additional access to on-line and downloadable dictionaries. A special enhanced version for classroom use will add fully interactive compressed digital televideo capability, language laboratory and computer-classroom master controls, and automated student monitoring, homework, and response features. This project will result in the equivalent of a two-semester university class in Hindi language that can serve as the basic text for classroom instruction, for supplemental tutorials and drills, or for self-instruction. Importantly, the program shell will be easily adaptable for other Less Commonly Taught Languages through an open-ended architecture that will allow for easy modification. While fully accessible on the current Web, the program has been conceived to take advantage of the latest technologies designed for the medium of Internet II, which delivers data at speeds up to 700 times the current Internet. A prototype of this net (called the Gigapop Ring Network) already connects the universities of the Consortium, and will be accessible to this project. By the end of the grant period, the new Internet II should be operational or very close, at which point the full multimedia capability of the program can be exploited. Importantly, the programming shell which manipulates and delivers the content of the courses will be created and documented as a regular package program that will be usable by any teacher of language using their own materials.

A note to the Reviewer.

The following proposal is described in perhaps more detail than normal precisely because the project itself is complex and because the technical problems that are faced, while clearly manageable given our expertise, are non-trivial and must, therefore, be spelled out. We have, however, attempted to place relevant technical information in the appendixes, while keeping the discussion in the body of the proposal focused on issues of principle, design, and management. It should also be noted that at the time of writing, the URLs for Web references are active, but for obvious reasons cannot be guaranteed to continue.

1. Need for the Project

[Maximum 10 points] *In evaluating this project, under this criterion, please consider the following questions: (a) Is there a need for the proposed material(s) in the educational area to be served? (b) Are the (i) language(s); (ii) region or country; or, (iii) the issues or studies, for the study of which the materials are to be developed, of sufficient priority for, and of potential significance to the national interest to warrant support at this time?*

World's second largest LCTL. Hindi-Urdu is the largest spoken language among the Less Commonly Taught Languages (LCTLs) of South Asia (defined minimally today as the nation-states of Bangladesh, Bhutan, India, Myanmar [Burma], Nepal, Pakistan, and Sri Lanka). In the last decade Hindi-Urdu, with an estimated speaking population of 585 million, has moved ahead of English in total number of speakers worldwide, second only to Mandarin Chinese.[1] Tagged with the name Hindustani in the nineteenth century, the spoken language covers a territory that stretches from the eastern Indian state of Bihar more than a thousand miles to the west through contemporary Pakistan. Grouping these spoken languages together consolidated a number of local variants that today are simply designated as dialects. A major division does fall, however, between two dominant forms that remain effectively distinct in their literary output by the use of different scripts. In the public rhetoric of the twentieth century, this division has political and

[1] David Crystal, *The Cambridge Encyclopedia of Language*, 2d ed. (Cambridge: Cambridge University Press, 1997). Crystal indicates 500 million speakers of Hindi with 85 million speakers of Urdu. Other sources break down the numbers differently, e.g., Sydney Culbert, ¸The Principal Languages of the World˝ in *The World Almanac and Book of Facts* (1998), cites 476 million Hindi speakers and 104 million Urdu.

religious overtones, with Urdu (written in the Perso-Arabic *nastaliq* script) generally associated with Pakistan and Islam, and Hindi (written in the Sanskrit-based *devanagari* script) associated with India and Hinduism, although many speakers of each language can be found scattered through the region.[2] In spite of this emerging political separation, our experience has demonstrated that Hindi-Urdu is sufficiently unified to be taught on the introductory level as a single spoken language. Because of its greater utility (i.e,. more speakers and larger literature) and its ease of acquisition, the proposed materials will be delivered in the *devanagari* script (with *nastaliq* reserved for the second year's instruction). For the remainder of this proposal, we will refer to the specific course subject only as "Hindi."

Contemporary Prominence and Change. Sharing a language with divergent literary traditions, speakers of Hindi, whether imagined as separated (Hindi-Urdu) or unified (Hindustani), figure prominently today in the regional and global arena as major determiners of our collective future, as recent development in nuclear capability in India and Pakistan have made unmistakably clear. As the sub-continent presses toward a new alignment of political, economic, and military leadership, changes can be expected in the use of language within the region. The literary and linguistic heritage of Hindi and Urdu is already rich, but three factors are changing, often dramatically, the way the language is developing. [1] New technologies to deliver the language (e.g., computer) are introducing subtle but far-reaching modifications, especially in spelling and syntax, producing an homogenizing effect. [2] The old homogenizer, the feature film, which had generally been standardized in language and content, now is produced from divergent sources which reflect a greater regionalism, resulting in a more variable and complex language, while still functioning to eliminate extreme differences. At the same time, through the power of a particularly popular actor or actress or director, local dialectical forms are often vaulted into nationally standardized or at least acceptable alternatives to widely acknowledged ways of

[2] For more on the relationship of Hindi-Urdu to other languages of South Asia, see Colin P. Masica, *The Indo-Aryan Languages*, Cambridge Language Surveys (Cambridge: Cambridge University Press), 1991).

speaking, again with an enriching effect.[3] Television follows a few steps behind as production is only recently beginning to reflect regional preferences. And finally, [3] the printing press, which traditionally had been limited to specific urban areas with limited output, is now a booming industry that is one of the largest publishing operations in the world, and that decentralization has promoted a greater linguistic variation and local identity. This new introductory course in Hindi will reflect some of the more profound changes in the new language that are nowhere found in extant pedagogical tools in use in the United States (most of which adopt a standard form that was acceptable nearly a half century ago and very intolerant of local variation). Appropriately—and this must be highlighted—the proposed course of instruction with its emphasis on functionality within the language (i.e., proficiency- rather than grammar-based learning), will be delivered through the dynamic medium of the World Wide Web (WWW), making it easy to modify and adapt as new usage emerges (a feature impossible in fixed textbooks and other stabilized media without major revisions and massive reproduction costs), but will at the same time be universally accessible without expensive updates.

2. Usefulness of the Product to Others
[Maximum 10 points] *Will the proposed materials have a good potential for being utilized by appropriate educational programs in other institutions in the United States*?

Fitting the Product to the Problem. The need for a national capability in all languages of the world is a point few would argue against,[4] but delivering the instruction necessary to meet this need is a debate that hinges on two critical factors: demographics and costs. No matter how idealized our dreams may be, the harsh reality of the contemporary academy is that we are pressed to deliver

[3] For the way film has changed lexicon, grammar, and pronunciation, see Afroz Taj, "A Language in Transition: Recent Phonemic and Grammatical Changes in the Language of the Hindi Cinema " South Asia Languages Association XIX Roundtable, York University, 18-20 July 1998.

[4] See Galal Walker, "The Less Commonly Taught Languages in the Context of American Pedagogy" in Helen Lepke, ed., *Shaping the Future: Challenges and Opportunities* (Middlebury, VT: The Northeast Conference on the Teaching of Foreign Languages, Inc., 1989), 111-37; Ronald A. Walton, *Expanding the Vision of Foreign Language Education: Enter the Less Commonly Taught Languages*, NFLC Occasional Papers no. 10, The National Foreign Language Center (Baltimore: The Johns Hopkins University, 1992); and Richard D. Brecht and A. Ronald Walton, "National Strategic Planning in the Less Commonly Taught Languages" in Foreign Language Policy: An Agenda for Change, edited by Richard D. Lambert (Thousand Oaks, CA: Sage Publications, 1994).

more for less, reaching greater numbers of students in order to justify expenditures. By their very natures, the LCTLs are vulnerable, often considered a luxury by many university administrators who seek to eliminate any class or course of study that falls below prescribed institutional enrollment minimums. Because enrollments are always expected to be low in the LCTLs, there are few positions nationwide for full-time instructors, much less tenured faculty lines, and as a result, there are even fewer professionally developed pedagogical tools—and this is definitely the case in elementary Hindi. Many instructors find themselves unhappy with the dearth of resources, which are (as hinted above, but explained in detail below), rooted in older fixed forms of the language, and delivered in what are now outdated strategies that emphasize a passive learning style with a grammar-driven pedagogy. Our strategy is to develop a course of instruction that can be adapted to a variety of environments, thereby enabling the individual instructor or tutor to tailor the program to his or her preferences either as the primary course of instruction or as graded exercises and supplemental material. In the extreme case, the proposed course will enable those universities and other institutions without instructors to deliver competent first year Hindi instruction with a minimum monetary investment (e.g., only for tutors or drill instructors), and for the highly motivated student, a reasonable course in self-instruction that exceeds anything available today.

Extending the Classroom and Integrating Technologies. In the euphoria surrounding the expansion of the Internet, administrators imagined that they could multiply the number of students at a minimal cost, thereby generating potentially significant revenues, and in a few instances this has occurred. But a much more significant advantage is the ability to make available the specialized instruction in topics that do not enter the mainstream—the LCTLs are the perfect case in point—for remote students who will never attend a university where these topics are taught.[5] Still, those of us who have used the Web and associated technologies for instruction have

[5] It was in 1993-94 during extended conversions with David Maxwell, head of the National Foreign Language Center in Washington, that this potential was made clear for our particular situation and which ultimately led to our highly successful three-year experiment in interactive televideo Hindi instruction; see his working paper titled "Knowledge Management and Intercultural Communication: Languages in Higher Education" (typescript, 1994).

discovered in our experience that there is no viable immediate replacement for the live instructor. But a little-talked about feature, potentially of greater significance than remote instruction, is the power the Web gives the teacher to enrich the classroom and laboratory experience through self-paced interactive exercises and instructor-initiated live interaction. Many programs claim interactivity, but a review of the existing Web-based materials for instruction (not just in language), show an astounding lack of creativity. The overwhelming majority of self-guided exercises on the Web simply transplant the book with the book on-screen, i.e., following a passive model, looking and reading, then pointing and clicking to another passive screen, in a manner that only minimally advances interactivity over the passive reception of film or television images or simply reading. What we propose is a significantly more dynamic environment. And to the extent we are successful—there are still a number of non-trivial technological hurdles—others will be able to take the shell of the program and tailor it for other LCTLs at a fraction of the cost in time and money.

Background to the Project. In 1995, Afroz Taj was hired by then Triangle South Asia Consortium Director Tony K. Stewart to develop a unique Hindi course that would be delivered to campuses in the Research Triangle Park area of North Carolina. This project, which was funded in part by a grant from the "Undergraduate International Studies and Foreign Language Program" of the US Department of Education's Center for International Education (Grant no. P016A50023, 1995-98), was mounted through the medium of broad-bandwidth teleconferencing (not to be confused with satellite delivery), with hookups linking North Carolina State University, Duke University, and the University of North Carolina-Chapel Hill through the Microelectronics Center of North Carolina's (MCNC) "North Carolina Research and Education Network" (NCREN). This medium allows for the participants to see and interact with each other fully in specially designed and professionally staffed studio classrooms. Taj was chosen because of his widely acclaimed innovations in using video and film realia in the language classroom and the decade-long development of his own course in Elementary and Intermediate Hindi, which integrated a variety

of novel pedagogical aids. Importantly for the televideo medium, his poise as an actor and as a publicly recognized poet, and his obvious comfort in front of live audiences and the camera, played a significant role in the choice. In the initial stages, Duke continued with its regular courses, limiting the experiment in televideo to NCSU and UNC-CH. Within two years enrollments went from virtually non-existent (no students at UNC-CH; 6 students at NCSU) to one of the largest programs in the US (combined enrollments averaging in excess of 120 students—the popularity creating unanticipated problems), perhaps eclipsed only by the University of Texas-Austin.[6] As part of that experiment, Taj developed a series of teaching strategies to cope with this novel form of distance learning, including interactive exercises, computer-delivered video and film, and Web-based homework and consultation, while discovering what would and would not work within the limitations of the technology. Taj was so successful in this experiment that his position was upgraded from Instructor to tenure-track Assistant Professor, and when the opportunity arose, the Consortium elected him Executive Director to handle all programming involving performance and the public. The results of this three year experiment in distance learning has not only revolutionized our own conception of language acquisition, but has positioned us to consolidate the various technologies in a way that will reduce even further the extraordinary costs of instruction delivered through normal teleconferencing. It is with this background that a series of principles were devised to deliver a course that would take full advantage of the integrated media. In short, we must quit thinking of the Web-based course as a glorified "book & TV" production, but a much more dynamic environment, approximating the classroom as much as possible.

3. Expected Contribution to Mandate under Section 606
[Maximum 10 points] *Will the proposed materials contribute significantly to the strengthening, expansion, or improvement of the instructional programs concerned with the language(s), area(s), or other fields of study for the use of which the material(s) will be designed?*

[6] The Director of the Texas program, Herman van Olphen, served as our outside language evaluator. His final report on his final site visit April 16-17, 1998, indicated that the Hindi-Urdu program of the Triangle universities was possibly the most robust in the entire country (p. 1).

Why the Web? Although we are just beginning to appreciate the true capabilities of the Web, we believe that it will become the preferred medium for delivering interactive instruction because nothing else is sufficiently fast to produce "real-time" interaction, short of using the studio classroom with its labor-intensive delivery and correspondingly high overhead; nor is there any other medium sufficiently flexible to allow the author to add or modify without remanufacturing and distributing new editions of fixed media (the ease of updating is an often overlooked advantage in developing materials for the Web). With the ubiquity of computer connections to the Internet, even the slowest machines will provide a more enriched course than could be deliverable through other non-live media, not just video or audio tape, but including CD-ROM and DVD disc. The ease with which the Web-based materials can be corrected, modified, and augmented, is a decided advantage over the fixed medium, although in recognition of that limited group of users who may desire it, the basic unenhanced course will be made available on CD-ROM or DVD and distributed at cost (which will be borne by the Triangle South Asia Consortium). With the extension of the high-speed Net connections provided by several new transfer modes that already increase Web speed by as much as three hundred times the norm —these high speed connections already link the Triangle universities (in ATM format) and are beginning to emerge in the public domain through telephone and cable companies (in ADSL format)—the fully enhanced version of the course will be easily accessible by the average computer user by the time of its completion. That final configuration of the Internet II, will likely see speeds rise to as much as 700 times the current capability, which translates directly into more material, especially high overhead material such as video, can be made available without waiting.

A Program for Delivery vs. Language-Specific Tools. The up-front costs of producing a professionally edited and produced multimedia language instruction package are not insignificant (as our budget reflects), but once prepared can pave the way for very inexpensive adaptation to other languages. The structure of this program will separate the delivery medium (the program itself) from its content (the lessons with parts) in such a way that it can be adapted for use for

other Less Commonly Taught Languages, indeed any language. The program will be made available to other teachers of foreign language in a packaged form that will relieve them of the trouble and tedium of learning technical details so that they can mount their own materials easily and professionally. The instructions for modifying this program will be built into the program itself (much in the manner of "help" menus found in popular commercial productions), which will enable the instructor to utilize part or all of the features in any combination. This ultimately allows the teacher to build materials without the pressure to produce everything at once; it will also initiate novice users of technology in such a way that they can begin to use the features with a minimum of fuss, inviting exploitation incrementally and without stress (or at least, reduced stress). In our experience, one of the greatest hurdles to the effective use of the Web is the perceived (whether genuine or not) steep learning curve, which inevitably means the investment of large amounts of time for initially limited returns. This program should make more and better materials available faster and easier, and without having to invest the precious time that can be better spent doing research or preparing classes.

4. Account of Related Materials
[Maximum 10 points] *(a) Have all the existing, similar materials (for the study of the language(s), region or country, or issue in question) been cited and accounted? (b) Is there a critical commentary on the adequacy of such similar materials and is this commentary accurate? (c) Will the proposed material(s) duplicate other materials already in existence or already in progress?*

Sources and Types of Materials. Existing multimedia materials for teaching elementary Hindi are limited, but can be grouped into three basic categories: [A] largely passive materials that are audio and/or video tape packages, usually in supplement to a textbook; [B] CD-ROM and computer software products; [C] Websites on the Internet. All products known to us have been reviewed, but only the best are listed in the appendix.[7] For a more complete public list, especially of traditional materials, see the information compiled by Frances W. Pritchett at Columbia

[7] The list was condensed from two ΔSAC internal reports; see Afroz Taj and John Caldwell, "Evaluation of Multimedia Hindi Teachings Tools" (07.09.98) and emended (02.28.99), and Philip Hassett, "A Report on Electronic Media for the Study of South Asia" (08.17.98).

University: gopher://gopher.cc.columbia.edu:71/00/clioplus/scholarly/SouthAsia/Teaching/ILM/hindi.ilm. An additional list of products and websites is maintained by Colorado State at the following URL: http://www.cs.colostate.edu/~malaiya/hindilinks.html. Detailed formal analysis of various products can be made available as needed by contacting the Project Director (e-mail: <tony_stewart@ncsu.edu>.

Conclusions. The review made clear that there simply is nothing available anywhere in the market or on the Web that approaches the level of multimedia presentation and integration that we propose, although the Chicago-Michigan project suggests a promising start. At the same time, we recognize that what we are proposing could not have been done even two or three years ago (when the latest of these efforts began) because of the inherent limitations of the medium (the Web and most of the user processors were too slow, compression ratios not sufficiently high, etc.), and we have taken advantage of the various experiments that others have begun. But perhaps more than any other issue is the difference in the concept of the course. Nearly every pedagogical tool for the serious (and not so serious) study of elementary Hindi has tended to conceptualize the multimedia dimension of the presentation as an extension and illustration of the "book." We are not producing a "book" and this cannot be emphasized enough. Conceptually, we are proposing a "classroom" that shares many of the features of traditional "live instruction" with many of the most desirable features of tutored drills and the sophisticated language lab—the ability to repeat and replay, to interact, and even to ask questions (and, importantly, get some answers). Afroz Taj will teach the user Hindi by appearing visually in every phase of the program in a manner that mimics the classroom.

5. Likelihood of Achieving Results

[Maximum 10 points] *(a) Are the objectives, which the proposed material(s) are to serve, clearly defined? (b) Are the outlined methods and procedures for preparing the material(s) practicable and can they be expected to produce the anticipated results? (c) Does the application reflect a sufficient degree of knowledge in the pertinent areas to assure a successful completion of the project (e.g., for language materials: modern language pedagogy, modern linguistic theory; for area studies and related materials: history, political and social structure, economics, etc.)?*

General Interactive Features. The course in elementary Hindi will be delivered primarily through spoken instruction and when desired coordinated with written text in *devanagari* script, which will be taught from the beginning of the course in a special interactive pronunciation and script-writing module. The use of English will be extremely limited, and translation of complete sentences into English will never appear anywhere in the lessons. Spoken instruction will be accompanied by fixed and animated visual cues, using compressed digital video technologies, with full playback features for repetition. Commercially produced DVD disc film clips will be integrated into the lessons, along with converted video tapes generated in the field with instructors and students in unrehearsed situations. Multiple self-correcting exercises for aural comprehension, reading comprehension, and writing sets will be imbedded in every lesson, with hyperlinked glossary and grammar for every word and/or construction (in addition, separate grammar lessons with exercises will be imbedded in each section). Graded readings will also include standardized text that can be linked to digital on-line dictionaries as they become available. For those willing to invest minimally in additional classroom equipment, or who have language labs equipped with computer stations, space will be provided in the enhanced version of the lessons that will allow fully interactive compressed digital teleconferencing, where the instructor can engage the students in full visual and oral/aural interaction (in that classroom or in a remote site)—but the basis for this capability will not be the $350,000 studio, but the $10-25,000 portable Web-based systems now available (costs will go down and quality, already far superior to broadcast television, will go up). In that enhanced mode, the instructor and students will have "whiteboard" capability, i.e., the ability to write directly on the computer screen through graphics tablets. Students will also be able to submit homework exercises—both typed in *devanagari* and spoken—by attaching files to e-mail. Unfortunately, voice-recognition software is still sufficiently crude and the programming for artificial intelligence still sufficiently in its infancy that talking and reasoning programmed instruction (invoked by images such as the master computer HAL in Kubric's "2001") is out of the

question. We will offer the next best thing, using an open-architecture for the programs that will allow for future enhancement along these lines (in as much as that can be anticipated).

Principles of Design I - Pedagogical Priorities. The course will be committed to teaching the student how to function in the language, giving priority to communication over form, which comes later with practice and experience.[8] In order to achieve this kind of desired proficiency, the following principles dictate the construction of the twenty-four lessons.

[1] The class will not be presented in a way that is meant primarily to be read, but to be delivered both orally and visually. Consequently, Instructor Taj will "teach" the class by introducing each section, giving oral instruction in the use of drills, etc. For those who prefer text only, a toggle will disable the oral delivery.

[2] The first objective is to introduce students to authentic spoken Hindi and to give them the tools they need to begin to comprehend the gist of a conversation. Thus the primary content of the website will consist of audiovisual dialogs based on real-life situations. These may be filmed especially for the website or taken from existing films and videos (realia).

[3] To promote reading, the script of the dialogue will be available on-line, but only in *devanagari* script. The student must have the option of viewing the script in parallel with the audio or separately. The student must be able to hear "instant replay" of any sentence or word in the dialogue.

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[8] The desirability of a proficiency-based curriculum has been affirmed by its success in producing functioning second-language speakers. When ACTFL began to promote the new standards in 1986, the emphasis was on communication, rather than grammar/translation models of the past; among the standard works, see Sandry J. Savigonon, *Communicative Competence: Theory and Classroom Practice* (Meno Park, CA: Addison-Wesley Publishing Co., 1983); Alice Omaggio, *Teaching Language in Context: Proficiency-oriented Instruction* (1986); and L. Bachman, *Fundamental Considerations in Language Testing* (Oxford: Oxford University Press, 1990). More recent developments have considered more general issues of testing proficiency; see J. Phillips and J. Draper "National Standards Assessments" in *Meeting New Challenges in the Foreign Language Classroom*, edited by C. Crouse, Report of the Central States Conference on the Teaching of Foreign Languages (Lincolnwood, IL: National Textbook Co., 1994), and Phillips' earlier article, "Testing" in *Research within Reach*, edited by V. Galloway and C. Herrin (Valdosta, GA: Southern Conference on Language Teaching, 1995). Parallel to these advances in assessment, concern to define and develop strategies for achieving the "communication goal" and the "cultures goal" have been effectively developed; see C. Chaudron, *Second Language Classrooms: Research on Teaching and Learning* (Cambridge: Cambridge University Press, 1988); R. Ellis, *Instructed Second Language Acquisition* (Oxford: Blackwell Publishers, 1990); and C. Kramsch, *Context and Culture in Language Teaching* (New York: Oxford University Press, 1993). Taj's approach, developed over more than a decade of experimentation with the proficiency communication model, is consonant with the general assumptions of these methods, but follows explicitly none of those precise paradigms.

[4] Function-oriented pedagogy will dominate instructional delivery, that is, the dialogues will introduce grammatical constructions in a cumulative progression, but each dialogue will have a functional objective, e.g. the student will learn how to introduce him/herself, how to describe an event, how to shop in the bazaar, etc. Exercises will ask students to listen to the dialogues and answer comprehension questions about them, or to participate in role-playing and meaningful interactions. The traditional pattern drills and English to Hindi translation exercises will be avoided.

[5] Since the second objective of language learning is to get the student to begin producing the target language (i.e. speaking and writing), each dialogue will be linked to a pool of interactive exercises in both oral and written modes. The student should be able to request a random set of exercises from the pool, and continue to request additional exercise sets until through these iterations he or she feels comfortable with the material from the lesson. We are not proposing a few exercises, but rather extended sets of exercises that may have as many as 150 different examples before repeating any one. [This will include an instructor's monitor that will reveal at a glance how many exercises have been requested by any student who logs in.] The point-and-click approach, which with pre-chosen responses induces a strong sense of failure when the outcome is declared "wrong", will be studiously avoided; students will be prompted to produce complete Hindi sentences orally and in writing. Integrated video clips from Taj's own classroom instruction will supplement the drills, allowing the user to see other students learn, giving the user a real life standard by which to gauge his or her own progress, while boosting confidence in seeing others in the learning process.

[6] If used in conjunction with formal classes, the instructor can elect an option that would enable students to submit homework and tests through e-mail or internet forms.

[7] Each dialogue will be linked to a grammar unit, which will be designed to teach patterns primarily through deduction by using examples drawn from the corresponding dialogue. Occasional brief English explanations of constructions may be required, but following the principle of using the target language as the medium of its own instruction, these English

diversions will be kept to a minimum. Written and oral grammar exercise sets will be available here.

[8] To teach the grammar through use (not through rules), at least one initial audiovisual dramatic scene and/or song clip from a Hindi will be used to illustrate the construction. Songs (which are frequent in Hindi films) are especially effective because of the refrain, which reiterates the desired patterns, while leaving the student with a context and mnemonic reminder of the construction.

[9] Each dialogue will also be linked to a vocabulary unit which further explains and exercises the vocabulary introduced in the dialogue. Written and oral vocabulary exercise sets will be available here.

[10] Each vocabulary unit will be linked to a writing system unit that will explain the spelling of the words from the dialogue. Spelling and pronunciation exercise sets will be available here.

Principles of Design II - Display Priorities. In recognition of the all-too-often ignored reality that the on-screen display and delivery of information will have an impact on what and how the student responds, the following principles have been adopted to give priority to ease of use and instantaneous or near-instantaneous feedback and response. These choices reflect certain tradeoffs, e.g., speed is sacrificed for non-essential graphics, and so forth.

[1] What the student sees must be so easy to follow that it appears to be intuitive, with extraneous graphics kept to a minimum. This tendency toward grace and concision of presentation has the secondary effect of focusing the user's attention on the audio-visual materials that are the real point of the delivery in contrast to the background and frame.

[2] Speed of loading files (e.g., film clips) and response times take priority over aesthetics, but given the high-speed systems with which we will be working, the graphic interfaces will not be barren.

[3] Navigation among screens must be easy and self-evident. No student can afford to feel "lost." In addition to navigation aids, an on-line Help Manual will also be available.

[4] In order to make the structures of each of the lessons comfortable and easy to follow, introductions and directions will be provided by the instructor, Afroz Taj, using video clips filmed on location in India, on the campuses of the Triangle universities, and in the classroom. This means that he will teach the class (as opposed to delivering information). This thin shell, with accompanying *devanagari* transcription, will serve as a human guide point to orient the user.

[5] The site must reflect the priorities of the instruction, reinforcing individual elements as needed. Consequently, the structure of the site will be layered along the following lines:

Layer One	Dialogue in spoken and written modes with video	Oral exercises	Written exercises
Layer Two	Reference grammar	Oral exercises	Written exercises
Layer Three	Vocabulary in spoken and written modes	Oral exercises	Written exercises
Layer Four	Writing system	Pronunciation exercises	Spelling exercises

Proposed Curriculum. The curriculum consists of 24 lessons. Three lessons will introduce new material, followed by a review lesson to consolidate the gains. The review lessons are cumulative, so that each review includes the previous three plus all other lessons before it. The pacing allows for approximately one lesson per week, which corresponds to two semesters of work Each lesson is centered around a situational dialogue, with accompanying video. New constructions and points of grammar introduced in each dialogue are listed in the right hand column.

Lesson	Dialogue	Grammar
1	Meeting and greeting	word order, interrogative particle “kya”, “to be,” present imperfect tense (writing system)
2	Asking directions in a street in India	personal pronouns, demonstratives, postpositions, imperatives (writing system)
3	In the bazaar	nouns, gender, plurals, need/desire, dative case (writing system)
4	Review A	Lessons 1-3
5	Visiting a friend in Benares	emphatic particles “hi” and “bhi”, “to do”, adjective agreement, “to be able”

6	A tour of a friend's house	oblique case, genitive postposition
7	In the vegetable market	personal pronouns, interrogative pronoun
8	Review B	Lessons 1-7
9	In the Himalayas	compound postpositions, optative tense (subjunctive)
10	Making a date	telling time, future tense, negative particle
11	Going for a walk	present progressive, "to meet", reflexive pronoun
12	Review C	Lessons 1-11

Lesson	Dialogue	Grammar
13	Birthday invitation	"whether", direct objects, ease and difficulty, fractions, telling time
14	At the Taj Mahal	comparatives, superlatives, relative pronouns
15	At the bus stop	obligation, conditional mood, "to wait"
16	Review D	Lessons 1-15
17	A visit to Bombay	perfect tense, present perfect, past perfect, past participle
18	A visit to Hawaii	knowledge, intention, persistence, opinion
19	Dinner party	"Supposed to," past imperfect, past progressive, causative verbs
20	Review E	Lessons 1-19
21	A visit to New York	future perfect, when clauses, days of the week, months, "since"
22	A scary story	"ne" construction, about to, interest, perhaps
23	A car accident	seasons, weather, directions, comparative clauses, passive voice
24	Review F	Lessons 1-23

Modifying and Integrating Preconfigured Packages. In our extended monitoring of Web instructional materials, we have found no single package that delivers the variety and level of multimedia integration we are seeking. On the other hand, we are not proposing to program from scratch, because many of the features we desire are already available in the market in discrete form. For video and audio compression and delivery, for graphic display, etc., we will rely on widely available packages that offer plug-ins free of charge to the end-user (e.g., QuickTime products from Apple). Instructional packages, however, are not generally available commercially, but there are two basic shells—both of which have been developed at North Carolina State University—which will be used as the starting point for the interactive pedagogical tools that

power our Website. Building on these programs, we will generate a final site that combines the most desirable features of each, and augmented by our own needs. The shells are: [1] WebAssign (WA), and [2] Web Lecture System (WLS).

[1] WebAssign. This package, already functioning but still evolving, has been created by the Department of Physics of the College of Physical and Mathematical Sciences at NCSU and available to us at no charge. It is largely oriented toward the presentation of self-correcting exercise sets, homework, and guided readings with responses. The system generates random exercise subsets from a larger bank of exercises so that no two students start with precisely the same materials. It then keeps track of which items were generated for each student (because every user will log on with an i.d. number); the student can continue to request new exercise sets until the material is comfortable. The program will monitor how long each student works on exercise sets and can check to see the progress of graded responses, giving a kind of "hands-on" control otherwise elusive. This program will be especially helpful in delivering the written exercises for each lesson, but will have to be modified to handle spoken exercises, a process that will involve minimal but significant additions to the command structure. Additional teacher's tools from this package will probably be incorporated directly into the enhanced version of the Website.

[2] Web Lecture System. The backbone of our audio-visual delivery system will be the Web Lecture System (WLS) developed by the College of Engineering at NCSU, which has also been made available to us at no charge. WLS is an integrated system of tools and mechanisms explicitly designed for support of proven network-based education (NBE) paradigms and workflows. It incorporates tools for construction, editing, capture, delivery, and management of Web-based classes, lessons, and presentations. WLS presentation can work with HTML or Java-scripted components (applets and Java-based simulations), with synchronized audio and video. In the "live" mode, WLS cooperates with most network-based collaborative problem solving environments and teleconferencing tools, which will provide the infrastructure for our enhanced version of the Website with its interactive compressed digital televideo component. Presentations can be captured live (synchronously) or off-line (asynchronously), and they can be presented live

(synchronously) and/or on-demand (asynchronously). The WLS toolset includes an on-line editor and content manager which allows authors and instructors to develop new, or re-use previous, lessons or presentations generated from other construction tools (using gif, jpeg, mpeg, applets, etc.). For greater customization, the system captures presentation audio, video and timing data, and automatically creates a web-deliverable version of the presentation, a feature that will allow instructors to include video of their own classes in the enhanced version of the Website. Viewing is through any standard Web browser—thereby meeting one of our main criteria—and the student can listen to accompanying audio via a RealAudio player, or view it via the RealVideo player on any of the platforms we have selected. In its original design, platform independence was one of the principal WLS requirements, so WLS lectures can be viewed on multimedia computers that run Windows 95/NT, UNIX-type OS, or Macintosh OS, which are precisely the platforms we have targeted. According to the creators, WLS also allows synchronized delivery of both audio an video using practically any teleconferencing or collaboration system (e.g., MS NetMeeting), but has been most effective by synchronizing with high-end full-motion delivery solutions such as MPEG-2 [and future MPEG4] or traditional wide-area TV-based Distance Education systems, which will include our proposed system from First Virtual Corporation. In the case of live delivery, the system allows student interaction with the instructor and an exchange of ideas via an "electronic hand-raising" mechanism. In short, many of the most desirable interactive features that employ compressed digital televideo can be incorporated through this shell.

Multimedia Technologies and Compressed Digital Video. The ability to transmit still pictures and text is a widely accepted reality today among users of the internet, while programs for playing voice and film clips can be easily downloaded. CD-ROM and DVD disk technology has made even the feature film an easily accessible medium. But the extended use of multimedia on the internet, including video, both passive and interactive, requires somewhat more specialized

technologies, some of which are still in their infancy.[9] The technology for live interactive televideo until very recently depended on broad bandwidth to transmit sufficient frame-rates to ensure the "feel" of live broadcast, i.e., to match film (at least 24 frames per second) to even live television broadcast (upwards of 30 frames per second), and special networks were necessary to provide this feature. New advances in digital compression and subsequent expansion, can now allow for better-than-broadcast quality televideo that uses ordinary bandwidths, by separating the signal into multiple units that are reassembled on the opposite end. While some time lag is certainly discernible in its cruder version, the more advanced versions are nearly instantaneous, especially when connected through ATM (Asynchronous Transfer Mode) ultra-high speed connections, such as we have in the Research Triangle of North Carolina (and which will be available nationwide in the next few years).

[1] For purposes of this project, we have tentatively chosen equipment manufactured by First Virtual Corporation (FVC), to provide the cameras, digitizers, encoders, etc. for the compressed digital interactive portions of the enhanced version of the site. FVC equipment was first developed by IBM, which has subsequently spun off that business to FVC. In an area where much is promised, but delivery does not always live up to expectations, we feel that FVC is a superior choice because much of the original equipment was tested and has been subsequently implemented on the NCSU campus, making it a known quantity (with all of its advantages and inevitable idiosyncrasies). For more mobile applications, especially suitable for small classes with few students (especially appropriate for remote access in campuses away from the Triangle), we are considering the Concorde 4500, which is a package turnkey mobile system. For more technical information, see Appendix 7: "Technical Information on Televideo - FVS and Concorde 4500"). The Triangle South Asia Consortium is planning to use existing equipment on the campuses and to purchase any additional equipment necessary for this feature (approximately $30,000); we have not requested funds in the budget for this item, because the interactive

[9] For one of the most straightforward and up-to-date introductions to televideo and related technologies, see Chwan-Hwa "John" Wu and David Irwin, *Emerging Multimedia Computer Communication Technologies* (Upper Saddle River, NJ: Prentice-Hall PTR, 1998).

televideo component is an important add-on feature that we have chosen to incorporate into the structure of the program for those advanced users who have access to the appropriate equipment, but it is not essential to the program's basic execution.

[2] It should be further noted that university computing has guaranteed access to the ATM network that will make the use of this equipment possible (see Appendix 8: NCSTate.Net Research and Development), and no special connections will be necessary because the FVC equipment utilizes standard telephone and ethernet connections at the point of origin. Importantly, the video output of the FVS system appears to be fully compatible with the emerging MPEG4 standard for digital television. The MPEG group (which stands for Moving Pictures Expert Group) will utilize Apple's QuicktTime technology to become the industry standard, sanctioned by the International Standards Organization (ISO). The importance for our project is that MPEG4 will be available long before the conclusion of the grant, enabling us to produce all videography in that format, which is much more heavily compressed and therefore quicker to download, while producing an extraordinarily high quality of image and sound. For more information on MPEG4 and its implications, see http://drogo.cselt.stet.it/mpeg/. It should be noted that while not needed to prepare materials or to deliver the basic class that will be available to anyone through the Web, the interactive televideo component is a logical enhancement for the instructor in the classroom, and one that will allow for the most creative adaptation of materials by the instructor as the lessons are mastered and taught.

Other Technical Considerations. In undertaking a design of this magnitude, we are faced with a series of decisions that have non-trivial implications for the final product, its user access, and portability or universality. The issues are generally resolvable to the tension between "universality" and "performance." It should be noted that the increase in the degree of change in computer technology carries with it two contrary tendencies: first, a decision to deploy a technology that is bypassed or falls out of favor within the market can render the program a dinosaur within a matter of a few years; second, with increased emphasis on cross-platform portability and translatability of

programming tools, betting on especially popular and/or dominant modes of computing will ensure that the programs are (relatively) easily adaptable to future computing environments. We will have to address at least six of these issues, and the final decision will be deferred as long as possible to ensure the greatest utility at the time of our undertaking: [1] users' computing capacity, [2] programming language, [3] browser, [4] mirror sites, [5] font unicode, and [6] word-processing.

[1] We propose to target the institutional setting for the initial use of this product, which means that we expect the minimum technology level to be somewhat higher than a single user might today enjoy at home. Projections of new technology within the computing industry indicate exponential increases in computational speed, for instance, the gigahertz chip is already in prototype, making the current Pentium and G3 chips seem like slugs in comparison; the cost of RAM is negligible now; telecommunication speeds are increasing, with ATM and ASDL connections running more than 300x current connections; and compression ratios (for making very large files very small) are rising in such a way that a file which today might take an hour to download, will (when connected with superfast transfer) take only seconds or less. The implication is that we will program for environments that represent the tendency toward greater speed and capacity. Our target computer will be the Multimedia PC (in the $1500-$2000 range as projected for the year 2002), a machine that will use DOS or Apple operating systems (although UNIX will support most of the features).[10] It should be noted, however, that the recent advances in technology, especially in the release of the new Pentium chips and the even more dramatic cost savings of machines such as the iMac, may well make this platform within the reach of any user, although institutions are most likely to have access to the high speed Web and Internet II.

[2] The choice of programming language for the internet at present pits Sun-system's Java script against the Web Standards Committee Hypertext Markup Language or HTML. The issue

[10] The Multimedia PC Marketing Council in Great Britain has established a standard for the Multimedia (MPC) and the Advanced Multimedia PC (AMPC or MPC Level II), which captures today's standards and projects forward; see http://ibis.nott.ac.uk/guidelines/ch11/chap1-1-A.html.

is cross-platform utility. HTML has been unevenly implemented (i.e., what is supposed to show up on screen does not always do so on certain computers), with sufficient variability that it is not as universal as hoped, which means that it is great for simple documents, but highly problematic for more sophisticated delivery. The MIT project (W3C.MIT.edu) is about to release HTML4, which should increase standardization, but that may quickly give way to an even more advanced mode XML, which should be available long before the end of this project. HTML and its variants offer a greater universality and standard, in spite of the uneven implemenation. Java script, on the other hand, represents greater control over final presentations on-screen, but suffers from a "dialect" problem, i.e., Microsoft and now Apple have added features (plug-ins) that increase Java performance on their specific machines, a move that makes those users happy, but which decreases universality, because programmers now aim for those specific add-ins (bypassing Java protocols). Our team is leaning at present to the Java environment, because of the greater control and flexibility. But the decision may be made for us, because ultimately it has become a subset of the larger conflict over browsers.

[3] The most common browsers today are produced by Netscape (the latest is "Communicator") and Microsoft ("Internet Explorer"). This is not just about monopoly, but about the way material is presented. What works for one browser is not always universally valid, so to program for one target could potentially impede other users. The result of this conflict is that what you present simply looks (and sometimes functions) differently on each of the browsers and their extant versions (e.g., things as simple as word wrap to fit screen size can skew columns). So, universality will require extensive double-checking of pages on different platforms and different browsers, which is a labor-intensive undertaking (here our graduate students and beta test sites will earn their money). We may recommend a preferred browser for greatest ease of use, as is often indicated on the home pages of many sophisticated sites (e.g., "This site works best if using Netscape Communicator, version 4.1.", etc.); provisions for downloading that browser would also be available.

[4] To make the program more accessible, we are planning to establish several mirror sites. Any university or institution that acts as a mirror will have the course available locally, which means that access times will be faster, especially in periods of peak demand. The choice of mirror, however, is not just a matter of agreement, but compatibility, for the hosting institution must be able to support with site licenses the packages we are including in the program (e.g., a program such as RealPlayer, which provides streaming audio and video, must be available at the mirror site as well). At present we are planning to negotiate at least two mirror sites, with Columbia and the University of Texas-Austin as the primary choices (not coincidentally the universities of our collaborators), although any university that chooses this course may reasonably become a mirror site to increase access speeds. Ideally all South Asia National Resource Centers are good candidates for mirror sites.

[5] Because the Webpages will primarily use *devanagari* script, we must choose or develop a font that follows the Unicode standard. Although a number of *devanagari* fonts have been developed during the last ten years, the Unicode standard for *devanagari* was only recently established, and some of its more arcane features are still to be determined, although it is now generally available on the international editions of Netscape and the newest Apple OS and is advertised as fully operational in the new Unicode Standards 2.0 publications. This standard ensures that each character will be handled the same way regardless of the platform. It also governs the special construction of ligatures or conjunct consonants, the placement of vowels which orbit around the consonants, and so forth. We anticipate that by the time a decision has to be made (late summer 1999) we will have several font sets to choose from and will not have to develop our own. This will, of course, have implications for the type of word processor that is adopted for the student responses. See http://unicode

[6] The word processor will be rudimentary, including basic insertion, deletion, highlighting, scrolling, etc. The choice of word processor will also structure the way visual space is handled on-screen. There are numerous packages from which to choose, but two major consideration are ease of use with the preferred programming language and browser combination, and whether it will be

easily adaptable for future language development, i.e., if the shell is adopted by another faculty member to present another language such as Persian or Urdu (where the *nastaliq* script requires the word processor to write from right to left). Again, we favor simplicity and universality.

6. Quality of Personnel
[Maximum 10 points] *(a) Is there evidence of professional competence and experience to direct this projection the part of the project director or principal investigator? (b) Is there evidence of the qualifications of other key personnel, if any, to participate in the project?*

Project Director: Tony K. Stewart. The grant will be directed and managed by Tony K. Stewart, Assoc. Prof. of Religion, North Carolina State University, and Director of the North Carolina Center for South Asia Studies of the Triangle South Asia Consortium. One of the two founders of ΔSAC, Stewart directed that institution for its first eight years, during which time it grew from a small faculty working group to a nationally prominent resource center. A University of Chicago-trained South Asia area studies specialist (PhD 1985), Stewart focuses his teaching and research on Bengali language, literature, and religion, in which he has published extensively (in both English and Bengali). He has held research fellowships from the National Endowment for the Humanities (1991, 1995, 1997), Fulbright (1981-82, 1992), the American Institute of Indian Studies (1978-79, 1981-82), the American Institute of Bangladesh Studies (1991-92), and was Jubilee Fellow at the University of Pennsylvania (1997); he has studied abroad and been resident in India and Bangladesh for more than five years of his career. Administratively, he has served as Trustee and Secretary of the American Institute of Indian Studies, Trustee and Treasurer of the American Institute of Bangladesh Studies, Faculty Advisory to the Social Science Research Council, consultant to the Council of American Overseas Research Centers, and the Executive Committee of the South Asia Microform Project. Importantly for this project, he has administered organized research grants from the National Endowment for the Humanities, U.S. Department of Education's Center for International Studies (Title VIa), and contributed as a member of the Advisory Committee for a Rockefeller Residency Institute for the Study of South

Asian Islam. Long interested in language pedagogy and the use of computers for it (his first published article as a graduate student was on the topic of producing fully computerized diacritics for rendering Indic languages in full transliteration), Stewart is responsible for conceptualizing the Hindi course based on the successful experiment in televideo instruction of the previous three years, his own work with Web-based instruction, and concern for developing curricula in the LCTLs.

Principal Investigator: Afroz Naqvi Taj. The creator of the course in Hindi, and the individual ultimately responsible for its content, is Afroz Naqvi Taj, Assistant Prof. of Foreign Languages, North Carolina State University. During his time as an instructor of Hindi-Urdu at the University of Michigan (1983-87) and at the University of Virginia (1987-95), Taj developed a series of teaching aids at all levels of the language. Hired at NCSU in 1995, he adapted those materials to the interactive televideo classroom, which resulted in an overhaul of his entire curriculum in Hindi-Urdu. In 1996 he received his PhD from Jawaharlal Nehru University in Hindi Literature, completing research on the history of the Hindi stage, at which point—and as a direct result of the success of his televideo instruction—his position was made tenure-track. Taj, who has begun the sequence, will also have completed the final stage of his ACTFL certification before the grant begins. Publications relevant to this project include a student's companion to three Pakistan soap operas used in classroom instruction, titled *Tanmaiyan Ankahi and Ahsas* (New Delhi: Monumental Publishers, 1996), and *Urdu through Hindi: Nastaliq with the Help of Devanagari* (New Delhi: Rangmahal Press, 1997), which teaches the Hindi student to read Urdu in *nastaliq* characters without using English. His introductory course in Hindi, published each year as course packs because it has been under continuous development and revision, is titled "A Door into Hindi: Elementary Hindi I" (whose title has been pirated for this Web course, but whose content has been abandoned in favor of materials developed exclusively for the Web) and "Namaste: Elementary Hindi II." Taj has also taught summer intensive elementary Hindi (for the University of North Carolina's University Center for International Studies, Title VI, NRC

program), which has produced a number of role-playing and situation-based exercises that were necessitated by the long classroom hours and need for variety to sustain student interest. Recently he served as consultant for the late stages production of the Rosetta Stone "Hindi 1" CD-ROM, which proved an invaluable experience for shaping his conception of the Web-based course. Important for the taped delivery of portions of the course, Taj is an internationally prominent Urdu poet and singer, with a background in acting. Currently he is Executive Director of the Triangle South Asia Consortium, responsible for all cultural programming, including the literary Urdu *majlis*, the South Asia Film Festival, the Classical Music and Dance Society, the UNC-CH and NCSU Study Abroad Program in Delhi, while serving as advisor to several South Asian student groups.

Hindi Documentary Film and Language Specialist: Satti Khanna. Associate Professor of the Practice in Hindi at Duke University, Satti Khanna's specialty is literature, film, and film production. He received his Ph.D. from UCLA (1969) and has authored and translated numerous books and articles including *The Servant's Shirt* (Penguin India, forthcoming) and two volumes of *The International Dictionary of Films and Filmmakers* (Macmillan, 1984). An accomplished documentary film maker, producer, and writer, who has filmed extensively the effects of partition in the living memory of survivors, Khanna was recently awarded an International Travel Award from Duke University to work on a documentary film on Contemporary Indian Writers. The first work from that project has appeared on Indian television Doordarshan under the title of "Literary Postcards" in Hindi, Oriya, Tamil, and Malayalam. He has also provided technical assistance and recorded the voice-over for a series on Indian folktales. Khanna will review course materials on a periodic basis, will advise the project in planning its video production and editing, and provide voice-recording of selected materials in the package.

Hindi Literature and Dance Specialist: Mekhala Devi Natavar. Collaborator and beta-tester for the project at Duke, Mekhala Devi Natavar, is lecturer in Hindi in the Department of Asian and African Languages and Literature at Duke University. Natavar received her Ph.D. from the

University of Wisconsin-Madison (1997) where she studied the performance traditions of South Asia. Natavar's primary interest is South Asian Dance and the majority of her research has been conducted apropos of the evolutionary development of Kathak Dance. Natavar has used her proficiency in Hindi, Urdu, and Sanskrit to conduct research projects in India and at home with funding from the American Institute of Indian Studies, the Jon B. Higgins Memorial Scholarship for dedication to the study of Indian dance and the Foreign Language and Area Studies Program (Title VI). She also received the KNAPP University Fellowship and the WARF Fellowship (Wisconsin). Fluent in Hindi and Urdu, and a student of Sanskrit, Natavar combines her scholastic interests with a professional life as a dancer, choreographer and director. She has publicly performed traditional Kathak dance as well as more modern forms. She has been teaching classical Indian dance for over 20 years, the performative dimensions of which will have a profound impact on the production of the video portions of our project.

Hindi-Urdu Literature Specialist: Shantanu Phukan. Shantanu Phukan is Lecturer in Hindi and Urdu Literature and Language at the University of North Carolina at Chapel Hill. Phukan is scheduled to receive his Ph.D. from the University of Chicago in the summer of 1999 from the Department of South Asian Languages and Civilizations. His expertise in Hindi and Urdu language instruction has been attested by over a decade of teaching experience and course development at the University of Chicago and now the University of North Carolina. In addition he has presented papers and published extensively on the Religious and intellectual history of Medieval India utilizing his skills in Persian, Urdu, Hindi and Bengali. Phukan's research has been supported by Fulbright-Hays, the American Institute of Indian Studies, the University of Chicago and the U.S. Government's Foreign Language and Area Studies Program (Title VI).

External Hindi Language Pedagogical Consultant: Herman van Olphen. Collaborator and consultant to the project, Herman van Olphen received his Ph.D. in Linguistics from the University of Texas at Austin (1970). He has been a standard bearer for almost three decades in the teaching of Hindi at the university level in the US. A well published and often awarded

researcher and instructor in the field of South Asian Linguistics he has pioneered a variety of technical innovations in pedagogy for South Asian language acquisition. Importantly for our project, he served on the National Committee to determine Hindi Proficiency Guidelines, helped to develop the ACTFL Project on Proficiency-based Teaching Materials in Hindi, and is an active member of the South Asia Languages Teachers Association (SALTA), the Linguistic Society of America, and the International Hindi Association (Life Member). Van Olphen served as the Chair of the Language Committee for the American Institute of Indian Studies from 1990-97, overseeing their language programs in India. He has authored two introductory textbooks for Hindi, and more than 30 articles on Hindi and related linguistics topics, with a notable interest in pedagogy. Van Olphen has formerly served as an outside reviewer for the both the NEH, the NSF, and the Department of Asian Languages and Literature at the University of Washington as well as the Distance Language Learning program at UNC and NCSU, the latter familiarizing him with the operations of the Consortium's Hindi program, with which he now collaborates. T

External Consultant for Urdu Pedagogy: Frances W. Pritchett. In order to serve both the Hindi and Urdu student, the project proposes as collaborator Frances W. Pritchett, Professor of Modern Indic Languages in the Department of Middle East and Asian Languages and Cultures at Columbia University. Pritchett received his Ph.D. (with distinction) from the University of Chicago (1981) in South Asian Languages and Civilizations and has been teaching at Columbia since 1982. She oversees their Hindi and Urdu language programs, which are among the most productive in the US. Pritchett's interests center around South Asian Islamic literature and he has published prolifically: eight books and translations of Urdu poetry and literature, a book on Urdu pedagogy, and 41 articles on the literatures of India and Pakistan. Importantly she has created and updates the Inventory of Language Materials (ILM) for the Southern Asia Institute at Columbia, which is maintained on their SARAI website. She research in India under the auspices of such agencies as the National Endowment for the Humanities Translation Fund, the Council

for Research in the Humanities at Columbia University and the American Institute of Indian Studies.

External Evaluator: Philip Lutgendorf. The external evaluator for the grant is Philip Lutgendorf, currently Associate Professor of Hindi and Modern Indian Studies in the Department of Asian Languages and Literature at the University of Iowa. Taking his Ph.D. degree (with distinction) in South Asian Languages and Civilizations at the University of Chicago (1987), Lutgendorf has since taught numerous courses relating to South Asian languages and cultures for graduates and undergraduates at the University of Iowa, while building a vigorous Hindi program from the ground up. In addition to first, second, and third year Hindi, he has taught classes on the epics, Hindu mythology, Indian theatre and cinema. His research on Hindu mythology, religion and religious nationalism over the past decade, includes his *The Life of a Text: Performing the Ramcaritmanas of Tulsidas* (Berkeley: University of California, 1991), which won the Ananda K. Coomaraswamy Prize from the Association for Asian Studies. His current work is on the epic figure of Hanuman. He has received funding from the Fulbright-Hays, the American Institute of Indian Studies, Foreign Language and Area Studies (Title VI) Fellowships, and the University of Iowa's Obermann Center for Advanced Studies. He has served as the Vice President of the American Institute of Indian Studies, serving on the Language Fellowship Selection Committee and on the Research Fellowship Selection Committee. He is currently Chair of the Department of Asian Language and Literatures at Iowa.

Principal Programmer and Technical Advisor: Harold Levin. The principal programmer for the project is Harold Levin, Assoc. Prof. of Philosophy, NCSU, and the assistant department head, who also held a second appointment in the Computer Science Department for eleven years. An MIT graduate in mathematics (BS 1965) and philosophy (PhD 1975), Levin combines strong interests in logic and the philosophy of mathematics with areas germane to cognitive science, specifically philosophy of language and philosophy of mind. These interests naturally intersect in the domain of computers and artificial intelligence. Working with computer science engineer Jo

Perry, he has co-authored one of the top selling textbooks for object-oriented design in C++ (also translated into Chinese). The author of several important essays on symbolizing logical form, his prior work on categorical grammar has immediate implications for the current project; see his "A Philosophical Introduction to Categorical and Extended Categorical Grammar" in Buszkowski, ed., *Categorical Grammar* (1988) and his monograph *Categorical Grammar and the Logical Form of Quantification* (1982). His latest interests move him into the arena of Java script programming, which will have a significant impact on this project. Levin has also served as consultant to the Microelectronics Center of North Carolina on its decision support system and, in an area of increasing concern, has served as expert witness on computer-related copyright infringement litigation. In his years at NCSU, Levin has also worked directly with Mladen Vouk, Professor of Computer Science, who is one of the country's leading experts in compressed digital televideo, and who has advised us in that area. Levin will also serve as the Assistant Project Director.

Video Photography and Editing: Neal Hutcheson. Award-winning free-lance photographer, videographer, and film editor Neal Hutcheson has agreed to produce the footage shot in India and to provide editing expertise for all of the footage incorporated into the Website. Taking his BA in Multidisciplinary Studies in Film and Film Production (1992), Hutcheson has produced and directed educational videos and documentaries with a sustained emphasis on the humanities and public service. Some of his work has appeared on PBS. In addition to the visual dimension, he has extensive experience in acoustics and the development of opto-acoustic sensors. For film editing, he has worked extensively on the Media 100 and compatible machines, is fluent in such programs as Video Toaster 4000, has worked extensively with FAST Video Machine editing and non-linear video editing interface. In 1997 he was awarded the United Arts 1997 Emerging Artist Grant award, and has traveled extensively through South America, Scotland, Scandinavia, Benelux, Hungary, Czechoslovakia, and Poland working as photographer and video production assistant and scriptwriter. He will accompany Taj, Caldwell, and Natavar to India to film.

Materials Development and Video Production. John Caldwell, Manager of Outreach for the Triangle South Asia Consortium, will be responsible for locating and evaluating existing audio-visual materials, while developing new ones, that will be directly incorporated into the course lessons. Caldwell has degrees in Music (MA, University of Michigan, 1987) and in School of Management (MBA, Yale, 1991), and an undergraduate degree in History and Literature of Russia and the Soviet Union (Harvard 1985). He is fluent in Hindi and Urdu and served as language classroom assistant and tutor for a number of years. Now trained in Web programming, and serving as technical advisor, teacher of HTML and Website design, and organizer of pedagogical materials for South Asia in the K-12 environment, Caldwell has recently taken over as Webmaster for the Triangle South Asia Consortium.

Interface Designer: Herman Berkhoff. The project's technical advisor for interface design is Herman Berkhoff. Taking his B.S. in Forest Management and Business from North Carolina State University in 1987 he has shifted to develop a focused technical expertise in the application of computer technologies to educational objectives in the university setting. As the managing director of the Foreign Language Technology Center, he has been instrumental in designing user friendly and time efficient computer interfaces appropriate to the unique educational demands of computer assisted language acquisition. Here his expertise will be invaluable, both in suggesting solutions to the problems of interface design, as well as in overseeing any programming necessary to achieve our ideal system. He serves As a technology consultant to the Foreign Language Faculty at NCSU where he routinely trains faculty and students in the use of multimedia equipment and multimedia teaching facilities and in addition serves as the Local Area Network (LAN) administrator for the FLTC.

See Appendix 5 for Curricula Vitae of key personnel.

7. Plan of Operation

[Maximum 10 points] *(a) Does the design of the project show high quality? (b) Is the plan of management effective? Will it ensure proper and effective administration? (c) Is there a clear*

description of how the objectives of the project relate to the purpose of the Section 606 Research and Studies Program? (d) Is the way in which the applicant plans to use its resources and personnel to achieve the project objectives appropriate and adequate? (e) To what extent will the applicant provide equal access treatment for eligible members of racial and ethnic minorities, women, handicapped persons, and the elderly?

Goals reiterated. The objectives of this project can be restated in general terms that speak directly to the central issues of *Section 606 Research and Studies Program*. The project strives

- To provide elementary Hindi language instructional materials in the form of a complete first year course to the widest possible audience;
- To revolutionize the way the Web is used for interactive language learning;
- To program using the latest technologies while anticipating the future delivery modes of these fast-changing tools;
- To create a Hindi course that uses the latest proven pedagogical strategies that emphasize communication over grammar and competence and functionality within the language over perfection of text-based ideals;
- To provide a program vehicle that can be adapted to other Less Commonly Taught Languages by language faculty who have no special computer expertise; and finally
- To deliver this package cheaply, efficiently, and on time.

In order to do this, we will rely on a proven administrative support system and division of labor with clear lines of responsibility and reporting (see Appendix 1 for a flow chart of Grant Management and program responsibilities), which can be summarized as follows.

General Organization: Triangle South Asia Consortium. The Triangle South Asia Consortium (ΔSAC) is an educational cooperative of the specialized South Asia faculty of NCSU, Duke, UNC-CH, and now NCCU. Founded 11 years ago, ΔSAC has expanded from a modest monthly colloquium to review works-in-progress (we have met 133 times during this period) to a wide range of academic and cultural activities that make our group one of the most productive of its type anywhere in the US. Today activities include workshops, conferences, seminars, team-teaching, museum exhibits, music and dance performances, literary gatherings, movie screenings,

etc. ΔSAC activities are guided by the Executive Committee, composed of 12 faculty from the four constituent universities, and chaired by Center Director Tony K. Stewart. These collective decisions about priorities and direction are executed by the Executive Director, Afroz Taj, who concentrates largely on public functions and outreach activities, and by Center Director Stewart, who concentrates on academic programs, inter-institutional affairs, fund-raising, and grant development. The reader is directed to Appendix 2 to see a compact visual summary of the extent of the overall programming activities (Appendix 2: Triangle South Asia Consortium Organizational Productivity). The decision to pursue a first year course in Hindi on the Web was recommended and approved by the Executive Committee more than a year ago (01 March 1998), although the planning started much earlier.

Administration of the Grant: North Carolina Center for South Asia Studies. Research and experimental teaching activities, such as those proposed in the document, are coordinated through the North Carolina Center for South Asia Studies (Center). Created in 1998 to meet the unusual challenges of coordinating programs across ΔSAC's four campuses, the Center is supported by dues from each of the campuses and has been approved for further development by the General Administration of the University of North Carolina's sixteen campus system. The Center is financed by direct contributions from ΔSAC's four constituent institutions and operates out of offices in the D. H. Hill Library on the NCSU campus. Financial management originates in that office and is closely coordinated with the Office of the Dean of Research for NCSU's College of Humanities and Social Sciences in liaison with NCSU's Office of Contracts and Grants. This organizational structure is the direct result of six years experience trying to coordinate large multi-campus grants (Rockefeller Foundation, National Endowment for the Humanities, U.S. Department of Education, and several smaller grants). The regular office staff of the Center will be used as needed to execute the grant, while the staff of the Assoc. Dean for Research of the College of Humanities and Social Sciences at NCSU will guarantee the bookkeeping.

Development Team. The immediate design team—Stewart, Taj, Caldwell, Levin, Hutcheson, and Herman—will meet as a group at least once per month to establish priorities, division of responsibilities, and evaluate progress. At least once per semester, the entire group of ΔSAC Hindi-Urdu language faculty will meet to discuss any relevant issues.

Filming and Travel. Filming of video segments will continue through nearly the entire project. Much of the filming will take place in the studio classroom, the Foreign Language Technologies Center (laboratory), and around the campuses of the Triangle universities. One trip to India is scheduled during the summer at the end of the first fiscal year and the beginning of the second, i.e., summer 2000 (hence the split in budget items). The point of that trip is to film on location the introductory segments delivered by the instructor, certain dialogue scenes (e.g., market, buses, "baby-taxis", rickshaws, etc.), and cultural sites. The Design team will map and script in advance those scenes and venues desired for shooting. Taj, Hutcheson, Caldwell, and Natavar will film using a portable high-end digital video camcorder, with in-field editing capability, and backup power supply (to be purchased by the grant). In several exercises, they will coordinate with students from the Triangle South Asia Consortium's travel abroad program in Delhi (located at Jawaharlal Nehru University and sponsored by the University of North Carolina and North Carolina State University). Filming language-learners in the field as they interact with fluent language speakers in real life situations should provide opportunities for helping the student of the course to gauge his or her own level of accomplishment, while offering a series of different strategies for communication that native language speakers always adopt when faced with someone who is not fluent (e.g., reduced vocabulary, circumlocutions, paraphrasis, etc.). Editing in-class videotape from successfully taught elementary classes in the Triangle universities will have a similar effect of helping the student to gauge his or her own level, while confirming that problems new language learners are most likely to face are not unique. At present more than 200 hours of class instruction is archived from previous classes. New footage will also be shot using the mobile interactive televideo units.

Video Editing. Taj, Caldwell, Hutcheson, and Stewart will work as a team to determine the video requirements for each lesson, with Khanna providing consulting advice. Hutcheson, with his extensive professional experience in non-linear editing techniques, will master the video portions; Caldwell, who is already familiar with many of the processes, will aid him (and it should be noted that as part of the project, Hutcheson has agreed to train Caldwell in the basics of video editing, which obviates the need for another editor or for extending Hutcheson's hours). NCSU's film production lab will set aside one of its newest non-linear film editor (a top of the line Media 100) for exclusive use during the phases of the project which will require intensive editing (see letter of support from David Covington, NCSU). A back-up editor will be available in the Department of Communications technologies lab, with a third somewhat more limited device supplied by the NCSU Foreign Language Technology Center (FLTC). Hutcheson will also provide rough editing in the field in India using the extended capabilities of the digital camcorder. Caldwell will assume responsibility for compiling final edited footage and making it available for integration into the lesson format provided by Levin. Caldwell will also work with the staff of the NCSU Learning Technologies Center (LTC) located in D. H. Hill Library (where the Center's offices are located). Caldwell will also be responsible for transferring existing videotape to digital format, which will be done at the FLTC, with appropriate input by Hutcheson. Our goal is to provide approximately 50 hours of edited video for the site (after shooting and rough editing, each hour of final video taking 15-30 hours to produce, largely because of the small segment size [average several minutes]); for the secondary and tertiary levels of the program, somewhat less sophisticated edited video will be made available, with the goal of doubling the total amount.

Programming. The bulk of the computer programming will be directed by Hal Levin, who will modify and integrate the packaged components to deliver the class. He will supervise all programming staff, including Hutcheson for video footage and editing, Caldwell for non-video and related materials, and a team of graduate students, who will be responsible for inputting the exercises, etc., provided by Taj. An Apple MacIntosh G3 (probably shifting to the anticipated

release of the G4 before the end of the grant) will be the preferred platform for programming, with machines dedicated to this effort in the NCSU's Foreign Language Technologies Center (FLTC). The site will also be tested in-house on a variety of computing platforms provided by the LTC, FLTC, the Consortium's secretariat, and various computing laboratories around campus (including DOS-based Pentium computers made by IBM, Dell, Compaq, Toshiba, etc., a range of MacIntosh computers from Power PC to G3 or G4, iMacs, and various Unix- and Linux-based machines (which will not be able to support all of the features).

Outside Consultation, Evaluation, and Beta Testing. See below, *Section 9: "Plan of Evaluation"*, and *Section 13: "Provision for Pre-testing"*.

Certification of Compliance with Section 427 (ref. OMB Control No. 1801-0004, esp. 8/31/2001). All public activities of the Triangle South Asia Consortium are made available to the students, faculty, staff, and when appropriate, the general public, without consideration of gender, race, national origin, color, disability, or age. Because of the nature of much of our programming, it is common for a substantial portion of the participants to be of international or heritage communities, and that is likewise reflected in the staffing and management of our programs (see biographical statements above), in the combination of our universities (one land-grant university, one public comprehensive research university, one public historically black university, and one private comprehensive research university) and of course our classes. All competitions (e.g, applications for workshop participation, for language tutor selection, etc.) are blind to the prescribed barriers noted in Section 427, while we hold all public events in venues that are accessible to everyone. The biggest potential problem is the preparation of pedagogical materials for teaching the LCTLs to the blind. Obviously there are certain physical constraints on the medium that limit what we can produce, but because of the multimedia nature of this delivery vehicle, we can overcome most of the hurdles without having to design and manufacture a completely new product at an enormously high cost (that would substantially exceed the budgets

of this grant program and would be available only for a limited number of users who could afford the high cost of required equipment).

Special Consideration For The Blind. For those who are visually impaired or blind, the oral/aural dimension of the lessons will go far to overcoming that impairment; but navigation into each of the separate modules will still be by visual cue and keyboard; current voice recognition software (with its slow self-correcting learning curve, its general imprecision, and its extremely high computing overhead) makes voice navigation effectively impossible for the target audience and type of machine delivery we have chosen. Any institution that chooses to use this program as a substitute for a live teacher will have to invest in this minimal aid to the visually disabled student. For those who are hearing impaired or deaf, the visual dimension of the instruction will allow for a very complete sense of the living language. We have not included any provision for sign language, but the optional scrolling display in transcription of words in the dialogues and exercises provides the most flexible alternative given the time, monetary, and computing constraints, not to mention problems of standardization of sign language for Hindi. It is in the realm of writing for the blind that we are most severely constrained by the medium of delivery. We plan to give priority to a single key-stroke per character keyboard action (which can be learned by touch), but there will be no provision for Hindi Braille. Unfortunately, there are no programs of which we are aware that can convert the written word into synthesized Hindi speech, as one can now begin to find in synsthesized voices for English, Spanish, and English-with-Hispanic-accent (available from Apple). It should be noted that we have contacted Ms Hena Basu of Calcutta, who is nationally prominent in India for her work with the blind, to advise us regarding Braille and other developments for the visually handicapped in Hindi and other vernacular languages.

8. Budget and Cost Effectiveness
[Maximum 10 points] *(a) Is the proposed budget adequate to support the project activities? (b) Are the costs reasonable in relation to the anticipated product (or ???) of the project?*

General. Trying to coordinate a program across four campuses is logistically complicated, equally so for disbursing funds for a complex project, although this one is less complicated than many we have administered, since the bulk of the work will take place at NCSU. As a result of past experience (we have been doing this for about a decade now), the Executive Committee of the Triangle South Asia Consortium has adopted a policy of centralized accounting wherever possible, limiting inter-university subcontracts to those items that can be handled no other way (e.g., library purchases). Precisely in order to streamline grant management and to centralize administrative and accounting activities, the universities of the Consortium have funded the North Carolina Center for South Asia Studies, which is housed at NCSU (see above under "administration" of the grant). Detailed budget information has been removed from this public document to protect confidential salary considerations of the production and design team. Queries should be forwarded to the Director of the project at <tony_stewart@ncsu.edu>.

9. Plan of Evaluation
[Maximum 5 points] *(a) Does the application include a plan for evaluating periodically the work accomplished under the project? (b) Is there a realistic time schedule for accomplishing the work?*

Evaluation. The external evaluator, Lutgendorf, will visit our campuses three times in the course of the grant, while having access to the Web site during the duration of the project. His charge is three-fold: to evaluate the content of the material that is being presented; to evaluate the strategy for development and progress toward delivery; and to evaluate the viability and functioning of the final product itself. In order not to prejudice this process, we have set no limitations on Lutgendorf's approach. Lutgendorf will present a formal written report at the end of each year. For more details, see also *Section 12, "Provisions for Pretesting"* below.

Schedule of activities. The initial goal will be to have enough material mounted on the Web by the second semester of the first year the student can begin to test it. By the end of the first semester of the second year we plan to provide a complete, albeit in places skeletal, class (including sets of exercises through three levels of each lesson). After that, Review Lessons and the fourth level for

each lesson will be incorporated, with the final year settling on final interface design, adding the enhanced instructor's features, including the televideo, whiteboard, and homework submission components, and enriching the exercise sets and video choices. (See Appendix 3: Grant Timeline.)

Pre-grant activity

- evaluate programming environment options (HTML, Java, etc.)
- start *devanagari* script development in accord with Unicode standards
- determine precise shell features
- initial interface design parameters
- choose initial dialogues and drills for Lessons 13, 14, 15, 17, 18
- evaluate classroom video material from prior 3-year televideo project for use in lessons

Year 1 - Fall semester 1999

- start script instruction module, with pronunciation guide
- set up shell for levels one, two, and three.
- mount single dialogues, aural and reading comprehension drills, and vocabulary units for Lessons 13, 14, 15, 17, 18 (for immediate use in next semester)
- Taj begins recording of introductions (continued through all twenty-four lessons)
- graduate TAs and ΔSAC language faculty begin testing (continuous through grant)
- choose initial dialogues and drills for Lessons 19, 21, 22, 23
- start experiments with live ATM and normal modes of compressed digital video (to continue through development)
- film Taj's classroom activity for later incorporation in lessons

Year 1 - Spring semester 2000

- continue script instruction module, with pronunciation guide
- mount single dialogues, aural and reading comprehension drills, and vocabulary

units for Lessons 19, 21, 22, 23 (for immediate use in second half of semester)

- beta-test Lessons 13, 14, 15, 17, 18, 19, 21, 22, 23 in classes
- begin compiling materials for Review Lessons 16, 20, 24
- film Taj's classroom activity for later incorporation in lessons
- external evaluation

Year 1 - Summer 2000

- choose initial dialogues and drills for Lessons 1, 2, 3, 5, 6
- mount single dialogues, aural and reading comprehension drills, and vocabulary units for Lessons 1, 2, 3, 5, 6 (for immediate use in fall semester)
- begin compiling materials for Review Lessons 4, 8, 12
- send team to India for filming

Year 2 - Fall semester 2000

- beta-test script instruction module, with pronunciation guide
- choose initial dialogues and drills for Lessons 7, 9, 10, 11
- mount single dialogues, aural and reading comprehension drills, and vocabulary units for Lessons 7, 9, 10,11 (for immediate use in second half of semester)
- beta-test Lessons 1, 2, 3, 5, 6, 7, 9, 10, 11 in classes
- mount Review Lessons 16, 20, 24
- start editing video materials shot in India
- users, collaborators, and outside reviewer meet at Wisconsin Conference on South Asia (Oct), South Asia Languages Roundtable

Year 2 - Spring semester 2001

- mount Review Lessons 4, 8, 12
- begin systematic addition of level four, Lessons 13-24
- integrate additional video materials for enrichment, Lessons 13-24
- integrate additional drill sets for enrichment, Lessons 13-24
- begin integrating "on-line help" (continue till completed)

- continue in-class testing with revised versions
- external evaluation

Year 2 - Summer 2001

- evaluation workshop of users, collaborators, and outside reviewer
- begin enhanced instructor's version, with "whiteboard" technology
- begin enhanced instructor's version, with compressed digital televideo for live classroom interaction

Year 3 - Fall semester 2001

- hands-on Workshop early in fall to familiarize language faculty around the country and to get feedback before final revisions
- finalize formats
- provisions for integrating on-line dictionaries when available
- integrate additional drill sets
- continue in-class testing
- outline possible "accompanying materials" (e.g., reference grammar, etc. for distribution with CD-ROM or DVD version)
- users, collaborators, and outside reviewer meet at Wisconsin Conference on South Asia (Oct), South Asia Languages Roundtable
- public presentation to interested faculty and graduate student at Wisconsin Conference

Year 3 - Spring semester 2002

- integrate additional drill sets
- continue in-class testing
- fine tune
- final decision on "accompanying materials"

Year 3 - Summer 2002

- final evaluation workshop of users, collaborators, and outside reviewers

- produce final version
- begin advertising in professional journals and Web
- burn unenhanced edition into CD-ROM or DVD disc and prepare distribution routine
- produce "accompanying materials"
- write final report
- take long vacation on remote beach with no computers in sight

Post-grant activity.

- public presentation of final product at Wisconsin Conference on South Asia (Oct), South Asia Languages Roundtable
- public presentation of final product at Association for Asian Studies (March)
- maintenance of the site and server, including periodic updates.
- make program shell available to language instructors.

10. Adequacy of Resources
[Maximum 5 points] *(a) Does the applicant have adequate facilities to conduct the project? (b) Are the equipment and supplies which the applicant plans to use adequate?*

Resources. In addition to the administrative infrastructure provided by the North Carolina Center for South Asia Studies of ΔSAC and the Office of the Assoc. Dean for Research, College of Humanities and Social Sciences, NCSU, the language classrooms and learning resource centers of the ΔSAC universities are a unique asset and will provide the environment and expertise necessary to mount the Website.

Foreign Language Technologies Center. NCSU's Foreign Language Technologies Center (FLTC) is truly a state-of-the-art language learning facility. This newly created facility, inaugurated in 1998, contains 40 Gateway 2000 computers for independent student workstations, 3 PowerMac G3 desktop computers for development, and a Classnet® classroom. This fully interactive classroom includes individual Gateway 2000 multimedia computers for 35 students. Each

student workstation has expanded memory, graphics accelerators, 8 Gigabyte hard drives, 24x CD-ROM drive, floppy diskette, with appropriate software, and connected to a fiberoptic local area network (LAN) for internal use and access to the Internet. The classroom also includes a high resolution Proxima digital projector (for projecting computer files onto large screen), a Bose audio sound system, and instructor controlled interactive features for tailoring instruction to individual students in the classroom. The lab includes facilities to burn CD-ROMs, to transfer video tape from analog to digital format, dubbing capability, and large monitor video viewing stations. The project will receive priority in the use of the MacIntosh G-3 machines, and the unlimited use of video transfer and dubbing equipment. A machine will be dedicated as the Webserver for the project and maintained by the FLTC staff. Once the Website is sufficiently developed for student use, Taj will teach his Elementary Hindi-Urdu classes in the multimedia classroom. While there is no way to declare the value of this cost-share, the dollar figure is obviously substantial and well beyond normal indirect costs.

Humanities Computing Laboratory. The College of Humanities is in the process of building a multimedia computing laboratory, which will emphasize humanities research, technical communication, and film studies. The film production facilities, along with extensive multimedia editing and creative tools, will be fully staffed. The lab will set aside one of its non-linear digital film editors for the exclusive use of the project for its duration (see Appendix 4: Letter of support from lab director David Covington).

Computing Services. NCSU's computing services, which handles the university's general computing and telecommunication needs has made available the Gigapop Ring Network for high speed ATM connections necessary to the compressed digital televideo portions of this project. See Appendix 8: NCSU's NCState.Net Research and Development.

Facilities on Triangle Campuses. Existing video classrooms, new multimedia classrooms, and enhanced language labs are at the disposal of all teaching faculty involved in the project from the

constitutive institutions of the Triangle South Asia Consortium. These will be used extensively for beta-testing the product.

ΔSAC Offices. Two iMac multimedia computers in the Triangle South Asia Consortium's offices in the library at NCSU will be available for preparing ancillary materials to be incorporated into the Website. The recently opened office is fully operational with fiberoptic network connections, telephone, fax, photoduplication, etc.

Specific Equipment Requests for the Grant. While nearly all of the programming tools, software, and basic hardware configurations are in place on campus, there are several specific items that we must purchase to be able to deliver the product we envision, two of which we are requesting in the grant.

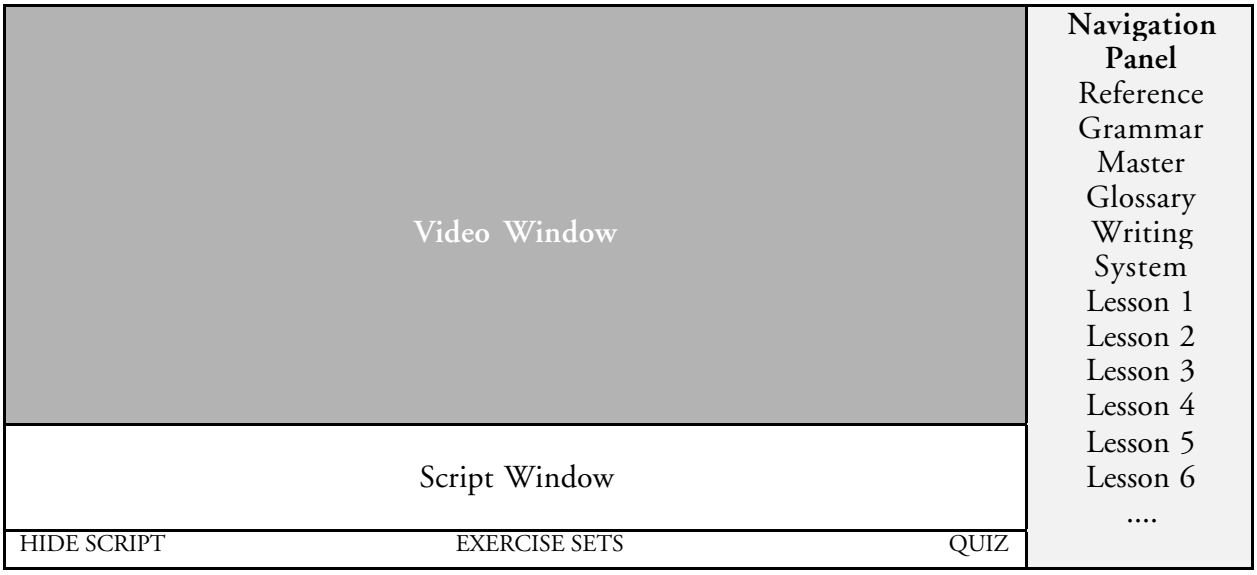
[1] We will purchase two MacIntosh G-3 or G-4 laptop computers in the highest configurations possible for development and testing, especially to anticipate the parameters of what will be the closest approximation of a standard multimedia machine available in the year 2001 or 2002.

[2] We will purchase a high-end or professional digital camera for videotaping in India during the second year of the grant. Given the current technology, the Canon XL1 super low-light Mini DV model is preferred because it offers for the first time a digital output equivalent to the standard beta video camera that is used by television (and some film) production, but at a fraction of the cost ($5000 vs. $50,000). It is ideal for travel and remote work as well as in-class and studio. See Appendix 9: Canon XL1 MiniDV Camcorder for specs. For still images not captured through the videocam, the Triangle South Asia Consortium will supply a high-end digitizing still camera for that work.

11. Description of Final Format
[Maximum 5 points] *Are the contents and final form of the projected material(s) sufficiently well described?*

Concept. While much of the concept has been described above in Section 5. "Likelihood of Achieving Results," the general concept for the final format is a non-decorative, no-nonsense window approach to the presentation of video dialogue, scrolling text, help menus, etc. The guiding principle is simplicity with a minimum of visual distraction and consistent "intuitive" placement of items and methods of manipulation and navigation. Navigation tools will always be visible to the user, with random access to the Website's parts (without having to backtrack). The overall look will follow a design that places the video in the dominant sight line of the screen, with scrolling script window underneath (its content matching the spoken word), and controls for the video and script activity directly below. Navigation panels will be on the periphery, with a general control visible and specific menus in pull-down mode, allowing access to the reference grammar, glossary, writing system module, or any lesson (or its subpart). The concept is presented below; there seems to be little need to produce a glossy mockup, which at present would be more imaginative than substantive.

Main Screen - Concept



Video, script, grammar. The script will scroll in sequence with the video, but will include an "instant replay" icon which will do precisely what it says, allowing for instance sentence by

sentence recaps. The script window can be hidden, just as the video and/or audio can be turned off. From the video dialogue, the student may enter into any number of self-correcting exercises or even quizzes. Homework would be submitted from within the exercise sets.

Hyperlinked Aids. New grammatical constructions will be identified by special markers imbedded in the script, which will display through hypertext links the nature of the construction and how it is used, always keeping English to a minimum. Every word in the dialogues and exercise sets will be hyperlinked to the glossary, which will be displayed by highlighting the word. If desired, the word will be pronounced. A second hyperlink will connect the chosen word to any available on-line dictionary that has been previously loaded (e.g., MacGregor's Hindi-English dictionary). Any highlighting of text during playback will freeze the video and audio output until the student is ready to return.

Submitting Student Responses. A Hindi typing interface will allow students to type their answers, which, depending on the mode selected, can be immediately checked or submitted to the instructor. Spoken responses can also be recorded and sent as attachments to the instructor (voice recognition software is not sufficiently well developed to allow voice feedback based on student responses). Dictation, pictorial description, and role play exercises are possible within the internet format, but passive multiple choice "point-and-click" type exercises will be avoided as much as possible, save in vocabulary development drills.

Flexible Program Shell. As previously noted, the entire site will operate through a shell that can be manipulated to expand or shrink any given set of materials, exercises or drills, etc. One of the most important features of this shell will be its flexibility which will allow it to be easily modified and augmented by any instructional user (e.g., other Hindi teachers). Of equal or perhaps greater long-term import, the shell will be adaptable to other LCTLs without complex programming. The simple procedures necessary for adapting the shell will be built into the program itself (similar to "help" menus available on most commercial programs today). This will enable any instructor

to use the shell, even if the initial use is as simple as a few written exercises or drills. Then as more materials are available, they can be loaded at the leisure of the instructor. Our intention is to make this shell as widely available as possible and at minimum cost (which will be determined in consultation with the Department of Education).

12. Provisions for Pre-testing
[Maximum 5 points] *Has sufficient provision been made for pretesting the material(s) (with students and/or in the classroom) for possible revision before general dissemination or publication?*

Evaluation and testing. Because of the nature of the product, testing and evaluation go hand-in-hand, although we will have an annual independent external report on progress. Slightly more than twenty percent of the grant funds—$106,000—will go to evaluation and testing; that will be matched by contributions totaling approximately $120,000 in equivalently valued time.

Beta-testing - Faculty and Staff. The graduate student language TAs and ΔSAC language faculty will begin testing as soon as the first module is made available, and will meet periodically to evaluate progress. This "first-look" testing will continue throughout the three year development period. Testing will be undertaken by the faculty, trying to anticipate as many uses and misuses as possible before placing the materials in the hands of students.

Beta-testing - Students. The first sets of basic lessons should be available for classroom and language lab testing starting with the second semester of the project. Taj's classes at NCSU will follow the format, with others in ΔSAC using them as lab supplements. This beta-test will last for five full semesters with the students reporting on their experience as a regular part of the classroom and lab exercises. NCSU students will begin testing the enriched version of the course in the Spring semester of the second year. University of Texas - Austin and Columbia University will begin limited testing of lessons during the spring semester. The full site will be available to the Lutgendorf at the University of Iowa, who will determine if it is appropriate for his classes.

Final Testing. The full version of the program will be available at the beginning of the final year of the grant for use as the primary course in Elementary Hindi, or as a sustained classroom supplement, at all ΔSAC universities, University of Texas-Austin, and Columbia University. Based on inquiries we have already received (University of North Carolina-Greensboro, Virginia Tech), we anticipate having several students use the course at this stage for tutored self-instruction at universities that have no Hindi teacher. Again, the University of Iowa will have full access if desired.

Annual Outside Review And Report. The external evaluator, Philip Lutgendorf of the University of Iowa, will have access to the Web-site as the lessons are mounted, with unlimited and unmonitored access. The reviewer will visit the ΔSAC operations in the spring or early summer of each of the first two years. His final visit will coincide with a workshop (see next item).

User and Evaluator Workshop. The final year of the grant, we propose a workshop that will bring together the creators, collaborators, beta-testers, and evaluators for a three day working session to critique and fine tune the product in its penultimate form. We will also invite all teachers of elementary Hindi that we can locate anywhere in the US, Canada, and Europe, who would like to attend. This workshop will be hosted and funded by the Triangle South Asia Consortium.

ACTFL proficiency rating. Students who have used the materials will be year-end tested for Hindi to determine their level of achievement against the national standard. The test will be administered and graded by an external ACTFL-certified evaluator. This benchmark, although not without its problems, will be the final test of the effectiveness of the program.

Built-In Response Forms. It is a truism in the computing industry that no program is ever final with all the bugs worked out. We anticipate that as users put our product to the test, they will discover both strengths and weakness of which we were not aware, no matter our diligence. Consequently, we feel it imperative to include within the program itself a built-in response mechanism (using e-mail through the Web), so that anyone who can access the program can contact us. The response

will be of two types: one a fixed checklist, with the other an unstructured text space in which to voice complaints (or praise!). Responses will initially be forwarded automatically to the course's principal investigator and to the director of the program.