Pause, Predict, and Ponder: Use of Narrative Videos to Improve Cultural Discussion and Learning

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ABSTRACT

Previous research shows that video viewing (a frequent activity in language courses) is more effective when students receive guidance. We investigate how to support students in an on-line environment in acquiring cultural knowledge and intercultural competence by viewing clips from feature films from the target culture. To test the effectiveness of a set of attention-focusing techniques (pause-predict-ponder), some of which have been shown to be effective in other contexts, we created ICCAT, a simple tutor that enhances an existing classroom model for the development of intercultural competence. We ran a study in two French Online classrooms with 35 participants, comparing ICCAT versions with and without attention-focusing techniques. We found that the addition of the pause-predict-ponder seemed to guide students in acquiring cultural knowledge and significantly increased students' ability to reason from an intercultural perspective. We discuss possible implications for intelligent tutoring systems in such difficult and ill-defined domains.

Author Keywords

Educational technology, computer-mediated communication, ill-defined domains, multimedia, intelligent tutoring.

ACM Classification Keywords

K.3.1 Computing Milieux: Computer Uses in Education.

INTRODUCTION

On-line learning is rapidly becoming a staple of post-secondary instruction. Many college-level courses have on-line components and more and more courses are conducted entirely on-line. In domains with many well-defined tasks like math and science, individual problem-solving tasks may transfer easily to the new medium, and intelligent tutoring systems that are currently shown to be effective in supporting students in these domains might be adapted for on-line use [1]. More ill-defined domains such as history, language and culture, or film critique, however, have traditionally received less attention by tutoring systems researchers. This may in part be because the open-ended tasks which are common in these classrooms often require facilitation by the instructor or interaction with other students. For example, a typical task might be to watch a film in class with guided questions and support from the teacher, followed by a class discussion. But in an on-line course where extensive human support may not be available, what kind of guidance from a system will be effective in this regard?

In the context of an online course, the use of video presentations creates a practical problem. While video content can now be easily distributed over the internet, and setting up an on-line discussion forum is easy to do with the student management systems that are in widespread use, video viewing without direct guidance from an instructor can result in shallow or little learning [2,3]. There is a need therefore to provide students with guidance to help them focus on the salient features of the video, and to help them interpret and discuss the events depicted in the video from a new perspective.

Our project focuses on the use of on-line multimedia technologies in language classes, where they are used to support many aspects of language learning [4]. We work on creating and evaluating on-line learning activities that give students a head start on developing *intercultural competence*, now (in both the US and European educational systems) an integral part of many modern language curricula. Students are expected not just to learn to communicate in the given language, but also to acquire an ability to "gain insight on native perspectives, opinions, and values; reflect critically and engage with otherness" [5]. In

an attempt to include these higher-order skills in language classrooms, the content standards of American Council on the Teaching of Foreign Languages (ACTFL) emphasize cultural understanding [6]. For example, Standard 3.2 recommends that "Students acquire information and recognize the distinctive viewpoints that are only available through the foreign language and its cultures." Practicing these skills differs from simply knowing a few typical facts about a culture (e.g., that the French standard criteria for completing high school is the Baccaleréat exam) in that students must be able to search for cultural explanations and take into account multiple points of view. The goal is to get students to go beyond evaluating unfamiliar events from the perspective of their own culture. Rather, one wants students to consider how observed behaviors might be indicative of different cultural values or customs, and to reflect on how those values and customs compare to those in one's own culture [7].

Our approach is to help prepare students for an on-line discussion through a video-viewing experience, augmented with a set of attention-focusing techniques we call "pause-predict-ponder." This approach has three main components. First, rather than watching an entire film, students view short video clips from authentic feature films made by filmmakers from the target culture (such as *Monsieur Ibrahim* [8]). We select moments from the film that reveal an interesting or unexpected feature of the target culture in a particularly compelling way. Second, we structure the activity of viewing and reflecting on the clip according to an existing model for the development of intercultural competence developed by Liddicoat [9]. In this cyclic model, students receive authentic input (such as a clip from a film), notice unique elements and reflect on them, and create verbal output to be evaluated by their instructor and peers. Third, we augment two of these phases by means of attention-focusing techniques: (a) *pause* the clip at moments of high cultural interest, (b) have students *predict* what will happen next in a series of deep questions, and then (c) after they have viewed the rest of the clip, have them *ponder* whether their prediction was correct and answer questions about the cultural content of the clip and how the events might have unfolded differently in one's own culture (e.g., [10]). After these activities, the students participate in an asynchronous, on-line discussion forum with their peers, where they interpret and discuss the cultural implications of the events depicted in the clip.

This paper explores whether the attention-focusing techniques in step three (pause-predict-ponder), when implemented by means of a simple tutoring system, help students overcome shallow learning that typically results from unguided video viewing.

Previous work on language learning provides indirect support for the use of these kinds of attention-focusing techniques. Focusing students' attention (e.g. by underlining or highlighting) on key components of language materials has been shown to help students acquire new knowledge by noticing inconsistencies with their current knowledge in domains like vocabulary or grammar [11, 12]. More generally, [13] found evidence that in order to correctly recall information, attention must be focused on appropriate features of multimedia, e.g. by revealing important information for emphasis. While a variety of techniques have been hypothesized to support attention, successful techniques are usually explicit and often used in combinations [14], as in the current work. Prediction, a key attention-focusing technique in our work, has been used successfully in domains other than language learning. For example, it is one of the four components of reciprocal teaching [15], a program that supports students in learning strategies to comprehend text and read with understanding. It has also been used successfully to help students learn from viewing animations of computer algorithms [16]. To the best of our knowledge, it has not been studied experimentally in the context of instruction on cultural knowledge and intercultural competence.

In these previous studies, students either did not receive feedback on their predictions, or received only informal feedback from peers (as in the reciprocal teaching studies). In an online learning environment, where students (inevitably) work individually at least part of the time, it may be important to have students reflect on whether their predictions are correct and on the explanations for their predictions. A tutoring system could help in this regard: explicit feedback on predictions and answers to the deep questions may help students 'notice the gap' between their current knowledge and the desired knowledge and increase learning. Thus, we augment the attention-focusing techniques with support from a simple tutoring system.

In this paper, we report on a study done in an introductory, college-level French Online class, in which we tested the hypothesis that focusing students' attention on moments that highlight a noteworthy cultural attribute helps students reason deeper compared to video viewing without attention-focusing techniques. To do so, we created a tutor, ICCAT (Intercultural Competence Attention-focusing Tutor), which supports the viewing of video clips and leads students through the phases of the Liddicoat model for the development of intercultural competence. We compared students' cultural learning with two system versions, one in which the attention-focusing techniques are turned on, and one in which they are turned off. To measure students' cultural learning, we measured the frequency of intercultural perspective taking in the on-line discussion forum. We also administered multiple-choice questions related to the video clips that required cultural analysis supported by declarative knowledge.

In this paper, we describe the ICCAT system, present our experimental design and procedure, discuss the results of the experiment, and discuss implications for intelligent tutoring systems design.

SYSTEM

In the ICCAT system, students receive authentic input from a French film clip. ICCAT leads them through the four stages of the Liddicoat model (authentic input, noticing, reflection, output) using the pause-predict-ponder approach described above. Although Liddicoat has shown that the model has some success assisting students in acquiring cultural skills in classroom contexts, it is not detailed enough to serve as the basis of a typical ITS. We built our simple tutor using the Cognitive Tutor Authoring Tools (CTAT), a set of tools that facilitate the rapid development of intelligent tutors [17]. CTAT provides the ability to build "example-tracing tutors" by demonstration, without having to do complex AI programming. CTAT also contains a video component that students use to play video clips.

On ICCAT's first screen, students review production details and a summary of the film they are about to see. On the next screen students view the first half of the clip, which begins the first step of the Liddicoat model, *authentic input*. The cultural content we present is one- to two-minute feature film clips that contain cultural information, based on suggestions from French instructors who utilize such authentic material in their classroom. To illustrate, one clip is from *Monsieur Ibrahim*, a recent film dealing with issues of cultures clashing among immigrants in Paris. In a scene from *Monsieur Ibrahim*, a boy named Moses walks into a neighborhood convenience store and has a conversation with the elderly proprietor about the etymology of their names. The shopkeeper gently explains to Moses that he is Muslim, not Arab. The boy asks, "Then why does my father say 'Go to the Arab's?'"

The students then move to the second step in the Liddicoat model, *noticing,* where they detect and report unique cultural elements with the assistance of ICCAT's attention-focusing techniques. After the boy's question to the shopkeeper, the video *pauses* and students respond to a set of questions (see Fig.1) in which they: 1) *predict* the next event that will occur in the clip from a drop-down menu, 2) provide a more extensive natural language explanation of their choice, and 3) state what they believe an appropriate response to the situation might be in their own culture. In general, a correct prediction requires cultural knowledge, not just understanding of the narrative content of the clip. The first question, presented in a menu format, constrains students to several actual cultural possibilities. For this video clip, two possible responses include 'The neighbors don't take the time to get to know me,' and 'Anyone in this profession is labeled an Arab'. In the second question, students expand upon their hypothesis and provide evidence from the clip or their knowledge of French culture to support their reasoning. Finally, students explicate the difference between their prediction for the French culture and what might be the resulting event in a similar circumstance in their home culture. To enable students to self-reflect, the system does not provide immediate feedback on these responses. This allows them to explore their own interpretation of the events prior to receiving intrinsic feedback from watching the events unfold in the film. Students may review the video up to this point as often as they like.

Next, students *reflect* on what has been noticed, the third step in the model, as they focus on the features that supported or contradicted their prediction, helped by

Figure 1. Students watch the first half of the film and make their prediction
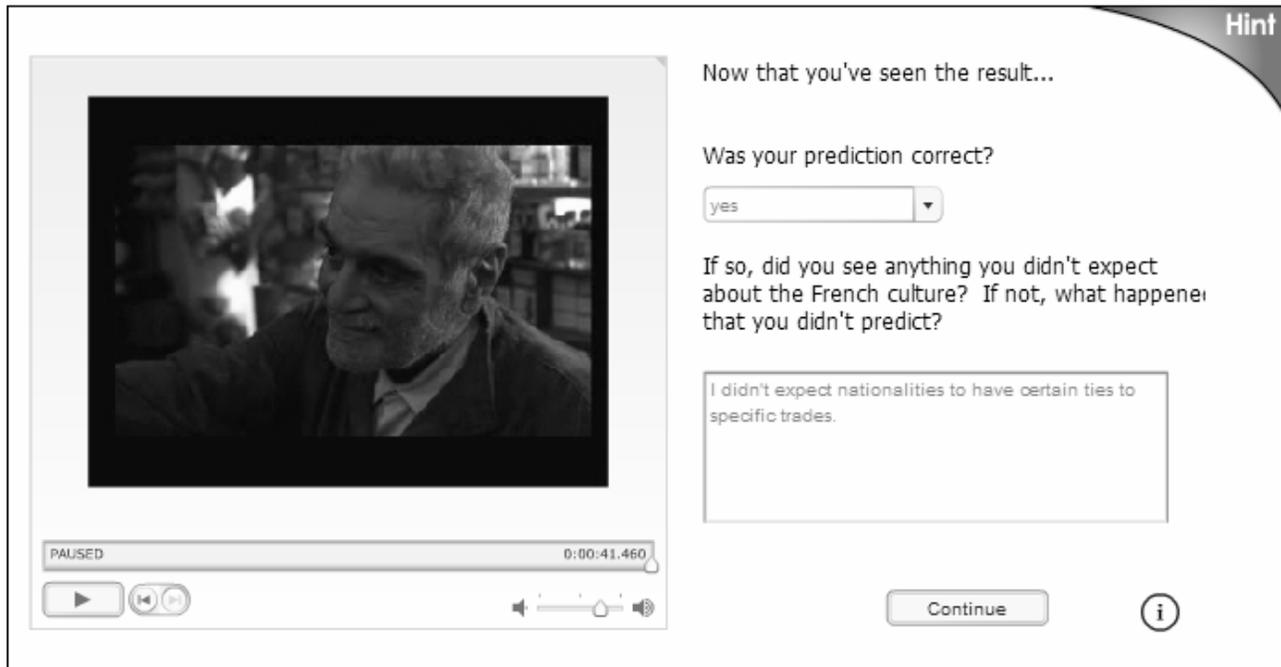
Figure 2. Students view the result of their prediction and reflect

ICCAT's attention-focusing techniques. That is, when students have provided answers to all three questions, the succeeding portion of the video clip plays and the ensuing cultural event is revealed. In *Monsieur Ibrahim*, the shopkeeper describes to the boy how his profession is stereotyped by Parisians. At the end of the video clip, a second set of questions asks students to make an assessment of whether they were correct in their prediction or not (see Fig 2). They are asked either to revise their prediction or explicate elements that surprised them, which may help them notice gaps between their prior knowledge and desired knowledge state. Finally, students are given a short set of characterization and general comprehension questions about the clip that may be answered with 'true', 'false', or 'maybe'. These questions are tutored with hints and error messages, as well as success messages that provide a summary of the evidence for a correct answer. One example question states, "Monsieur Ibrahim lives in an isolated immigrant community," which would be correctly answered with 'false'.

In the final step of the Liddicoat model students *create verbal output* to be reviewed by the instructor and peers. They participate in an asynchronous online class discussion where they use what they have seen to reflect on cultural differences, similarities or assumptions about the French culture, and ask questions about the meaning of behaviors they have seen in the clips. The prompt students see for *Monsieur Ibrahim* is, "Post at least one original post and one reply with questions, analysis, or other thoughts about the immigration issues in France you've seen. Think about the racial and ethnic stereotypes in France that you have seen depicted in this film to get started." Feedback on the

output students create should assist them in noticing relevant features of the next authentic input.

EXPERIMENT

An *in-vivo* study was recently completed with 38 students in the Pittsburgh Science of Learning Center's French Online classes at Carnegie Mellon (CMU) and University of Pittsburgh, to test the added value of the attention-focusing techniques (pause-predict-ponder) in cultural learning with videos. Specifically, the goal of the study was to test the hypothesis that focusing students' attention on moments that highlight a noteworthy cultural attribute helps students reason more deeply compared to video viewing without attention-focusing techniques. Within each class, students were randomly assigned to either an experimental group that used the ICCAT system or a control group that viewed the same video clips without the attention-focusing techniques; i.e., a "stripped-down" version of ICCAT that did not pause the video or prompt for predictions or reflection, but simply provided an open space where students were encouraged to take notes. The study was comprised of three assignments spaced throughout the semester, in place of typical cultural reading and writing assignments for the class. In each, students first took a pre-test that explored their knowledge of basic information about the assignment's cultural theme. They were then given two film clips in ICCAT to watch and discuss. Film clips corresponded to French cultural themes that were explored in the classroom, such as immigration, employment, and education. After each ICCAT session, students accessed the discussion board for that video clip. They were required to post at least twice and encouraged to return to the discussion board to read other replies and to

post again. The materials for each assignment were linked from a course webpage that provided background information about the theme. Students received class participation credit for each assignment they completed.

We assessed how the respective interventions affected students' learning both in terms of their specific knowledge about French culture and their intercultural competence. First, following each assignment, students completed an online post-test that included 7 or 8 analytical questions which measured declarative knowledge components (i.e., a unit of learning such as a fact, concept or skill) related to French culture in multiple choice and true/false format. The questions on this test were developed with French language instructors through an analysis of the cultural elements in video clips. They covered key knowledge components related to the high-level cultural objectives of the course, and were situated within the context of the film. In general, questions asked students to analyze the events in the film (e.g., "From the factory scene in *Ressources humaines*, we know that social mobility is possible in French society.") or compare between the two films in the assignment (e.g., "Based on the clips you just saw, *Être et avoir* and *Le Péril jeune* are similar in EVERYTHING BUT: …").

Although these questions enabled us to get a concrete glimpse at how students comprehended and synthesized the material, these types of questions cannot hope to cover all of the learning in such a complex domain, nor can they give a sense of how students apply their knowledge in an open structured assessment akin to how they might use the desired skills in real life. To that end, we used the discussion board posts as a measure of transfer in order to evaluate whether the intervention lead students to reason more from an intercultural perspective. We coded the forum responses using a coding scheme developed and validated by Steglitz, which distinguishes three main levels of desirable and undesirable cultural writing on a similar intercultural competence writing task [18]. The first level of this coding scheme indicates no awareness of cultural influences on behavior in the writing sample (e.g., "This is the wrong way to do things!"). In the second level, students show awareness of multiple perspectives, but are unspecific about cultural causation (e.g., "I think the French do this differently"). Writing categorized at level three shows clear cultural awareness with specific, elaborated cultural explanations (e.g., "The French may view time in a different way").

RESULTS

While 38 students had signed up for the class, only 35 students (18 in the control and 17 in the experimental condition) completed at least one of the assignments during the semester. Since each assignment covered novel cultural material, all students who completed at least one of the assignments were included in the analysis. Prior to the first assignment, demographic data was collected from each student. A t-test showed no significant difference on post-test scores between students in the two universities. Also, although we anticipated a potential disparity in cultural abilities between international students and U.S. citizens, a t-test found no significant differences, perhaps due to a small sample size of 5 international students. Therefore all students were analyzed in two groups, the experimental condition and the control.

On the "cultural knowledge" post-test students were given a point for each question answered correctly, and then these scores were averaged across the three assignments (see Fig. 3). While students in the control condition scored an average of only 62%, students in the experimental condition scored an average of 72%. This difference was marginally significant on an ANOVA test (F (1, 34) = 3.68, p < .064, SDs = .12, .16). However, using the F statistic to calculate Cohen's *d* [19], a measurement of the relative size of the observed effect, shows that the treatment had an overall effect size of .67 (generally accepted as a medium size effect). When we explored each assignment independently, immediately a disparity between the assignments emerged. The difference in means (.59 vs. .72) on the first assignment was also marginally significant (F (1,28) = 3.9, p < .058, SDs = .12, .22), and Cohen's *d* shows a large effect size of .75. However, on the subsequent two assignments, the scores of the conditions seemed to converge. This difference may be explained by the fact that 3 students in the experimental condition with a score over 80% dropped out by assignment 3, while 3 students with scores under 60% dropped out of the control condition by the third assignment.
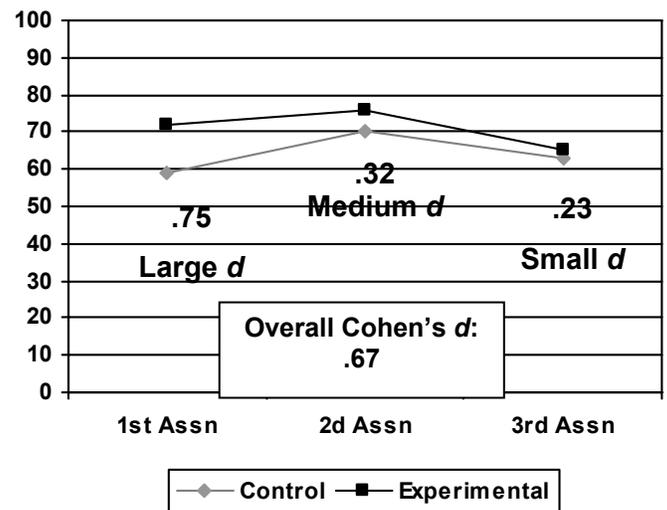

Figure 3. Means for normal post-test by assignment

In our second type of assessment, the "intercultural competence" measure, each post on the discussion boards was given a score according to the categories developed by Steglitz, and then an average score was calculated for each

student across all of their posts (see Fig. 4). An ANOVA shows the experimental group scored a significantly higher average of 1.61 out of 3, compared to the control mean score of 1.36 (F (1, 34) = 3.9, p < .05, SDs = .42, .40). Table 1 presents examples of posts classified in each level.
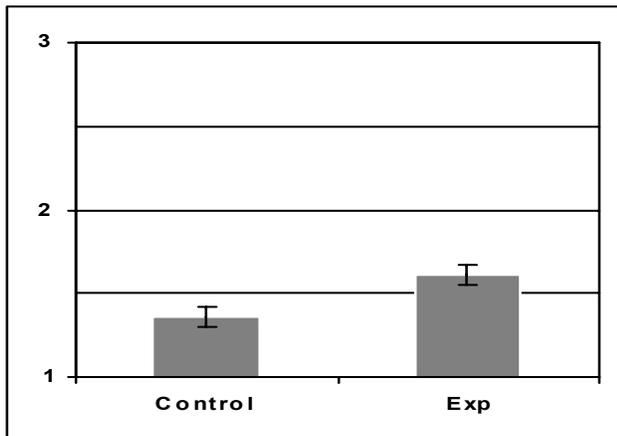

Figure 4. Means for discussion measures

Level 1: no cultural reference	I always thought the French were welcoming until watching these clips.
Level 2: unspecific cultural explanation	From this video, I saw that Arabs were stereotyped and generalized. I've never heard of this before in French culture, but I probably could have guessed it because I know that Anti-Semitism has been on the rise in France for several years now.
Level 3: specific and elaborated cultural explanation	We have similar confused stereotypes about middle Eastern/South Asian owners of convenience stores. We don't neccessarily consider them Muslim. Usually in my understanding of immigration, immigrants are victims of negative stereotypes because of economic insecurity. Realistic competition for scarce resources seems to bring out the worst in people. I wonder what type of stereotypes there are against immigrants in non-European countries, and I wonder if they exist for the same reasons.

Table 1. Examples of posts from each category

In a comparison made between the two types of assessments, no significant correlation was found between the scores (r squared = .066, p > .15).

DISCUSSION

While we found that students in the experimental condition were significantly better at reasoning with intercultural competence, we found only a marginally significant difference in the cultural knowledge post-test. In an attempt to further understand how the attention-focusing techniques beneficially influenced students' learning trajectories, we investigated individual post-test questions and the ICCAT prediction data. While all of the questions on the post-test are taken from course objectives that are observable in the video, each test has one particular question whose answer is best exemplified in the video at the moment of the pause (which is not a question presented in the *ponder* step of the model). Looking at only these 6 questions, students in the experimental group made significantly more correct responses on the particular knowledge component. (F(1, 34) = 5.24, p < .05, Ms .51, .71, SDs .24, .28). These results can be explained by students in the experimental condition being given the opportunity to make predictions about this component and reflect on them. From the tutor data logs, students made a correct prediction 40% of the time before viewing the second half of a clip, which is better than the chance rate of 25%. This may be an indication that they were able to activate some of their prior knowledge of French culture and relate it to appropriate information from the clips. After viewing the rest of a clip, they were able to accurately assess whether they had made a correct prediction 79% of the time, reinforcing their interpretation of the cultural events. This suggests that we can help students understand particular declarative knowledge components by focusing their attention through a pause in the video.

Intercultural competence knowledge components, on the other hand, are taught only implicitly in ICCAT, by prompting students to search for cultural explanations in the clip in order to make a prediction, and by asking students to make an explicit cultural comparison to their own culture. Thus they are a measure of transfer, and yet we see a significant difference in the ability of the experimental students to apply them. Students in the experimental condition came much closer to including at least an unspecific reference to cultural explanations in each of their discussion posts (level 2 in Steglitz's coding scheme). Thus, they seem to acquire desirable knowledge components for cultural competence (e.g., if there is a difference from my culture, then explore whether or why it might be related to culture), whereas without ICCAT's attention-focusing techniques, students more frequently display shallow or undesirable intercultural knowledge components (e.g., if there is a difference from my culture, the behavior or value is wrong). An informal assessment of the flow of the discussion shows that posts in the experimental condition were fairly uniformly competent. In the control, however, the discussion tended to be at a low level of competence until a particularly good student made a contribution; these posts acted as a catalyst that sparked improved discussion

among the rest of the participants which was not necessary in the experimental condition.

Although both types of knowledge measured by our post-test (cultural knowledge components and intercultural competence) are important targets of a language classroom, the two measures are not well correlated. This finding implies that some students are able to acquire the declarative components of the domain without gaining any perspective-taking skills. A test that might be considered a normal post-test for cultural learning (i.e., the first part focused on cultural knowledge) apparently does not capture these intercultural knowledge components. The results from the current study strongly suggest that in assessing cultural learning, and perhaps in other similar domains, it is important to include deeper, more comprehensive measures of competence.

CONCLUSION
The research presented in this paper investigates how an on-line multimedia module for an introductory college-level language course can be effective in helping students acquire a first level of intercultural competence. The use of feature films is attractive from an educational perspective, because films are often rich in cultural content and details. Without guidance, however, the learning outcomes of video viewing can be disappointing [2, 3]. Language instructors therefore often engage students in a classroom discussion about the cultural significance of the events in the film. We adapted this time-honored classroom method for use in an on-line environment. In our approach students are presented with short, carefully-selected, culturally-relevant clips from a feature film from the target culture. Following this activity, they have an asynchronous on-line discussion with the whole class about the cultural implications of these clips. In order to guide students' attention to relevant features of the film clip, and to spark reflection on its cultural implications prior to the on-line discussion, the software pauses the video clip at a moment of cultural interest, asks the student to enter a prediction of what will ensue, and, after the clip has played to completion, ask the students to reflect on the accuracy of, their prediction and on how the scenario might have played out differently in their own culture.

We conducted an evaluation study to evaluate the added value of the attention-focusing techniques by the pause-predict-ponder model. The results of this study indicate that attention-focusing techniques help students to reason better from an intercultural perspective, while potentially increasing learning of declarative knowledge components. Without the attention-focusing techniques, the discussions in the on-line forum turn out to be quite wide-ranging, but students do not often seek to arrive at or discuss possible cultural interpretations of the events in the clip. When the videos were watched with the attention-focusing techniques in place, the on-line discussions are richer and contain a higher frequency of cultural comparisons. Also, students do

marginally better at cultural analysis questions related to the videos.

An important result of this work is the demonstration that with appropriate techniques that are relatively easy to implement with tutor authoring tools, we can make some progress in a difficult and ill-defined domain. While we saw a significant improvement in reasoning skills using ICCAT, however, even the improved scores of student writing on the discussion board are still lower than one would hope. In our current work, an extension to ICCAT is being developed which will focus on providing adaptive, guiding feedback to students on the discussion board on improving their cultural writing. This new component uses relatively simple machine learning to support students in what we have discovered is a very difficult part of this domain. With this machine interpretation in development, we have the goal of creating a complete tutoring system for cultural learning and discussion.

Designing interactions that lead students to engage in productive cultural reflection, and demonstrating their effectiveness in enhancing multiple measures of cultural leaning, are novel contributions to the field of technology-enhanced learning. While the majority of the successes in this field have come in well-structured domains such as mathematics [20] and physics [1], the current research demonstrates headway in an ill-defined and open-ended task,.. The work involves exploration of an approach to learning that is increasingly used in courses at every level of education, with learners working independently, studying resources at their own pace, with multimedia and asynchronous discussion boards as a central part of the learning activity. This approach has the potential to be broadly applicable to a range of areas, including film studies, history and anthropology but increasingly other areas as well, where learners make use of resources such as film and audio to support deep learning of sophisticated concepts.

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