

Cross-Cultural Issues in a Tutored Video Instruction Course

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ABSTRACT

In this paper we discuss cultural issues encountered while offering an Algorithms course from a US university at a Chinese university using Tutored Video Instruction (TVI). TVI is a distance learning methodology where lectures are recorded at one site and then shown to a group of students at a remote site by Teaching Assistants (TAs) who stop the video periodically for questions and discussion. In conducting this cross-cultural class, we were interested in determining if we could overcome the issues of using English language materials for Chinese students, achieve a sense of local ownership of the course, and create an interactive classroom environment. We were generally successful in achieving these goals by providing supporting materials and working closely with the Teaching Assistants who served as facilitators.

Categories and Subject Descriptors

K.3.1 [Computers and Education]: Computer Uses in Education – Distance learning.

General Terms

Human Factors.

Keywords

Tutored Video Instruction, International Course Offerings, Classroom Presenter, Tablet PC.

1. INTRODUCTION

In Fall 2006, we offered the senior level algorithms course from our US University at Beihang University in Beijing, China. This project came about because Beihang University wanted to add a course that was not available in their standard curriculum. The desire was that this course match the US curriculum and be taught in an ‘American style’. The fact that the course was taught in English, by a native English speaker with professional expertise in the subject was considered a significant added benefit.

We faced the problem of offering an US-style course at a Chinese university using distance learning, but still preserving the interactive learning atmosphere of the US course at the remote site. We chose to use Tutored Video Instruction (TVI) [1] to offer the course: in the TVI methodology, classes are video recorded, then shown to a group of students by a Teaching Assistant (TA) who stops the video periodically for questions and discussion. TVI was chosen because it enables a more interactive learning environment than other methods of distance learning. However our TVI deployment faced unique challenges due to its cross-cultural nature; for instance, interaction is not generally encouraged in Chinese university classrooms, but the traditional TVI methodology relies on student-initiated interaction. Thus we augmented the traditional TVI model to accommodate these challenges by building more opportunities for interaction into the course model. We did this by using active learning supported by classroom technology, providing supporting materials to the TAs, and building relationships between the US team and Beihang.

We focus upon these cultural issues and the tactics used to overcome them. In particular, we discuss issues of language, relationship building, and promoting classroom interaction. For a broader discussion of the course, please see [6].

2. TUTORED VIDEO INSTRUCTION

Tutored Video Instruction has been used in a range of different situations to support courses spanning multiple sites. These include Gibbons’ original TVI program at Stanford University [1], and the Digital Study Hall project [4] supporting primary school education in rural India. In Gibbons’ original deployment, TVI was used to offer courses recorded at Stanford at a remote site at HP. The students were employees at HP who achieved Master’s degrees as a result of participating in the program. Digital Study Hall uses TVI to improve the quality of instruction in rural schools in India. In villages in rural India, the teacher is often overworked and undertrained, so TVI was seen as a mechanism to improve instruction while exposing the teachers to examples of good teaching.

A project that had a strong impact on this one was a University of Washington project where introductory computer science courses were offered at community colleges through TVI [3]. Community college instructors used lectures recorded at UW as the basis of the class instruction. The UW-community college project ran from 1998 through 2001, and encountered a series of challenges. The lessons of that project guided our implementation of this course. We discuss these lessons below.

2.1 Course Ownership

One lesson learned from the community college deployment was the importance of a sense of ownership for the course residing at the remote site. The way that the program was initially implemented (for example grading and grade assignment were done at UW), engendered resentment because students felt they were in competition with UW students, felt that the roles of their teachers were diminished, and they questioned the motives behind the TVI offering. When the community college instructors were given a greater role in leading the presentation and grading the students, student satisfaction increased substantially. For this reason, in our deployment, all grading and final grade assignment was done at Beihang University, which also granted the course credit. Additionally, while we attempted to give the TAs as much support as possible, they were free to adopt whatever facilitation style they wished. Our goal was that the students perceive the course as a Beihang course, with support from the US faculty and staff, *not* as an external course. As discussed below the TAs embraced this opportunity, not only developing their own facilitation styles, but their own teaching styles.

2.2 Facilitation

We also feel that having skilled TAs as the facilitators was important to the success of the course. In the community college deployment, the facilitators were community college professors who were capable of teaching the class themselves, which caused resentment on the part of the professors. On the other hand, the facilitator must be motivated in order for the deployment to be successful. TVI seems to be most successful in situations where the facilitator learns about teaching by watching the video and preparing for class. In both Digital Study Hall and our deployment, the facilitators are at times seen reproducing sections of the video; not just facilitating but actually teaching. This is perhaps the best outcome of a TVI deployment.

2.3 Student Options

Another important issue that contributes to the success or failure of a deployment is what the students' alternative to TVI is. For the community college deployment, the alternative was a small class with personal attention – the very reason that many students choose to attend a community college – which in part explains the students' unenthusiastic reaction. In contrast, in the case of Digital Study Hall, the alternative is a class taught by an overworked, undertrained, and often absent teacher. In the original Stanford deployment, the alternative was a very long commute, or no courses whatsoever. The latter two cases have had some success, and in both of them, it can be seen how TVI could be more attractive than the alternative. In our deployment, the alternative is a class with little or no interaction; when asked on the end-of-term student survey what made it easy for them to learn, 15 of the 23 responses make some mention of interaction, classroom technology, or examples. Thus interaction was one factor that made our TVI deployment more attractive than the alternative.

3. COURSE MECHANICS

Video was captured and replayed using ConferenceXP and the Webviewer tool. Webviewer shows the presentation display, with

slides and ink, in the main window, along with a smaller window containing the talking-head video of the instructor, and a navigation interface. Figure 1 shows the Webviewer interface.

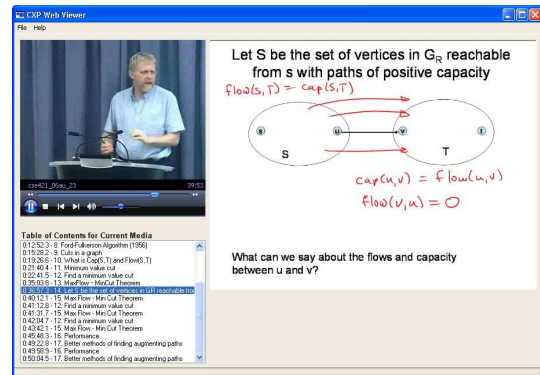


Figure 1. The Webviewer video replay tool.

We used Classroom Presenter [2], which facilitates active learning using networked Tablet PCs. An instructor broadcasts their PowerPoint-style slides and digital ink (their writing and drawing on the Tablet PC) to student machines, and the students then augment the slides with digital ink before sending them back to the instructor. The instructor then chooses some of the students' work to display anonymously to the class.

The workflow for a particular class began with the instructor preparing a set of slides [5] augmented with activities for use in China. The instructor would give the lecture locally, then the local team (including a graduate student from Beihang sent to help with the course) prepared a set of materials designed to help the remote TAs prepare for class. At Beihang, the three TAs would prepare for lecture, using the video and the supplementary materials, and meeting to discuss teaching and facilitation strategies. Finally, the TAs showed the video to their classes, stopping at appropriate points for discussion or activities.

The US class met three times a week for fifty minutes; at Beihang classes met twice a week for two hours. There were three remote sections of approximately 25 students each, each of which was the responsibility of a different TA, and on average 3 students worked on each Tablet.

3.1 Supporting Materials

In addition to the active learning exercises, we provided several documents to accompany each lecture video, to make it as easy as possible for the TAs to create opportunities for interaction in their classes. We prepared Lecture Summaries, which were intended to serve as a "road map" for facilitation of the class. We would suggest times to stop the video for activities, along with tips for successfully facilitating the activities, times to stop for discussion, and clarification of language issues. When activities were done in the local class, the instructor reviewed how they went in Activity Summaries. Interaction Summaries listed every time there was verbal interaction between the students and the instructor in the local class, including timing and what was said.

3.2 Data Gathering

Since we were attempting a novel deployment of TVI, we wanted to ensure that we had data available to help us understand how

successful it was. We designed a set of forms to be filled out by the TAs after each class period, focused on gathering data about the amount of interaction in the class, and how our support for the class could be improved. We also designed an end-of-term student survey which focused on issues related to language and interaction, receiving 23 responses. We gathered observational data through two visits and video recordings of class sessions at Beihang, and we examined classroom artifacts including the TAs' slide decks with their digital ink (the drawing and writing done on the TA's Tablet during the class period), as well as the completed activities submitted by the students.

3.3 Overall Success of the Course

We feel comfortable in concluding that the class was a success. While the Beihang students' exams were graded at Beihang in an effort to foster a sense of ownership of the course, it is encouraging that the Chinese students' average score on the final exam was very close to the American students' average score, and when asked on the end-of-term survey to rate their learning in the class in comparison to a typical class on a 1-5 scale, the average of 3.83 corresponds to "I learned somewhat more". In addition, the students responded very positively to the course; when asked (again on a 1-5 scale) to compare the course to other courses at their university, the average of 3.91 corresponds to "I liked it somewhat more".

4. DISCUSSION OF CULTURAL ISSUES

We were aware from the beginning that cultural issues would have a major impact on the course. Language was an obvious issue: we did not know how well it would work to base the course on English language materials, in particular on materials from a US based course, where some of the language would be colloquial and informal. Student acceptance of the course was another potential issue. We anticipated that the students would perceive both positive and negative aspects of an externally originated course. We were aware that the course that we were creating would have a very different classroom atmosphere than the standard Chinese university course. Courses in Chinese universities are often lecture based, with large numbers of students, and very little audience participation. We planned to offer the course in smaller class sections, and hoped to establish a very interactive classroom environment. From the beginning, we planned to create a course that was different in style than the other courses that the students had taken.

4.1 Language Issues

We planned to use English language materials recorded in a live course. This was considered an additional advantage of the course offering, since it would expose the students to technical English from a native speaker. We did not specify how the Teaching Assistants should conduct class – they could use English or Chinese. Our visit before the course started confirmed our expectation that students had substantial exposure to English but very little experience speaking the language. Students reported having studied English for about 10 years, although many students said that they had never spoken English with a native speaker. In addition to formal study of English, and some courses taught in English, students said they spent a considerable

amount of time watching American movies and television shows¹. Another concern was that colloquialisms in the lecture could cause the students difficulty. Even though the instructor knew the lectures were being recorded for use in China, informal language was occasionally used.

The main tactic used to address issues of language and cultural references was the creation of supporting materials. As part of the Lecture Summaries, we identified words and phrases that we thought might be troublesome for the Chinese TAs and students. A graduate student from Beihang assisted in this process.

We feel that this issue was handled successfully. On the end-of-term survey, we asked the students to rate, on a 1 (not difficult) to 3 (very difficult) scale, how difficult the instructor's use of English on the video made it to understand the course content. The average response was 1.7. On the same scale, we asked the students to rate the difficulty due to cultural references; the average was 1.35. We consider these results to be quite acceptable, considering that the opportunity to improve students' English was seen by Beihang as a benefit of the course.

One thing that helped was the fact that the lecture materials were made available to students outside of class, so they could review the video more than once. We asked students how much time they spent reviewing the video outside of class, and 17 of the 19 students who answered this question gave non-zero answers, ranging from 1-4.5 hours. When asked to express any other concerns about the course being taught in English, one student responded: "The recorded video being downloadable makes it easy for us to review the content that is not fully understood in class." Additionally, the fact that the students' English comprehension wasn't perfect may have ameliorated the effect of colloquialisms in the lecture; since students were accustomed to missing some content, it seems likely that the cultural references were simply filtered out along with unfamiliar words and jokes.

While the lecture materials were in English, and the TAs' writing on the slides was almost entirely in English (the only exceptions being translations), the class discussions and the majority of the students' writing was in Chinese. Given the instructor's observations described above, it is not surprising that, while the students were comfortable with the English-language video, they conducted discussion in Chinese.

4.2 Forming and Maintaining Relationships

From previous work [3], we were very conscious of the importance of building relationships, particularly with the remote TAs. Part of building these relationships involved communicating to the remote staff that the team at the originating site was heavily invested in the success of the course. The provision of the supporting materials contributed to this effort, as did the two trips the instructor made to China during the term. Institutional relationships were also an important factor in the success of the course. The idea for an American-style course was initiated at the Chinese university, and had support from the highest levels of the administration; Beihang even sent a graduate student to the US to work with us on the preparation of materials for the course.

¹ An informal survey had *Prison Break* as the most popular show, with *24* and *Friends* high on the list.

The instructor's first visit occurred at the beginning of Beihang's term, before school had started at the American university. This trip provided opportunities for relationship-building between the instructor and the TAs during a TVI facilitation training session and technical trials of Classroom Presenter. The instructor also led two class sessions during this visit, allowing the instructor and students to become acquainted. In the first class, he gave a lecture using Classroom Presenter to facilitate in-class activities, allowing him to assess the students' background and introducing the students to Classroom Presenter. During the second class, he led a TVI session, which bolstered the TAs' understanding of the facilitation process, in addition to acclimating the students to the TVI model, and lending the teaching technique credibility.

The instructor made a second trip to China approximately halfway through the course. The purpose of this trip was primarily to assess how the classes were progressing. The instructor observed one day of classes, and then taught a day of classes using Classroom Presenter. From his observations and assessment student work, the instructor felt that a large proportion of the students were engaged in, and doing well in, the class. This visit also served to strengthen the ties between the students and the instructor.

The TAs took ownership of the course, spending a great deal of time – they reported about 10 hours per week - preparing for class, watching the videos and meeting as a group to discuss facilitation strategies. They also personalized their classes. At a minimum, the TAs could have just shown the video, stopping for activities and student questions. However, they did a great deal of drawing and writing on slides (the TAs digitally inked about 24% of the slides in the deck); at times re-creating something that the instructor had done, and at times doing something completely different. There was even significant variation in inking behavior between the TAs; thus while the TAs were guided by the instructor's inking, and by their discussions with each other, each TA found their own unique style. It became clear that at times, the TAs were in fact teaching sections of the lecture, usually modeling themselves on what they had seen in the lecture video. From watching videos of the Beihang classes and looking at the corresponding inked slides, we could see that while some of the inking occurred while the video was stopped and the TA was directly discussing a slide with the class, some of it occurred while the video was still playing; here the TAs were taking advantage of the fact that the student machines always showed the Classroom Presenter view even when the public display showed the Webviewer video, to create an extra channel of communication to the students. This level of innovation is strong evidence of a sense of ownership.

The TAs were responsible for all grading, including assigning final grades for the course. Alternatively, grading could have been centralized at the local site, using email as the mechanism for homework submission. We feel that the choice to have the Chinese TAs do the grading independently of the American staff contributed to the TAs' sense of ownership of the course, and the students' acceptance of the course.

We have found that the proper handling of logistical issues is essential to the establishment and maintenance of strong, positive relationships between the local and remote teams. For example, there were issues with the room assignment that were resolved because the instructor noticed them during his first visit to China,

and he ensured that a different room was assigned; issues like this are unremarkable, but we feel that our willingness to help resolve them communicated our level of investment in the course. In addition, the version of Classroom Presenter used at the Chinese university was under development at the time of the deployment, so there were some major technical issues, especially at the beginning of the class. While these issues did cause frustration on the part of the TAs, we feel that our prompt responses and their willingness to be frank with bug reporting helped to minimize the impact that this had on the relationship between the originating and remote teams. When asked on a 1-3 scale whether problems with the technology affected their learning, the students' average response was 2.48, where 2 = Yes, a little and 3 = No, not at all; this leads us to believe that the technical problems were not a major source of frustration for the students.

4.3 Creating an Atmosphere of Interaction

We were aware that the classroom atmosphere we wanted to create was very different from that of the traditional Chinese classroom. This was supported by survey results; when asked how often they spoke in a typical course at their university, the average response was once a week, with the most common response being zero times a week. Thus we were somewhat concerned that the TAs and students might not adopt the style of discussion and interaction that we were promoting. Much of the theory behind TVI is that the student learning comes about from classroom interaction, from discussion or from activities, as opposed to passive viewing of the recorded materials.

Since we felt that creating an interactive atmosphere for learning was a part of our criteria for success, we worked hard to build opportunities for interaction into the course from the beginning. This was the main motivation for integrating Classroom Presenter into the TVI framework. The traditional TVI paradigm involves playing the video and stopping it when students have questions. In this case, interaction is student-initiated. Since we knew that interaction is not common in the typical Chinese classroom, we decided to focus instead on TA-initiated interaction, for which we provided support in the form of in-class activities embedded in the slide deck, and Lecture Summaries with advice on when to stop for interaction. One advantage of this approach, especially the inclusion of in-class activities, is that it creates structure for the interaction. This makes it easier for the TA to facilitate the class, and makes it easier for the person designing the course to ensure that the students take away the key lessons of the interaction. In addition to keeping interaction relevant, it also keeps most interaction in the realm of what the TA has prepared for, which improves the quality of the interaction as well as the quality of the experience for both the TA and the students.

Our numerical data confirms that we were successful in encouraging interaction. In the same survey that the students reported speaking once a week in typical classes, the students reported speaking 2.8 times a week in the Algorithms class. We found that on average in each class there were 10.0 interaction events (we define an interaction event as a verbal exchange between the TA and one or more students; this exchange could have multiple rounds). We compiled numbers on a subset of the American classes, and this is about 2/3 the number of interaction events in the American class, which we consider comparable. In addition, we found that on average each interaction event included 2 student speech acts; thus these exchanges did not just

consist of the TA asking a question and a student answering it, but created a dialog between the TA and the students; the longest such exchange included 8 student speech acts.

In addition, Table 1 shows how various indicators of interaction increased from the first half of the course to the second half. In particular, the number of long exchanges (as defined by including more than 3 student speech acts) increased tenfold.

Table 1. Various measures of interaction. All positive measures increased from the first to second half of the class.

| Interaction measure | Over all | 1st half | 2nd half |
|---|----------|----------|----------|
| Student speech acts per class | 19.5 | 11.2 | 27.8 |
| Student speech acts per interaction event | 1.9 | 1.4 | 2.3 |
| Interaction events per class | 10.0 | 8.0 | 12.0 |
| Interaction events containing more than three student speech acts (total) | 56 | 5 | 51 |

In addition to promoting a large quantity of interaction, we wanted to empower all students to contribute. On the survey we asked the TAs to fill out after every class, we asked them to estimate how many different students spoke in class that day. The average of 6.1 means that about a quarter of the class was contributing to verbal discussion; this interaction is in addition to the interaction enabled by Classroom Presenter.

Survey results also indicate that students enjoyed the interaction; comparing it with the interaction in a typical class, the average response corresponded to “I liked it somewhat more” When asked which had a greater effect on their learning experience; watching the video or interacting with the TA and other students, interaction was the most common response, with 47.83% of responses (21.74% said “The effect of both was similar”).

The use of in-class activities and the capability for displaying student submissions also contributed to the interactive atmosphere of the class. An activity occurred about every 25 minutes, providing frequent breaks from the lecture video. The students reacted positively to this aspect of the interaction: asked if the in-class activities impacted their learning experience, the average response was 4.09, where 4 = I learned somewhat more. When asked how they felt about having their solutions displayed to the class, the average response was 4.17, where 4 = I liked it. Another source of interactivity was TAs’ inking on lecture slides, as discussed above. We were pleasantly surprised by the extent of this, since it was not explicitly encouraged.

In person and in videos of the remote class, we observed an informal atmosphere at the remote site, which may have contributed to the high degree of interaction in the class. We observed joking and laughter between the TAs and the students. The student submissions also contain indications of informality, including student submissions expressing uncertainty about an answer, submissions on non-activity slides asking questions, and playful responses containing drawings or silly responses (Figure 2). This informality may be attributable to the fact that the students and the TAs were all graduate students, and thus peers. It is likely that the anonymity of the system also contributed to the informal atmosphere.

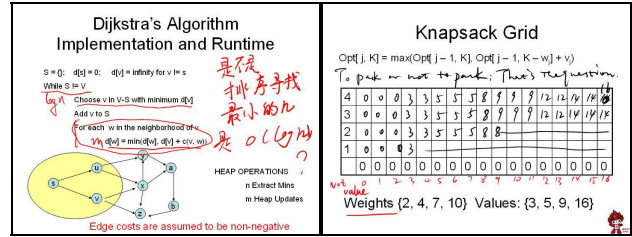


Figure 2. (left): A student expresses uncertainty about their answer; the submission translates as: “Is it that to find the smallest n is O(log n)?” (right): A playful submission: the student wrote: “To pack or not to pack; That’s the question.”

5. Conclusions

Several lessons on offering cross-cultural courses are apparent from this work. While our students were more comfortable conducting discussion in their native language, they had no difficulty in consuming English-language materials such as slides, lecture videos, and text books. In addition, we feel that our approach of providing a large amount of structure to promote interaction, in the form of supporting materials, while allowing the TAs a great deal of freedom in how they used those materials to facilitate classes, served the dual purposes of fostering a sense of ownership for the course within the TAs, and establishing a highly effective and interactive learning environment.

6. Acknowledgments

Microsoft Research Asia and Microsoft Research External Research and Programs provided support that made this course possible.

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