The Power of Social Simulation for Chinese Language Teaching

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Mastery of Chinese language and culture requires competence in a range of knowledge, skills, attitudes, and other relevant factors (KSAOs). Instructional technologies for global competence must be designed to ensure effective learning, practice, and assessment of KSAOs. Social simulation offers a revolutionary approach to teaching communicative skills. Alelo's unique social simulation technology and instructional methodology helps learners develop the communication skills necessary for effective interpersonal interaction. Alelo's instructional methodology integrates principles from learning, motivation, and second language acquisition theories to frame a task-based language learning model and align them with the ACTFL 5Cs. Learners engage in spoken dialogs with virtual humans in immersive environments authentic to China. This approach is designed to maximize learner engagement and effective transfer of KSAOs to real-world contexts. Integrating social simulations into instructional practice significantly advances the state-of-the-art for Chinese language learners.

Keywords: Social simulation, instructional technology, Chinese language and culture

Teachers of less commonly taught languages (LCTL), such as Chinese, face a shortage of effective instructional and supplemental materials (CARLA, 2012). Although organizations such as Hanban and Confucius Institute provide instructors access to materials to teach Chinese language and culture, most resources are print-based and input-focused. Alelo's instructional social simulation approach addresses this gap by supplementing Chinese language instruction with technology that provides immersive scenarios in which to practice communication skills and address the complexity of learning tonal languages. Alelo's interactive instructional materials focus on the four communicative skill areas of reading, writing, listening, and speaking. This focus on communication skills is developed through activities devoted to developing Chinese language competencies and culminating in extended target language (L2) conversations with virtual agents, animated characters driven by artificial intelligence technology.

Alelo's social simulations bring learners into realistic virtual environments. Learners "visit" Chinese locations and engage with "locals" to complete concrete and measureable communicative tasks. In these simulated contexts, learners communicate with virtual humans through spoken dialog aided by Automated Speech Recognition (ASR) technology that interprets cultural meaning in addition to words and phrases.

As Chinese becomes an increasingly critical world language (Lauerman, 2011), the quality of instructional technologies must rise to meet the needs of teachers and students. Alelo's approach ensures that 1) learners are provided ample opportunity to practice their communication skills in realistic settings, in a manner that is engaging, encouraging and non-threatening; 2) learners are enabled to make rapid progress; and 3) teachers are empowered to guide and support learners. By addressing these factors, Alelo's social simulation approach accounts for both cognitive and affective needs while mediating the challenges faced by English speakers in learning tonal languages and non-Roman scripts.

1. Social Simulations

Second language acquisition (SLA) theories identify the following factors as critical for effective learning: comprehensible input, comprehensible output, corrective feedback, attitudes and motivation (Krashen, 1985; Lee et al., 2011; Swain, 1985). The Alelo social simulation approach addresses these factors via game-like simulated experiences of varying difficulty, coupled with virtual coaching that provides cognitive and motivational feedback (Johnson et al., 2012). According to Vygotsky (1978), the level of comprehensible input increases dramatically when L2 is heard in context. Social simulations provide that context.

Context affects both how communicative skills are learned and how they are recalled and applied. Alelo's social simulation approach provides learners with real-world opportunities for learning and practicing communicative skills. These opportunities are designed as meaningful tasks aiding both learning and recall. Alelo's social simulation technology extends the task-based approach of SLA theories to tasks and situations that are difficult to replicate in a classroom. In order to perform successfully in the social simulation, the learner must understand and produce a number of communicative functions, including greetings, suggesting days and times to meet, and agreeing or disagreeing with proposals. In Figure 1, a dialog is taken from a prototype Chinese course that Alelo developed and trialed with high school students in the Virtual Virginia Online School to help meet the high demand for Chinese instruction despite limited human and financial resources. In this example, the student's character (left) is arranging to meet with a friend named Zhang Li (right), an animated native speaker-like agent. The learner speaks into the microphone in Chinese and Zhang Li responds in Chinese. In the example, Zhang Li has just asked the learner: "Wǒmen lǐbàijǐ jiànmiàn?" (What day should we get together?) The learner needs to respond by suggesting a day to meet. A help menu on the left lists a number of possible ways of responding, with different days of the week and choices of phrasing. This menu can be closed to increase the challenge and provide a realistic simulation of real-world task-oriented dialog.

Alelo's instructional design for language acquisition manages cognitive load through providing part-task practice with social simulation activities. These smaller social simulations engage learners through communicative functions that utilize learned words, phrases, and concepts. Part-task practice prepares learners for the whole task of applying communicative functions in extended social simulation dialogs with virtual humans by providing learners with meaningful, constructive, and focused feedback.

Figure 1. Alelo's social simulation

Throughout these dialogs and exercises learners are provided immediate feedback by our virtual coach, Erica (See Figure 2). Erica has been designed to encourage and scaffold learners to apply best efforts and achieve Chinese proficiency. Learners receive feedback that is cognizant of communicated meaning and maintains an authentic interactive experience for learners. An example of this is the use of the particle "ba" in making a suggestion. Although a phrase may be grammatically correct with or without "ba," inclusion of this particle at the end of a suggestive phrase softens its delivery. Without it, the meaning of a phrase may also differ. Alelo's speech recognition interprets words and phrases as well as cultural appropriateness of language use and draws on this to provide feedback to learners. If learners use "ba" inappropriately or incorrectly, Erica will inform them of their mistake and explain how to avoid this problem in the future. The speech recognition also supplies the virtual coach with suggestions for how to improve dialog performance. For example, in the dialog described in Figure 1, if the learner replies to the question "Wǒmen lǐbàijǐ jiànmiàn?" with an acceptable, but not ideal response, Erica will provide detailed and constructive feedback explaining this.

Figure 2. Mini-dialog social simulation activity with feedback from virtual coach

2. The instructional approach

The instructional model underlying Alelo's social simulation approach is based on evidence-based cognitive and learning theories (e.g., Bandura, 1986, 2002; Paivio, 1986; Vygotsky, 1978). Learners first gain a knowledge-level familiarity with words, phrases, and cultural concepts via classroom instruction or computer-assisted language learning (CALL). Upon mastery of necessary KSAOs, learners then engage in social simulation-based activities involving communicative functions that utilize these words, phrases, and concepts. Learners then practice applying communicative functions in extended dialogs in simulations of real-world situations. The similarity between the simulated situations and real-world situations facilitates transfer of learned KSAOs to the real world.

According to some cognitive theories, retention of words and phrases is best accomplished when they are presented in a meaningful context such as with a task-based approach (Ellis, 2003). Alelo's lessons and social simulation activities are therefore based on one or more tasks and learners are given relevant "missions" or "goals" to complete the task(s). Figure 3 shows clearly defined task-based dialog learning objectives. Providing students with concrete and measurable performance-based tasks has been positively correlated with factors that relate to motivation, such as feelings of efficacy and positive outcome expectancies (Locke & Latham, 2002).

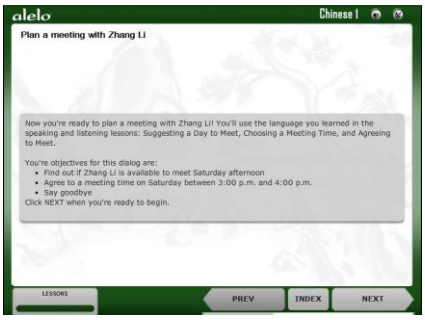

Figure 3: Social simulation dialog learning objectives

The instructional methodologies employed in Alelo's social simulation approach are motivated by key principles of how people learn in general, and how they learn communicative skills in particular (Bransford et al., 2000). In the Alelo approach, learners are provided opportunities to practice communication skills in multiple social simulations. This results in variable practice (i.e., practicing a set of skills across a range of situations), which has been found to be beneficial across many skill domains (Ghosdian et al., 1997), and stimulus variability during training, which has been shown to increase skill retention and transfer (Gick & Holyoak, 1987).

Alelo's approach is also valuable as a way to address the ACTFL "5 Cs" or goal areas of foreign language standards. These goal areas include communication, culture, connections, comparisons, and communities (ACTFL, 2008).

2.1 Communication Alelo's social simulation approach places emphasis on communicative skills through increasingly complex interactions with virtual agents. With these agents, learners practice listening to native speech, speaking in short interactions, and eventually engaging in extended and unscripted multi-turned dialogs.

Understanding Chinese orthography is critical to the understanding of Chinese language and culture; therefore Alelo emphasizes reading and writing within the instruction. According to Tzeng et al., (1979) learners process single Chinese characters as they would images, in the right side of the brain. These "images" are then able to be dual coded through verbal and visual channels, resulting in likely increases in language acquisition and retention (Paivio, 1986). Alelo's design applies these cognitive learning principles to reading instruction pages (See Figure 4a). Learners are also provided instruction for producing a Chinese character using correct stroke order and have multiple opportunities to practice and receive feedback throughout the writing exercise (See Figure 4b).

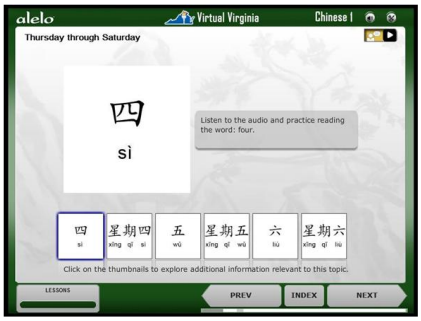

Figure 4a. Reading Chinese characters

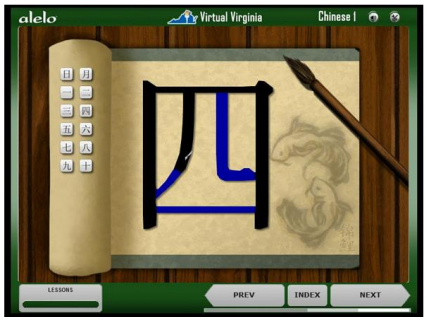

Figure 4b. Writing Chinese characters

2.2 Culture Alelo instructional design addresses culture through a Situated Culture Methodology (Johnson et al., 2012) that creates a holistic communicative approach that utilizes learning objectives to develop a tailored curriculum focused on intercultural competence. Within the Alelo Chinese course, instruction is presented on cultural KSAOs. Learners then have opportunities to use cultural knowledge within the classroom and social simulations. In the classroom, interactions are generally limited to teacher-learner and learner-learner, with a larger proportion of language practice being in the latter context. A benefit of practicing the application of cultural norms within the social simulation is the ability to interact with a varying "demographic" of others. A learner can practice different and appropriate ways to greet an old man, a peer, and a little girl, and receive immediate feedback within Alelo's social simulations.

2.3 Connections Connections to other disciplines can be created through a blend of Alelo's social simulations and teacher-led instruction. For example, a social simulation based in a Beijing market can teach students about how to make requests in Mandarin and cultural knowledge about the process of shopping in Beijing while making connections with teacher-led history and math.

2.4 Comparisons The ACTFL goal area of Comparisons emphasizes the importance of linguistic and cultural self-reflection. Language Instruction pages and culture note pages in Alelo software draw attention to similarities and differences between Mandarin and English languages and Chinese and American cultures.

2.5 Communities The ACTFL Community goal can be difficult to attain because speaking in a foreign language often sparks anxiety in novice learners (Horowitz et al., 1986). This can be particularly true in a tonal language such as Chinese. Alelo's approach allows learners to engage in increasingly complex interactions without fear of embarrassment or judgment, and can help increase learner self-efficacy and confidence to practice with native speakers outside the classroom.

3. Teacher Resources in Chinese Language Education

Alelo's courses apply innovative instructional technologies to provide a holistic Chinese language-learning experience. In an effort to supply effective resources to teachers of less commonly taught languages, Alelo has developed instructional materials based on the social simulation approach. These materials can be used as supplements in the classroom. Alelo's Chinese language products include teacher guides that link Alelo's curriculum to commonly used Chinese textbook curricula for easier incorporation of technology in the classroom. Future plans for Alelo products include the development of a complete computer-based course with the ability to be integrated with learning management systems and collaborative tools. These courses will provide teachers the ability to track learner progress and tailor curricula to individual learner needs. Furthermore, the full Alelo course will make it possible to "flip" the language classroom. In the "flipped" classroom, learners review instruction prior to class and come fully prepared with requisite knowledge and skills enabling teachers to use classroom time more productively.

Within the blended classroom, Alelo's scalable and modular social simulation-based courses can supplement live, teacher-guided instruction to provide learners opportunity to practice communicative competence with regard to the ACTFL 5Cs. Alelo's emphasis on input from native speakers and learner production of Chinese are critical components to developing language proficiency and useful cultural perspectives. The Alelo approach can be effectively used in the classroom or for self-paced learning to provide extended opportunities for realistic practice of Chinese language competence.

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