

Constructing a Virtual Tower of Babel: A Case Study in Cross-Cultural Collaboration Across Three Continents

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Abstract. The collaboration project described in this paper revolves around the construction of a virtual Tower of Babel in a 3D Collaborative Virtual Environment (3D CVE). It involved students across three cooperating institutions, on three different continents in different time zones. It addresses the increasing need for students to engage in international collaboration, as much of today's Information and Communication Technology work demands it. This requires cross-cultural understandings with one's co-collaborators, yet there are few opportunities for this to occur in a pedagogical setting. Therefore, this paper discusses a pedagogically-oriented case study of the use of a 3D CVE as a multi-cultural classroom, describing and discussing different phases in the cross-cultural collaborative process.

Keywords: 3D Collaborative Virtual Environments, multi-cultural classroom.

1 Introduction

The Tower of Babel parable relays a story of ancient times of confusion arising from the diversity of languages interfering with communicating a common goal (see Fig. 1). This paper describes a modern-day version of the construction of a virtual Tower of Babel in a 3D Collaborative Virtual Environment (3D CVE). The aim was to identify the challenges that arise in a 21st century globalized setting. In so doing, we were able to explore cross-cultural issues and pedagogical and collaborative aspects in a culturally diverse environment using different communication technologies.

The major motivation behind this project was the ongoing need for ICT professionals to work in diverse cultural environments. ICT professionals encounter cross-cultural issues in their daily collaborative practices within and external to their work environments [1].

The need for cross-cultural understandings in group work and learning is well documented [2, 3]. Remote collaboration addresses this need. A number of different remote collaboration systems have been used to date [4, 5, 6]. They range from simple email text and file transfer to chat and sophisticated video conferencing tools. The set of tools described here incorporates many of these existing technologies in



Fig. 1. A number of towers of Babel have been envisioned over the years. This is a 16th-century version by Brueghel (1563) based on the Colosseum in Rome (www.wga.hu, 2007).

combination with a 3D CVE, featuring synchronous and asynchronous information exchange. It is part of a system developed over a number of years of previous use of remote collaboration 3D CVEs by the authors [7]. The 3D CVE in this context was chosen because it capitalizes on a pre-existing common interest by students in the international multi-user 3D computer game culture, and the ability of a 3D CVE for supporting informal socialization [8, 9]. The collaborative learning in the multicultural team environments described here followed a process of acculturation to a new knowledge community [10, 11].

The rest of the paper is structured as follows. Section 2 presents the case study setting. Section 3 presents the results and illustrates the different phases of the cross-cultural process. Section 4 analyses and discusses the pedagogical and collaborative aspects of this experience while Section 5 concludes the paper and suggests directions for future work.

2 Case Study Setting

2.1 Stakeholders

The case study described in this paper was designed as a series of exercises in the third quarter of 2006 at the participating universities: the University of Queensland

(UQ), Australia, Norwegian University of Science and Technology (NTNU), Norway, and National Yunlin University of Science and Technology (NYUST), Taiwan. The corresponding curriculum backgrounds were different for each; the focus was on design and virtual cooperation in Australia and Taiwan, and on CSCW technologies in Norway.

In the Australian teams there were 9 groups of ~6 students (25M, 32F) with 13 international students (Chinese, Taiwanese, Vietnamese, Philippine, Fijian, Singapore, and American), comprising 1st year Multimedia Undergraduates. In the Norwegian teams there were 9 groups of 4 students (30M, 6F) with 13 international students (Spain, Netherlands, China, Vietnam, former Yugoslavia and other countries), comprising 4th year IT undergraduates. In the Taiwanese teams there were 9 groups of 1 student each (7M, 3F) all Taiwanese, comprising Master of Computational Design.

2.2 Tools

The suit of tools chosen for this project comprised three primary groupware applications: MSN and Yahoo messenger (video and chat), email and Active Worlds (AW), a 3D CVE, (www.activeworlds.com). The latter provided the 3D virtual building space, a standard library of building objects, a set of avatars with corresponding gestures and movement modes, and chat facilities (see Fig. 2).

2.3 Process

Each international group built a tower in the AW environment. The members of each group contributed to both the construction and the preparatory design negotiation process. Each national subgroup made contact with their partners in other countries to determine role distribution and to prepare their designs for the construction to follow. Students sketched their designs before trying to construct them in the AW application.

In the final performance, towers were constructed from scratch in a one hour time limit per group (3 groups constructed at the same time, hence total time for all groups was 3 hours). A number of practice constructions preceded the final construction. Towers constructed during the practice sessions were critiqued by group members and designs were continuously being modified until considered appropriate within the constraints given.

2.4 Method

Following the practical exercise, the Norwegian and Australian students delivered reflective essays where they elaborated on their collaborative experiences and discussed the appropriateness of the chosen tools for supporting cross-cultural collaboration. A qualitative study methodology has been used to analyse the results of their essays, chat logs and direct observation of the building process and the resulting constructions, and interactions.

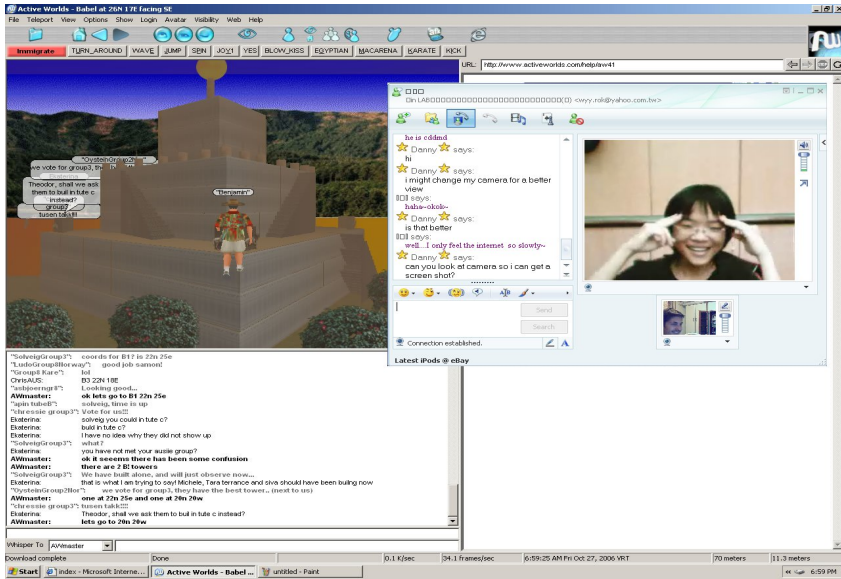


Fig. 2. Typical use of the suit of tools leading up to and during the final performance

3 Interpretation of Results

Two distinctive phases of inter-cultural collaboration emerged: preparatory (when the students got to know each other and worked towards a common design), and real-time building on the day of the performance. For both, it was important to establish a common understanding and communication.

3.1 Finding a Common Language

An outcome of being forced to communicate between participants of native English and ESL (English-as-a-second-language) caused many to reflect on how they thought their communications were being received. For example, according to the Australians, the Taiwanese students seemed reluctant at first to talk in English when they knew they had the option to speak to a native Chinese speaker in the Australian group. The Australians interpreted this as a rebuff for, what they called, their 'brazen colloquial English'. This self-reflection on cultural difference was an important outcome for them. For example, one student relayed how their own experience of using a second language helped them understand the other's ESL:

I can understand [their reluctance to talk to us] because when I talk in my second language (Japanese) to strangers I know it makes me nervous. I am afraid of being misinterpreted.

However, for the other native Chinese speakers in the Australian group, that they could use their native language was welcomed. This gave them new impetus and raised their status in the group. In turn, this led to the use of some first-language

'go-betweens' to translate and pass on information. Sorting out problems was then relayed or translated by a local member to the other local member in a many-to-one-to-one-to-many manner.

This many-to-one-to-one-to-many strategy took advantage of a local native speaker as the 'contact' person. As that member would translate for the rest of the group, this introduced a new role for foreign students at the local level. They got to know their peers better, and internal cross-cultural exchanges occurred also.

3.2 The Preparatory Phase

After the teachers/coordinators distributed tables showing group compositions and assigned building spots, the collaboration typically developed as follows. The groups started exchanging emails. In some cases, the contact was made by leaving messages and contact details in the proposed group building spots in AW. The different cultural approaches to communication were not always identified by the parties concerned in time to make the necessary adjustments for a more cooperative working environment. While the Australians reported that the Norwegians did not seem to respond to their emails in a timely manner, the Norwegians reported being confused by the sheer number of unsolicited emails sent by the Australians. The Australians seemed to be using a many-to-many approach hoping for a response whereas the Norwegians were more directed in their approach to communication. The communication with the Taiwanese students was in most cases opposite. As one of the Norwegian groups stated, "We had the feeling [of] having to draw the information from them". However, the number of Taiwanese students was much smaller than the number of participants in the other two national teams (only one Taiwanese student for each international grouping). Therefore, the communications among Taiwanese students tended to focus on understanding the issues across different groups rather than on the content of a single session.

Once groups had located their co-collaborators, they started to discuss the details of the tower design; working mainly on MSN/Yahoo messenger, mail and in some cases engaging a joint session in AW. All the Norwegian subgroups had a 'rehearsal' session in AW where they built 'trial' towers and prepared a set of 'building stones' on the assigned spots (Fig. 3). Following this, they sent screenshots of these to their partners in Australia and Taiwan. In addition, simple design sketches were exchanged between students.

The time difference between countries was clearly an issue. As one Norwegian group noted, "a lot of the e-mails we received from the Australians came the night before the final building. This was too late to come [up] with objections and [counter] proposals." This complicated the overall coordination. The same problem applied to the use of MSN, as the Norwegian groups were often "... too busy on the mornings when the Australians were online." This was often perceived by the Australians as the Norwegians "ignoring" requests to meet in AWs until the last moment. By contrast, the Taiwanese were almost always in AWs when both the Australians and the Norwegians logged on, suggesting a different, more engaged, culture with technology in general, and they were happy to negotiate roles and were less affected by the time difference.



Fig. 3. Building ‘trial’ towers during ‘rehearsal’ sessions

Collaboration was also complicated by ‘acts of vandalism’. Prior to the day of the final performance, an anonymous user with the nickname “admin”, deleted the building stones on some of the construction sites. This behaviour led to frustration among the builders (as the deleted items had to be replaced) and impacted negatively on the overall collaborative atmosphere. In the recorded chats, there were suggestions that this was done by one of the groups in order to complicate the work for their competitors.

3.3 Collaboration in the Final Presentation

The building process on the final day involved a number of challenges. At one stage, the server in Australia was overloaded preventing some participants from logging in for some time. In some cases, the international subgroups ‘lost’ each other: the Australians had problems with their computers, they had to go to a different lab, and then did not show up at the assigned building spot, so the Norwegian subgroup and a Taiwanese student worked alone. Attempts to locate the ‘lost’ Australians via MSN, mail or AW chat did not seem to help. In other cases, different subgroups started building in different places. It took some negotiation in the chat to locate the other partners and then to come to a consensus on where to build, which delayed the overall process. In another case, the result was that “we all decided to build two towers and put a teleport from one to the other”. In yet another, the Australians started building on a totally different location but in the end moved to the assigned spot where the Norwegians were building.

We saw significant variations in the organization of the collaborative process across the 9 groups. Some followed the original plan, while others used a more impromptu method. In some cases, the members had a clear understanding and division of tasks. For example, a part of a group might build the walls while others

worked on the interior. In another case, a group reported that at the start of building the Australians proposed a totally different design than the one sent to their partners in advance; it was finally agreed to follow the original plan as the simplest one. The conflict level during the construction process was in some cases high, on the verge of “sabotage”, such as when only a few members of a group built most of the tower. Another aspect concerned the deleting of each other’s objects (both from the lack of coordination and as a disapproval of a design) and ejecting group members. As one of the Norwegian groups noted:

...in the end, it was total confusion: whether the participants were trying to build or destroy the building... something that led to Norwegians getting one after another thrown out of the AWs... we wanted to build as high as possible while the Australians wanted to finish as quickly as possible.

Students adopted various construction solutions for their towers, incorporating different aspects of their intercultural collaborative processes and communication. Most of the towers followed a ‘modern’ design approach (Fig. 4) while there were also examples of towers in a more ‘authentic’ style (Fig. 5). Nearly all towers were built vertically, to reflect the “reaching heaven” idea of the parable, sometimes representing the idea of the tower symbolically, such as with a set of ‘endless’ stairs. Some of the towers reflected the cross-cultural aspects of the exercise. For example, in one case a greeting from the Australian team “G’day from Australia” was displayed together with a Norwegian sign on the top saying: “We cannot continue as we speak different languages”. In two additional cases, the cross-cultural collaboration was symbolized with national flags on the constructions: Australian, Taiwanese, Norwegian and Spanish, the latter from an exchange student in the Norwegian team (Fig. 4). At the end of the final performance, students examined peer towers, discussing the designs and voting for the best one.

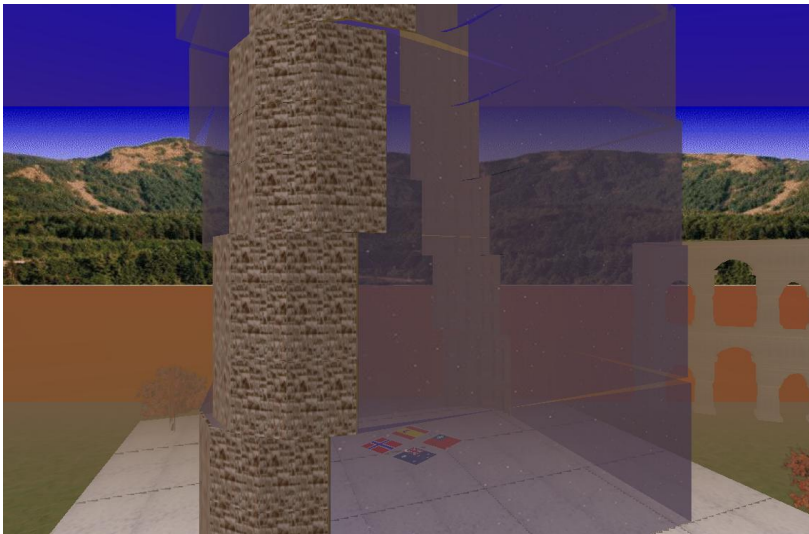


Fig. 4. A Babel tower in modern design with national flags on the floor

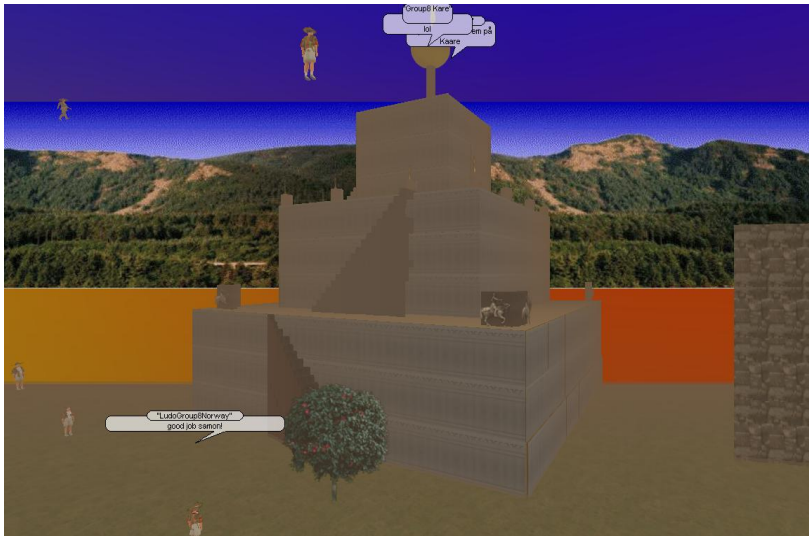


Fig. 5. A Babel tower in an ‘authentic’ ancient style

4 Discussion

4.1 Lost in Translation

According to many participants, philosophical issues were harder to discuss via text alone. They claimed this was easier with the aid of the 3D CVE and sketches. While the structure of a design might have been understood textually, understanding the theory behind how a tower actually works remained problematic – explaining concepts such as lifestyle within the tower design and its underlying political system remained difficult. As one of the Australian students noted, ‘explaining concepts of life with decisions integrated with punishment and the eventual destination of heaven was basically a nightmare to explain’. This was despite communicating numerous analogies to try to elucidate the concept. A solution to this particular problem was not found. This was due to both the differences in language and technical difficulties. Chatting in English to ESL participants clearly required many repeats and clarifications leading to misinterpretations.

Some of the misinterpretations could be resolved simply, however. For example, when an Australian student asked his Taiwanese partner “Is this idea going to work out?”, it was totally misunderstood: “What do you mean idea is going to work out? Idea goes to the gym”? In this instance, the Australian-Taiwanese communication was mediated by an online text translator. When this did not work they used more simple English expression. When this did not work they went directly to demonstrating their ideas by modelling in the AWs environment – this seemed to work best. In this manner the Australian participants could ‘show’ rather than ‘describe’ what they had in mind to their Taiwanese counterpart.

However, not all misunderstandings could be resolved in this way. For example, as one of the Australian students noted, “the English niceties we take for granted in

everyday conversation aren't easily learned in textbooks". Such issues needed to be addressed on a deeper level, establishing a common set of rules and understandings between the collaborative partners.

A common language emerged across all cultural groups. This was due perhaps to an interest in common to all – computer programming. There was a common perception that the main issues to be resolved revolved around technical problems where 'basic English' was insufficient to communicate the necessary information to find a speedy solution. The need to "explain, re-explain, clarify, and re-clarify began to feel pointless when hours of communication just did not seem to be achieving much". Coding, on the other hand, was reported as easy to understand by all, as it followed a common syntactical structure. In other words, even though all groups had at least the basics of a common language (English), the meaning of many sentences was often lost in translation.

4.2 Establishing Trust and Cooperation Pattern

Differences in culture were highlighted by the teamwork processes adopted. Participants commented that they learnt a lot about the different ways of working within a team both from external and internal influences. The key influential traits they were able to identify included trust, diligence, and reliability. All groups identified differences in cultures by their perceived traits. For example, the Norwegians perceived the Taiwanese students as being rather passive during the discussions while the Australians, on the contrary, were "too determined" and "taking the lead". For instance, the fact that some Australian groups "went on their own and started building the tower" on the final day was attributed to cultural differences as, according to one of the Norwegian students, "no-one from the Norwegian team did or tried to do a similar thing."

The students were surprisingly consistent in their assessment of the other culture's work-ethic traits. Whether this was because it had been discussed within the same-culture groups and thus adopted by all in the group is not clear. Also, most same-culture groups agreed on their remote partners' assessment of their own work-ethic traits. Except for the Norwegians who did not see themselves as blunt, headstrong, arrogant, incommunicative, and bossy, as they were perceived by the Australians.

Developing trust between members of a team and across teams was an important element of cooperation. After students from the different countries identified the particular traits in their remote counterparts' behaviour they seemed to take this into account in their communication strategies. For example, the Australians concluded that working with the Taiwanese was preferable because they seemed to have more in common (some students continued friendships struck up during the online exercise). Both the Australians and Norwegians reported that to develop feelings of trust with the Taiwanese they needed to talk about more personal things before getting to the business at hand. The Australians obliged by spending time discussing personal issues. Establishing an atmosphere of cooperation was not so straightforward with the Norwegians.

The final voting for the best towers created by the students showed a clear correlation between the quality of the final product and the effectiveness of the collaborative process in the corresponding group. The design of the best towers was

typically characterized as thought-through and well-planned. Such towers were typically finished in time, and the collaborative process went smoothly, without major conflicts. However, in some cases the collaboration was ‘sacrificed’ in order to save time and achieve best possible marks for the design. Instead of trying to resolve the design-related disagreements by joint discussions and negotiations, in some of the teams the national subgroups just went on realizing their own plans, ignoring and even ‘ejecting’ their partners from the environment. This shows that communication with the chosen set of tools was, in certain cases, problematic and required more effort from the collaborators.

4.3 Supporting Cross-Cultural Collaboration with 3D CVEs

As follows from the discussion above, 3D CVEs proved to be capable of supporting cross-cultural collaboration, in both a synchronous and an asynchronous manner. The tool allowed a quick acquaintance between the participants and facilitated a creative construction process. However, as our experience shows, it also has some weaknesses. Student feedback provided some indication on how these could be overcome to improve the support for cross-cultural understanding. For example, in addition to the general improvement of the communication facilities (more user-friendly, possibilities for targeted group discussions), the students focused specifically on the personalization of avatars to convey the national traits and values and to create awareness of cultural diversity. However, this should be balanced against the need for anonymity and ‘uniformity’ in some cases.

5 Conclusions

In this study, we explored the challenges related to supporting cross-cultural collaborative learning with modern technology. As in the parable, the contemporary construction of a tower of Babel was characterized by chaotic conditions and misunderstandings. The study identified a number of communication problems. Some of these problems were, at least partly, resolved by the tools used, while in other cases they were aggravated by the same technology. This study confirms in part the value of the 3D CVE as a platform for cross-cultural encounters across significant geographical distances. The tool allowed a quick and informal ‘acquaintance’ between groups of students from different cultural backgrounds. One of the groups expressed a thought that in a very precise way summarizes the role of technology in this context implying that in the virtual environment, “everybody participated in a common space where the culture for all the actors was new”. In this way, “one wipes away the cultural differences through anonymisation and the fact that all the actors were involved in a kind of ‘new culture’”.

This experience had significant pedagogical value for the students involved. It showed how intercultural collaboration works in reality, but also how it does not work, and how modern technology could be used to support it or not. Even the misunderstandings occurred can serve as a valuable lesson as they prepare students for their future real-life intercultural encounters.

In future work, our task will be to analyse the identified problems, focusing on how the intercultural collaboration and learning process could be better supported with the existing technology, and this form of pedagogical approach to cross-cultural collaboration.

References

1. De Blij, H.J., Muller, P.O.: *Human Geography: Culture, Society, and Space*, 3rd edn. John Wiley and Sons, New York (1986)
2. Powell, G.C.: On Being a Culturally Sensitive Instructional Designer and Educator. *Educational Technology* 37(2), 6–14 (1997)
3. Roblyer, M.D., Dozier-Henry, O., Brunette, A.P.: Technology and Multicultural Education: The Uneasy Alliance. *Educational Technology* 36(3), 5–12 (1996)
4. Gutwin, C., Greenberg, S., Roseman, M.: Workspace Awareness in Real-Time Distributed Groupware: Framework, Widgets and Evaluation. In: *HCI 1996: People and Computers XI*, pp. 281–298. Springer, London (1996)
5. Ishida, T.: Towards Communityware. In: Ishida, T. (ed.) *New Generation Computing*, vol. 16, pp. 5–22. OHMSHA LTD and Springer, Heidelberg (1998)
6. Maher, M.L.: Designing the Virtual Campus as a Virtual World. In: *CSCL 1999, Palo Alto, USA 1999*, pp. 376–382. Lawrence Erlbaum, Mahwah (1999)
7. Wyeld, T.G., Prasolova-Førland, E., Chang, T.-W.: The 3D CVE as a Cross-Cultural Classroom. In: *2nd International GameSetandMatch Conference 2006, Delft, The Netherlands*, pp. 568–573 (2006)
8. Prasolova-Førland, E., Divitini, M.: Collaborative Virtual Environments for Supporting Learning Communities: An Experience of Use. In: *GROUP 2003, Sanibel Island*, pp. 58–67. ACM Press, USA (2003)
9. Börner, K.: Adaptation and Evaluation of 3-Dimensional Collaborative Information Visualizations. In: Bauer, M., Gmytrasiewicz, P.J., Vassileva, J. (eds.) *UM 2001. LNCS (LNAI)*, vol. 2109, pp. 33–40. Springer, Heidelberg (2001)
10. Kolb, D.A.: *Experimental Learning*. Prentice – Hall, Englewood cliffs, NJ (1984)
11. Jarvenpaa, S., Leidner, D.: Communication and Trust in Global Virtual Teams. *Journal of Computer Mediated Communication* 3 (1998)