DEALING WITH CULTURAL DIFFERENCES IN A 3D VIRTUAL CLASSROOM: A CASE STUDY OF COLLABORATIVELY CONSTRUCTING A VIRTUAL TOWER OF BABEL

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ABSTRACT
The collaboration project described in this paper involved students across three cooperating institutions, on three different continents in different time zones, building a virtual Tower of Babel in a 3D Collaborative Virtual Environment (3D CVE). Much Information and Communication Technology work today involves international collaboration. This requires cross-cultural understandings with one’s co-collaborators, but there are few opportunities for this to occur in a pedagogical setting. Therefore, this paper outlines a pedagogically-oriented case study of the use of a 3D CVE as a multi-cultural collaborative classroom.

KEY WORDS
3D Collaborative Virtual Environments, multi-cultural classroom, collaborative learning.

1. Introduction
The case study reported in this paper is an inter-cultural collaboration project involving multimedia design and computer science university students in Australia, Norway and Taiwan working together to construct a virtual Tower of Babel. The original Babel parable relays a story of ancient times of confusion arising from the diversity of languages interfering with communicating a common goal. The aim of our virtual Babel project was to identify the challenges that arise in a multicultural ‘classroom’, uniting 3 continents. We wanted to explore cross-cultural issues and pedagogical and collaborative aspects in a culturally diverse environment using different communication technologies such as email, Instant Messaging, videoconferencing, and 3D Collaborative Virtual Environments (CVE). One of the questions we sought to answer was how contemporary technology can or cannot support intercultural learning and collaboration, thus giving new meaning to the Babel parable.

The major motivation behind this project was the ongoing need for ICT professionals to work in diverse cultural environments. When members of different cultural backgrounds come together to collaborate on a single project they become acculturated to different ways of seeing themselves in relation to others and are able to observe how others behave in the same situations. They come to appreciate different approaches to similar tasks and adjust their own behaviour to accommodate these differences [1]. ICT professionals encounter cross-cultural issues in their daily collaborative practices within and external to their work environments.

This project highlights how students can be exposed to many of the same cross-cultural issues raised, before becoming professionals. The need for cross-cultural understandings in group work and learning is well documented, e.g. [2, 3]. Remote collaboration addresses this need. A number of different remote collaboration systems have been used to date e.g. [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 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 for a number of reasons. Such technology was previously successfully used in collaborative design situations, e.g. [6]. It also capitalized on a pre-existing common interest by students in the international multi-user 3D computer game culture. Finally, the ability of a 3D CVE for supporting informal socialization is acknowledged by existing research [8, 9].

While building the virtual Babel Tower in this case study, the students learnt by experimenting with their own understandings of the technology used. Learning was a process in which knowledge was created through their transformative experiences with the technology and the ways it did or did not support cross-cultural exchanges [10]. The collaborative learning in the multicultural team environments described here followed a process of acculturation to a new knowledge community [11].

The rest of the paper is structured is follows. The next section describes the settings of the case study. Section 3 presents the results, describing the different aspects of the collaborative process. Section 4 discusses the experiences, focusing on how the collaborative process was affected by
the cultural differences and other aspects such as technological tools. Section 5 concludes the paper, suggesting directions for future work.

2. Case Study Setting

The case study described in this paper was designed as a series of exercises in the third quarter of 2006 at the participating universities, Queensland University, Australia, Norwegian University of Science and Technology (NTNU), and National Yunlin University of Science and Technology (NYUST), Taiwan. The corresponding curriculum backgrounds were different for each. The focus was on design with virtual cooperation in Australia and Taiwan and on CSCW technologies in Norway. Student tasks differed also, mostly the theoretical assignment, while the major practical tasks were common to all three. The final grading of the exercise was based on the level of participation in the international collaborative process, the quality of the reflective essays delivered after the practical part, and the quality of the final 3D constructions. Totally 9 international groups participated.

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.

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 provides the 3D virtual building space, a standard library of building objects, a set of avatars with corresponding gestures and movement modes, and chat facilities.

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.

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. The results below are therefore based on the following data sources: student essays, chat logs and direct observation of the building process and the resulting constructions.

3. Results

The inter-cultural collaboration that occurred can be considered as two distinctive phases: 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 these phases, it was important to establish a common understanding and communication as discussed below.

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:

*When I encountered... [a Taiwanese student] in the Active Worlds server, he seemed hesitant to talk to me and when he did type something, it was along the lines of ‘I have talked to... [the other Chinese-speaking student in your group].’ This made us think that he did not want to communicate with us, we thought maybe our English was too brazen for him to understand. I can understand this 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 often relayed or translated by a local member to the other local member, rather than all-to-all. For the majority of group members who did not share their remote partners’ first language, this strategy was useful for overcoming the irritation of having to explain things many times over. It was also recognised that “this strategy would be helpful for developing their skills in interacting with people from overseas in the future,” as the industry increasingly dictates this type of collaboration.

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 also occurred. However, when the native Chinese speakers did not share the information this caused problems and some resentments:

although... [we] managed early contact with our Taiwanese contact, as they shared a common language of Chinese [with another member of our group.]... this meant that... [they] felt more comfortable speaking in their native tongue, thus preferred to communicate with four local native speaker only).

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. 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, sometimes not belonging to their own group, often of “unserious” and “spam-like” character, which made it difficult to sort out the important information. The Norwegians claim they “would never send emails like that but would send some more formal emails” just to the people who they would be going to cooperate with. This may account for why the Australians said they rarely received responses to their emails. 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 totally opposite. As one of the Norwegian groups states, “We had the feeling 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. Therefore, the communications among Taiwanese students focused on understanding the issues across different groups rather than on the content of a single session. These problems are repeatedly opposed to the smooth process within the national group: “Within the Norwegian group we stimulated each other to get a look in the 3D world and we helped each other out of small problems we came across”.

The groups continued to locate their collaboration partners and discuss the details of the tower design, working mainly on MSN/Yahoo messenger, mail and in some cases having a joint session in AW. Screenshots of the building stones and ‘trial towers’ prepared by the Norwegian groups and design sketches were exchanged. For example, in one case during the Norwegian practice session in AW a student “made a funny sketch with lots of TVs as walls” and a “swimming pool on the top”. The group sent the screenshot to their partners, which was accepted well, though “with windows instead TVs”. The result can be seen on Fig. 1. In one of the groups, a blog was used to discuss the design.

The time difference between countries was also 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 is too late to come with objections and 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… time difference was rather clear, especially when Aus. decided to meet 9.00 after having sent the request mail at 6.50 the same day…” This was often perceived by the Australians as the Norwegians “ignoring” requests to meet in AW until the last moment. The Australians’ impression of the Norwegians was also that they “disregarded work others had been doing and tried to take over”. This may be accounted for within the Norwegians self-image as older thus more senior to the others, hence they may have felt they did not need to follow the Australians’ instructions. This was not well received by the Australians. The Taiwanese, by contrast, were almost always in AW when the Australians checked, suggesting a different, more engaged, culture with technology in general, and were happy to negotiate roles and less affected by the time difference.

The collaboration was also complicated by ‘acts of vandalism’. Prior to the day of the final performance, an anonymous user with the nick “admin”, deleted the building stones on some of the construction sites. The origin of this person is still unknown, but his/her behaviour led to frustration among the builders (as the deleted items had to be replaced) and impacted negatively on the collaboration 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.

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 bring any success. In other cases, different subgroups started building in different places. It took some negotiation in the chat to locate the other partners and then 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. In some cases,
the members had a clear understanding and division of tasks, for example a part of a group built the walls while others worked on the interior. In a different case, a group reported that at the start of building the Australians proposed a totally different design than the one sent to them 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 out. As one of the groups (Norwegian) noted,

...in the end, it was a 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 AW... we wanted to build as high as possible while the Australians wanted to finish as quick 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. For example, in Fig. 1 the students are discussing whether they should put a swimming pool on the top of their Babel tower. The tower in Fig. 2 displays a more ‘authentic’, ‘ancient’ design and is therefore more in accordance with the spirit of the original legend. Practically all the towers were built vertically, to reflect the ‘reaching heaven’ idea of the parable. Some of the towers clearly reflected the cross-cultural aspects of the process. 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 yet another case, the cross-cultural collaboration was symbolized with four national flags on the tower floor: Australian, Taiwanese, Norwegian and Spanish, the latter from an exchange student in the Norwegian team.

4. Discussion

This section summarizes the experiences and discusses the challenges associated with a cross-cultural collaborative educational process and the construction of a virtual Tower of Babel.

‘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. 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. For example, as the remote partners’ interpretation of English was different to ours this made for some interesting conversations. Such as, comments made by us which would not be given a second thought by another person from our culture prompted them to ask us what we meant by those statements and sometimes even caused some offence to them. I found working with the Norwegians that they were very “blunt” in a sense and did not use the niceties that the Taiwanese people used but I believed this was not the intention of the Norwegians I believe their understanding of the English language played a role in how they spoke to us and their cultural background simply allowed them to get straight to the point.

As a solution to misunderstandings, in one instance, 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.

A common language emerged across all cultures. This was perhaps due 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. From a programming point of view, if the remote partners were given the correct ‘syntax’ in English, then they had no problems understanding the meaning of words. However, when it came to explaining concepts and ideas, even if it was written in a way they should have been able to understand, they still had trouble understanding whole sentences. But, once we started using a kind of programming syntax we began to understand each other.

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.

Establishing trust and cooperation patterns. 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 the 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, but not all same-culture groups agreed on their remote partners’ assessment of their own work-ethic traits. For example, the Norwegians 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 took 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. In this way, for the Australians, the Taiwanese were better at eliciting personal responses than the Norwegians. This aided the perception that they were easier to get along with. For the Norwegians, communicating with the Taiwanese people this was opposite to that of the Australians. Their carefully targeted emails did not elicit the response they desired. The Norwegians did not report spending as much time discussing personal issues with the Taiwanese as the Australians did. This may have contributed to a lessened sense of the trust between the Norwegians and the Taiwanese than the Australians had reported.

Challenges not directly related to culture. It is interesting to note that only 5 of 9 Norwegian groups acknowledged the influence of the inter-cultural differences on the collaboration process. It shows that encountered problems can also be attributed to the conditions not directly related to cultural difference. These include:

- Technological limitations. In addition to the server difficulties on the final day, the students focused on the barriers that the communicational media imposed compared to e.g. the verbal communication between different Norwegian groups sharing a computer lab. A recurring complaint was the difficulties with distinguishing between ‘own’ and other groups in the AW chat. As one of the students puts it, “…one never knew if one had the full attention of another person, something we could do via msn or mail….the solution was that one of the group members was responsible for chatting in Babel, while others built.”

- Coordination and management issues. Practically all the groups expressed criticism towards the management of the exercise, as one of the groups noted: “…..both the Australian group leader and the Taiwanese seemed both a bit confused as to what was their job, and what was supposed to happen and how we Norwegians [were] to fit into this”. The students implied that the teachers should have played a much more active role in negotiating the tasks and group distribution. This can be seen as the opposite to the original intention of the exercise where the students were expected to overcome the communication challenges and agree on the processes on their own.

- Age difference was mentioned by at least 2 Norwegian groups as an important factor. This supposedly explained the “unserious attitude” and “joking around” from some participants as perceived by the Norwegian students of the Australians: “…the greatest differences were in the age difference, not the cultural differences… They [Australians] looked like they were there mostly for playing, while we needed to have an exercise done”.

- Establishing trust and cooperation patterns. 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 the cultural differences as, according to one of the Norwegian students, “no-one from the Norwegian team did or tried to do a similar thing.”

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Course-related expectations also played an important role. For example, the final result (i.e. the tower construction) counted for the final grade for Australians, leading to the students in at least one of the Norwegian groups experiencing being “thrown out as Australians interpreted the situation that we destroyed their grade”. This, however, can also be indirectly related to the cultural diversity as it indicated differences in the corresponding national education systems.

5. Conclusion

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 Babel tower was characterized by chaotic conditions and misunderstandings. The study identified a number of communication problems, both culturally related and not. Some of these problems were, at least partly, resolved by the tools used, while in some cases they were actually aggravated by the same technology. This study confirms 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 people 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 is 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’.

We believe that this experience has significant pedagogical value. It showed how the 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 can 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 pedagogical approach. The organizational and social issues need to be taken into consideration. For example, a more active involvement of teacher/coordinator might be required in some cases. Also, there is a need to identify the modes of interaction and the educational tasks and situations that are best suited for such collaborative activities. This includes longer ‘get-to-know’ periods and regular joint activities over a more protracted period of time.

References