

# **FLIS: Audible computer-aided language learning for Southeast Asian languages: observations after a year of use**

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## **0. Introduction: The NIU Foreign Language Instruction Station (FLIS) System**

Computer-Aided Instruction for foreign languages typically is completely mute. Few systems for the commonly taught languages have any audio capability, and those few make limited use of audio; no systems (other than FLIS) for the less commonly taught languages have an audio capability.

The FLIS System provides the ability to create, edit, and present audio-rich language lessons, with "random access" to the audio so that any audio segment (or "speech") can be accessed and played instantly under software control. The strength of the system is in presenting listening comprehension lessons with built-in tools to assist the learner in achieving comprehension. Other lesson types such as tutorial, drill and practice, and interactive fiction are easily implemented. FLIS offers the following features:

1. An integrated, menu-driven, frame-based authoring system designed so that individuals can create and modify lessons for the system with no knowledge of computer programming.
2. Built-in audio support. Up to 27 minutes of audio per lesson consisting of up to 400 separate speeches ranging from 1 second to over a minute.
3. Attractive color graphics to illustrate the lessons.
4. L2 (Thai, Burmese, etc.) script support. Text can be displayed in the L2 script anywhere on the screen, students

can type answers in the L2 script, and authors can create new fonts or modify old ones.

5. Built-in learning aids for the student, including (1) instant speech repeat; (2) instant repeat of a slower re-recording of the speech; (3) instant play of an "alternate speech" which may be a translation or simpler re-phrasing of the speech; (4) a pop-up menu of author-supplied audio hints or explanations; (5) a pop-up menu of glossary items for the lesson; (6) ability to display the text of the speech; and (7) ability to record the student's voice and play it back.

These learning aids are available at any time during the lesson when the student is to enter a response (even in the middle of typing an answer) via a pop-up menu.

6. Multiple choice questions with audio feedback and/or a forced branch for each possible answer. In addition, short answer questions with several methods of feedback are supported. Answer entry may be in roman or L2 script. Both feedback and answer entry mode are specified by the lesson author.

7. Built-in Administrative support for defining courses and lessons, registering students, and collecting and reporting on student usage statistics.

Additional information on the FLIS system can be found in Henry, Hartmann, and Henry (1987, 1989).

## **1. The FLIS System in use**

For the past year, students at Northern Illinois University have used FLIS as an integral part of their study of beginning level Thai and Indonesian. While it is too early for definitive conclusions about effects on student achievement, there are indications are that students find the system useful and interesting. In addition, a number of observations growing out of intensive use of the system may have implications for future courseware development and for other systems of this type, and possibly for foreign language curriculum development in general.

### **1.1. Description of Thai and Indonesian courses**

Thai and Indonesian are taught intensively at Northern Illinois University. Classes meet five days a week for 50 minutes during a 15 week semester. A two-semester sequence can fulfill a student's language requirement for the B.A. There are several significant differences between the two courses. Indonesian uses the familiar roman orthography, and so reading and writing are used from the beginning and throughout the course. Partly because of the use of roman orthography, the total lexicon presented in the Indonesian course is greater than that in the Thai course. Thai uses an "exotic" and unfamiliar script, which is introduced in class at about the fifth week. FLIS Thai lessons assume increasing familiarity with the script after that point, but it is not a major emphasis (although there are plans to develop lessons which explicitly teach and provide practice in Thai orthography). The Thai class thus has a natural initial emphasis on listening skills as opposed to reading skills. This emphasis continues at a somewhat reduced level throughout the course.

The grammars of the languages differ greatly. Indonesian is based on a rather complex inflectional grammar, with categories unfamiliar to Western learners. Even looking up words in a dictionary requires familiarity with at least part of this system. Mastering the grammar receives considerable time and attention in the second semester of the course. Thai is not an inflected language. Its grammatical complexities are governed largely by word order, hence an imperative to rely more on rote memorization of "chunks" of the language in context.

There is, in general, a greater emphasis in listening and speaking in the Thai course than in the Indonesian course. Indonesian class tests are entirely based on reading and writing with about half of each test based on memorized material and half on grammar, while a component of most Thai class tests involves listening comprehension (in which students translate a passage they have heard) or communicative activities (for example, a student written script-based conversation in which one group presents a short passage, and a second group listens and asks questions about the passage). Both courses have periods of in-class listening and speaking practice, but only Thai explicitly tests listening comprehension. Because of this fact, and the difficulty of reading Thai, the Thai students may be more naturally focussed on and attentive to listening comprehension.

Finally, there was a difference in the stated FLIS lab requirement for the two groups. Students of Indonesian were required to spend one hour per week (or more if they so desired) using FLIS lessons. They were asked to re-take and review lessons if they completed the current week's material before the end of the hour. Thai students were asked to complete a certain number of lessons, but no set minimum time was given.

## **1.2. Design and use of current FLIS courseware**

One of the primary design requirements of current FLIS courseware was that it be consistent with and relevant to other aspects of the language courses. That is, rather than providing apparently unrelated supplementary or enrichment exercises, FLIS courseware was designed to explicitly reinforce students' classroom and textbook study experiences. It is by now a truism that courseware which is not directly related to classroom instruction and course goals will either not be used by teachers (who cannot spend the time to determine how it might fit in with or be adapted to the course) or will not be accepted by most students (who will not see any relevance to the course instructional goals and, in particular, to the class tests).

Since classroom instruction (for both Thai and Indonesian) was designed to parallel the textbook used, the text itself became the primary determiner of lesson content and pedagogical emphasis. Both books used (Wolff for Indonesian and the Brown AUA text for Thai) feature grammar and memorization-based pedagogical methodologies which date back to the audio-lingual methods of the 1960's. More modern comprehension and communication-based approaches and exercises are almost entirely absent from these books, with obvious implications for the design of CALL lessons meant to accompany them. (Discussions of some of these approaches may be found in Blair (1982), Krashen (1982), Winitz (1981), Johnson (1989), and Underwood (1984)) Thus, most FLIS lessons were designed to help students memorize and understand the texts' dialogs and narratives (with minor variations), to memorize vocabulary, and to explain and provide practice for various grammatical constructions. A notable exception is a series of lessons designed to give learners practice in hearing and discriminating spoken Thai tones.



Students were required to use FLIS courseware in a dedicated lab. They were asked to reserve time for each week, although they were allowed to reschedule into any open time slot. Indonesian students were expected to spend an hour a week; Thai students were expected to complete the week's lesson (with no set time requirement). In addition, they were allowed to sign up or drop in for additional time on the computers when time was available. The FLIS lab was open for 20 hours each week, and four workstations were available, for a total of 80 available machine-hours per week. Over 1700 separate sessions were recorded by the system.

### **1.3. Characterization of learners**

A questionnaire was given to all beginning students in Thai and Indonesian early in the first semester (about 25 in each class). This questionnaire attempted to determine the background and motivation of the students. This information, along with information provided by the course instructors is the basis for the following characterizations.

With some exceptions, the majority of students taking these courses were undergraduates with little intrinsic motivation for learning the language. Their primary motivation was extrinsic - most commonly, the language requirement for their degree program. There was some difference between the Thai and Indonesian classes. About 90% of the Indonesian students reported that their primary reason for taking the course was the degree requirement as opposed to only 40% of the Thai class. About 75% of the Thai students reported that they enjoy language learning, as opposed to only 40% of the Indonesian students. Part of this difference might be due to the makeup of the Thai class: about 1/3 of the students were ethnic Southeast Asians who already knew some Thai and who enrolled in the class in part to develop and perfect their grammar and literacy skills.

Overall indications of student academic ability suggest that as a group these students fall slightly below average. The Thai class had an average ACT of 18.9 (with scores for four out of 24 students unavailable) and a NIU GPA of 2.5 (one score missing). The Indonesian class had an average ACT of 18.3 (five out of 25 scores missing) and an NIU GPA of 2.31 (eight out of 25 scores missing). These averages may be somewhat misleading because of several factors such as the large proportion of non-native speakers of English in the Thai

class, and the relatively large number of missing scores (about 1/3 of the Indonesian class consisted of new transfer students without reported ACT or GPA scores). Of the students with reported figures, only four had a GPA above 3.0, and only fourteen out of the 40 reported scores - about 1/3 - had an ACT above the NIU average of 21 (with a high of 27). Despite these uncertainties, it seems clear that the students as a group fall at or slightly below the NIU average, and can in no way be considered academically exceptional.

Group averages often hide individual exceptions. Several students in these classes, as well as a few students doing independent study did not fit this profile. Their reactions and some corresponding implications will be noted below.

## **2. Preliminary findings**

### **2.1. Reliability and ease of use**

Two necessary - but by no means sufficient - conditions for the success of a Computer-Aided Instruction (CAI) system are high reliability and ease of use. After nearly a year of use, software reliability has proved to be high. No problems attributable to software bugs were encountered during lesson presentations (i.e. students taking lessons). Given the intensity of use of the hardware (for lesson creation and testing, as well as for lesson presentation) relatively few problems were encountered. One computer hard disk and one monitor failed and had to be replaced, and one Instavox random access audio unit needed repair during the academic year.

The system was easy for students to use. After an initial instruction period at the beginning of the semester, students seemed at ease with the user interface, and were able to control their interactions with it. There were no indications of frustration or confusion either directly expressed or observed. Voice recording and playback was perhaps the most difficult sequence of commands. Some students needed to be shown how to accomplish this sequence once or twice, but had little trouble thereafter.

Lesson authors (graduate assistants working on FLIS lessons about 20 hours per week) were given a 16-session training course by one of the project directors. Each session lasted about two hours, with additional out-of-class lesson implementation exercises. At the end of this time all were

capable of using the authoring system to create short FLIS lessons (given a lesson design specification) incorporating pictures, audio, and multiple choice and short answer questions with feedback and branching. Their abilities to devise creative variations on the basic lesson types increased *with time, but several expressed some uncertainty about issues* of lesson planning and design (as opposed to the mechanics of creating a lesson once the design was set). See the discussion below under "Problems and Questions".

## 2.2. Student attitudes

In addition to the minimal requirements of reliability and ease of use, a CAI system should be perceived as useful and interesting by those who use it. If the system is not seen as contributing to the student's (or course) goals, it may be considered a waste of time. If instruction seems boring it may not be effective, especially for students with marginal or low motivation.

A questionnaire was given to all students at the end of the first semester of FLIS use, asking about their reactions to the lessons, and soliciting their comments and suggestions. A second questionnaire was given at the end of the second semester. Although these questionnaires asked students to supply their names, they were assured of anonymity until the course was over and grades issued. The course instructors saw only a summary of student answers which was prepared by a third party. It may be noted that students were quite willing to express criticisms and negative comments about aspects of the system that they did not like (e.g. some lessons were too long, the lab hours were too restricted, etc.)

Using a Lickert scale from 1 = Strong Agreement to 5 = Strong Disagreement, students were asked several questions related to usefulness and interest. The Thai group tended to be a little more positive than the Indonesian group, but the average differences were generally small - on the order of 0.1 or 0.2. (These differences have not been tested for statistical significance because of uncontrolled confounding variables and because the actual "real world" significance of such small differences is questionable.) Therefore, averages for all students are reported in the following summary.

Students agreed (average = 1.8) that "the computer lessons have been helpful in learning the language". This agreement changed very little from the first questionnaire to the

second. Students also agreed (average = 2.0) that "the computer lessons have been interesting". There was mild agreement (average = 2.6) that "additional lessons and time in the computer lab would be useful". In answering these questions, students seemed to divide into two groups (based on other written comments): one whose members thought that one pass through each lesson was enough if they "understood" it, and the other whose members saw a benefit to any increased exposure.

At the end of their year-long course, students were asked to go to the tape-based language lab (which had been used in past years, before FLIS usage). They did not enjoy these lessons in comparison to FLIS. There were several unsolicited written comments on the questionnaires stating a strong preference for the FLIS lessons. The students disagreed (average 3.7) with the statement that the language lab (tape) lessons were "about as helpful as the computer lessons," and also disagreed (average 3.7) with the statement that the language lab lessons were "about as interesting as the computer lessons". This is despite the fact that the computer lessons were often dialog and grammar based drill-and-practice lessons.

Also at the end of the course, students were asked open-ended questions in which they were to name the "best aspect" and the "worst aspect" of the FLIS and the tape-based lessons. The answers to these questions were often interesting.

By far, the most frequently mentioned "best aspect" of the computer lessons was the pictures (18 out of 40). The current generation of students either is, or has been persuaded that it is, a generation of "visual learners." In fact, this result was not a great surprise to us, since visitors to the project frequently mention the attractiveness of the graphics before anything else. This finding suggests that additional effort and planning should be placed on the visual element of the lessons, and that the technology of interactive video, despite its cost and complexity, may have a dramatically powerful differential effect on student interest, attention, and motivation.

The second most frequently mentioned "best aspect" of the computer lessons involved the audio - either the audio per se, or the ability to instantly repeat or slow down the speeches (10 out of 40).

Each of the remaining responses was supplied by only one or two students. They included matters such as availability

of clues, close relationship to tests and classwork, specific grammar instruction, and the helpfulness of lab assistants. There was considerable diversity in the features which students found most helpful, and in their reported patterns of usage. This finding supports claims that a single teaching/learning style may not be appropriate for all students. FLIS provides the flexibility to accommodate these diverse learning styles.

The most frequently mentioned "worst aspect" of the computer lessons was expressed in various ways, but centered on time and scheduling problems (14 out of 30), not on any aspect of the lessons themselves. Some of the students of Indonesian resented the requirement to stay for a full hour each week, even though they had "finished" the lesson. Some found it difficult to find time during the hours the lab was open; others found it difficult to plan ahead (they were asked to sign up a week ahead of time, although they were allowed to - and frequently did - change their time). Clearly, increased lab hours would do much to reduce this problem. Possibly lab usage should be made optional.

The second most frequent comment in this category was "nothing" (6 out of 30). That is, six people did not list a "worst aspect".

The remainder of the "worst aspects" occurred only once or twice per item, and included matters such as the temperature in the lab, the length of lessons (one complained that some lessons were too long and another that they were too short), etc.

Similar questions for the tape-based lab revealed that students thought that there was no "best aspect" for the tapes (19 out of 31). Possibly students genuinely did not like the tape lessons. However, one may guess that an alternate explanation for some of the null responses to this and the next question is that some students did not go to the tape-based language lab. A number of students did have particular likes: several liked the very close correspondence of the tapes to the textbook (3 out of 31), and several liked the audio (5 out of 31).

There was no "worst aspect" according to 11 out of 32 answers to this question. The most frequent non-null "worst aspects" were that the tapes were "too fast" (8 out of 32) and "boring" (5 out of 32).

An important note should be added with regard to the exceptional learners who used FLIS courseware. Although

they indicated in interviews that they enjoyed using the lessons and felt they learned from them, they did find them somewhat confining and repetitious at times. One student reported that she always got all of the answers right; that the lessons were not challenging enough. These reactions seem to be a clear indication that one set of courseware is not appropriate for all students, in particular, that able students who are highly motivated might benefit from more challenging lessons.

### **2.3. Classification of students by usage patterns**

In addition to student reactions to the system, data was collected on patterns of student usage, in order to identify what patterns were used by both successful and unsuccessful students and ultimately to develop and provide learning strategy guidance for future semesters. This guidance could be provided by teachers and lab assistants or eventually by a FLIS tutorial module. At this time, analysis of this data has not been completed, but there are preliminary indications based on informal observation and on the use of an experimental neural network. The network used an unsupervised learning mode to analyze summary records of student behavior (i.e. answers, hints chosen, etc.) at the end of the first semester to classify students. The network identified several "types" of students, primarily on the basis of the number of aids accessed before an answer was attempted. These groupings seemed to correlate directly with the instructor's assessment of the students' motivation and work habits (with the more highly motivated students using more aids) and indirectly with their ability.

The ultimate goal of this work is to incorporate an 'intelligent' tutorial module in FLIS which can dynamically adapt instruction based on an analysis of student behavior and characteristics. Although such an adaptive system is an ambitious goal, it could largely eliminate the problems of able well-motivated learners who are bored by repetitious, narrow, easy lessons designed for average learners, or of average learners who may be frustrated and confused by lessons designed for the more able and interested learners. See Jonassen (1988) for discussions of adaptive instruction and learner diagnosis.

Observation of students working on the lessons seemed to illustrate a truism of education: motivation is a far more important factor in learning than pedagogy or mode of instructional presentation. Some students simply went through

the mechanical motions of pushing keys with the apparent intention of finishing as quickly as possible with a minimum of mental engagement with the material. Others apparently used the easy access to hints and aids to "short circuit" their own mental engagement with the material, sometimes looking up the same word in the glossary many times rather than attempting to remember it. In some cases, especially for roman- text-based Indonesian, students appeared to pay little attention to the audio since a text transcription was just a keystroke away. Since their textbook and tests stressed reading and writing, there may have been insufficient incentive to learn to listen for these extrinsically motivated students.

Other students made good use of the interactive and exploratory nature of FLIS. Observations of these students support some of their own reports such as "the parts that were hard to understand could be repeated until I understood." A fuller understanding (beyond informal observation) awaits analysis of student usage patterns.

#### **2.4. Comparison of FLIS and tape-based language lab**

One final comment should be made regarding FLIS usage. In previous years, students were required to go to the tape-based language lab one or two hours per week as a part of their coursework. Despite some (grade) penalties, it was often very difficult to achieve compliance with this requirement, especially by the second semester, when attendance dropped to near zero. Students did not perceive the tape-based activities as helpful, but did perceive them as boring and tedious. This problem was greatly lessened with the FLIS lab. By the end of the year novelty was no longer a factor, yet most students continued to attend fairly regularly, although not always as much as expected. During the first 12 weeks of the second semester, Indonesian students had attended an average of 8.5 out of (the required) 12 hours, and the Thai students an average of 6.5 hours (recall that Thai had no minimum time requirement). Eight out of thirty-seven students who attended fewer than 3 hours brought the average down; the remaining twenty-nine students attended for an average of 8.75 hours.

### **3. Problems And Questions**

A number of problems and questions derive from this first year of use with the FLIS system.

### **3.1. What is the appropriate relationship between FLIS courseware, student characteristics, and the other aspects of a given course?**

As stated earlier, the primary goal of courseware development for the first year of the project was to create materials to accompany and reinforce the textbooks used in the courses, so that the FLIS experience would directly relate to classroom activities, homework, and tests. At some points during courseware development it seemed unfortunate that the books emphasized audio-lingual methods and grammar rather than the broader comprehension and communicative approaches for which an audible CALL system might be better suited. See, for example, Bacon (1989), Dunkel (1986, 1987, 1991), Henry et al (1989), Jones (1989), Salazar (1989) and Lund (1990) for suggestions along these lines.

In addition, students who are motivated primarily by a need to pass the course will most likely favor courseware that is directed specifically to particular well-defined goals of the course as they perceive them, while students who are intrinsically motivated by a desire to learn and acquire true competence in the language may be more inclined to favor courseware which is more open-ended and exploratory in nature. It seemed that FLIS is particularly well-suited for the latter kind of courseware, but that most of our students preferred the former.

In short, it is tempting to view audible CALL courseware solely from the perspective of its own potential strengths: those of providing an open-ended exploratory listening comprehension and communicative environment and related practice and exercises for ideal learners. It is easy to classify students who can not or will not benefit from these kinds of learning experiences as problems. It is also easy to see courses whose goals do not correspond closely to these strengths as problems. It is easy to suggest, then, that an attempt should be made to change the students' behavior or the course goals to fit the strengths of the courseware.

However, teachers will not usually be able or willing to alter the goals of their courses to fit the courseware, and student behaviors cannot simply be changed by decree. For these reasons, it is important NOT to view the mutual



relationship of course, student, and courseware with the strengths of audible CALL driving the system. The mutual relationship should be considered with course goals and learners driving the relationship. Courseware must be developed consonant with the goals of the course for which it will be used. It should also be developed with close attention to the characteristics of the learners who will use it, or, ideally, with an ability to adapt instruction according to the characteristics of the learner. FLIS, with its integrated authoring system, allows author-instructors to develop instruction specific to course goals and student characteristics (less the adaptive element), but at the same time it places upon them the responsibility to explicitly determine the goals of that instruction and the characteristics of the learners and to design courseware consistent with them.

With this relationship clearly in mind, it is still possible to consider evolution or modifications of course goals that might be facilitated by the availability of audible CALL courseware based on comprehension or communicative theories of language learning. To the extent that instructors may want to move in these or related directions, audible CALL can provide supporting learning experiences for students.

### **3.2. How should ineffective or inappropriate styles of using FLIS courseware be identified and dealt with?**

Some students appeared to use the various learning aids in an inappropriate or ineffective manner. As mentioned above, some seemed to overuse aids in a way that avoided engagement with the material (for example, multiple lookups of the same word). A way should be found to identify these patterns of usage and advise students of appropriate uses of the system aids. This is a difficult problem, since identical patterns may result from entirely different reasons. For example, a weak student might access many aids because of confusion and uncertainty, but a good student may also access all these aids due to a desire to confirm guesses and to obtain all possible information. In cases such as this, information beyond a simple keystroke history will be necessary to make an informed assessment of a particular usage pattern.

Once an inappropriate pattern is identified, it may be sufficient to inform the learner and provide advisement. Alternately, perhaps a monitor mechanism built into the

software could react to inappropriate use. For example, a "score" could be associated with a lesson, and the monitor could subtract a certain amount for overuse of the aids in certain circumstances (e.g. looking up the same word several times).

The problem of reading versus listening may be a more difficult problem when the goals of the course include listening comprehension explicitly. When improvement of listening comprehension is a goal of the course, reading should not be allowed to short-circuit the listening process; however, if reading can be an aid to understanding and retention, it should not be prohibited. This dilemma remains to be resolved.

These problems are complex, and will require further study. A first step will be a deeper analysis of the performance data and patterns of the current year's usage gathered by the FLIS software.

### **3.3. Should training for lesson authors be modified?**

Actual implementation of courseware was handled primarily by graduate assistants working under the direction of the language instructors, who provided relatively detailed specifications about the scope, content, and goals of the lessons. The language instructors continued to work with and guide the graduate student lesson authors during lesson development, providing ongoing suggestions and feedback.

As mentioned earlier, training in the mechanics of using the system was accomplished in a few weeks, and went smoothly. The authors felt that they did know how to use the authoring system after the training period, and they did go on to create a significant body of courseware with few procedural problems. However, the training did not include explicit material on how to design lessons. This was done deliberately, so as not to impose a particular pedagogical style (i.e. comprehension-based, grammar-based, etc.) on the authors. Given their expressed uncertainty and (in a few cases) confusion about lesson design issues, future training sessions should probably include an explicit instructional design component, beginning with an overview of several pedagogical orientations, and then specializing on the techniques, pedagogical philosophy, methods, and explicit goals of the particular course for which they will be designing and implementing lessons.

#### 4. Conclusions

The FLIS system (hardware and software) is reliable and easy to use. Dissemination of the system is feasible.

Student reaction to FLIS lessons was positive. Lab attendance was up dramatically from the previous years in which tape-based languages labs were used and attendance was sporadic and approached zero by the end of the year.

Course goals and student characteristics should drive courseware design. Audible CALL technology and theory may influence but should not drive course goals.

Data analysis of current usage should be made, and learning strategy advice made available to students.

Use of pictures in lessons should receive renewed attention, both in terms of more efficient production and in terms of more effective uses in lessons. Ultimately, motion video should be considered, given the potential interest- and attention-generating effect it would create.

The next cycle of lesson author training should provide an instructional design component, with an exposure to the implications of the different goals of the instructional approaches on courseware design.

Use of the system at other institutions and with other student populations could also provide valuable information and insights. In particular, courseware for highly able and motivated students should be developed and tested.

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