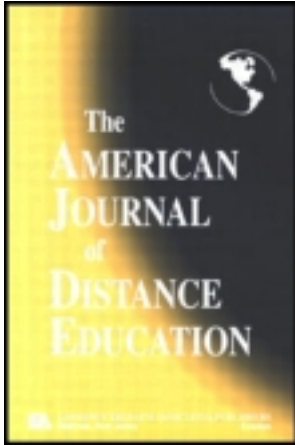


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Globally Networked Collaborative Learning in Industrial Design

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Globally Networked Collaborative Learning in Industrial Design

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Abstract: This article explores project-based cross-cultural and cross-institutional learning. Using Web 2.0 technologies, this project involved more than 240 students and eighteen academic staff from seven international universities.

The focus of this article relates to a project-based learning activity named *The Gift*. At each institution the students formed small local project teams that were paired with teams of students from one of the other collaborating universities. The findings suggest that the majority of students perceived this activity facilitated their learning, especially in the development of virtual teamwork and communication skills. The article discusses findings related to peer learning in relation to information and communication technologies and cross-cultural communication. It concludes by evaluating the validity of underlying assumptions.

The Gift was conducted in collaboration with seven internationally based higher education institutes in Japan, Australia, Korea, China, Taiwan, England, and Canada. The project was supported by a Korean multinational industry partner and run through the Global Studio (<http://theglobalstudio.eu>). Communication with international collaborators was conducted through Web 2.0 technologies. This article focuses on findings related to peer learning between students based in England and Asia in relation to information and communication technologies (ICT) and cross-cultural communication.

PEER LEARNING

The teaching and learning between the collaborating institutions was delivered using a blended learning approach (Brandt et al. 2011; Schön 1985b). The

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online learning was delivered via Web 2.0 technologies and the face-to-face delivery was conducted through a studio-based learning environment.

The organization of this project necessitated a co-dependency between collaborating students and a student-centered approach through peer tutoring. Topping (1996, cited in De Wever et al. 2010) defines peer tutoring as tutoring facilitated by individuals who are not professional teachers. The concept of peer tutoring has its origins in face-to-face environments (De Wever et al. 2010); however, De Wever et al. (2010) argues peer tutoring also takes place in an online setting as it has been shown to improve “knowledge construction” (355). Indeed, Wong et al. (2003) propose that students “interacting with a more knowledgeable peer can learn to become as knowledgeable as the peer” (417). Specifically pertinent to the project described in this article, cross-institutional learning through ICT has also been suggested to show increased levels of peer learning among students (OECD-CERI, 2005, cited in Laurillard 2007).

Concepts of Learning

It is interesting to note that students from different cultures have different concepts of what constitutes learning. For example, Dahlin and Watkins (2000) suggest that as opposed to their Chinese counterparts, Western students perceive understanding to be more a function of natural ability than of effort on the part of the learner. Cultural differences between East and West have been argued to have influenced the behavior of Chinese students and native students in other parts of East Asia and as a contributing factor in explaining the tendency for some Asian students to be viewed by some Western teachers as being more passive in classroom environments than Western individuals (Cortazzi and Jin 1996; Turner and Hiraga 1996). However, Cheng (2000) suggests that the “influence of cultural attributes have been exaggerated as the hidden causes of perceived reticence and passivity” (445). Instead, he suggested that one reason to explain why Far East Asian students are perceived to be less active in classroom discussion with Western students is their tendency to be less familiar with the Westerners’ native languages (Cheng 2000). Cheng’s notion is of particular interest to this article as English was the *lingua franca* in this collaborative project.

Foreign Talk

In order to bridge the language divide, participating students had to utilize communication strategies. One such method adopted implied the use of what Ferguson (1975) terms Foreign Talk. Foreign Talk is employed when practiced speakers of a particular language attempt communication with individuals for

whom this language is not the mother tongue. Foreign Talk can necessitate the incorporation of strategies that, in the eyes of what we term the native speaker, facilitate communication with a non-native speaker. The use of “foreigner talk represents an attempt to improve communicative efficiency by mimicking the speech of the foreigner” (Snow, van Eeden, and Muysken 1981, 90). The Workgroup on Foreign Workers’ Language (1978, quoted in Snow, van Eeden, and Muysken 1981, 81) claims that such strategies include the incorporation of “lexical analysis” and “grammatical simplifications.” The level to which a native speaker feels he needs to adjust his speech in order to address a non-native speaker varies, but it has been suggested that in extreme examples, the use of Foreign Talk results in the native speaker producing “ungrammatical sentences” (Snow, van Eeden, and Muysken 1981, 81). Longer conversations with non-native speakers necessitate more use of Foreign Talk by native speakers (Snow, van Eeden, and Muysken 1981); as well as this, foreigners who tend to make more mistakes with regard to their non-native language receive more Foreign Talk in conversation with native speakers (Snow, van Eeden, and Muysken 1981).

Assumptions

A number of assumptions were made in the initiation of this project. First, we assumed that all participating students would be digital natives (e.g., Bennett, Maton, and Kerwin 2008; Brabazon 2009; Prenksy 2001).

Second, we assumed that, as students from each institution were not familiar with students from collaborating universities, they would not share any personal history, and therefore there would be a sense of “equal status” among these students. Third, as the project was not run at any one geographic location, and all students had equal access to all teacher-generated and student-generated information as well as online project sites, there would be a sense of neutrality about the project.

These assumptions are further addressed later in this article.

Digital Communication Relevant to Designers

The International Council of Societies of Industrial Design (2003, cited in Yang, You, and Chen 2005, 158) has recommended that a higher education industrial design program include education in “specific industrial design skills and knowledge.” It can be argued that this notion is context driven, for as times change, the skills necessary to meet the demands of contemporary employers change too. It has been argued that contemporary design higher education degrees are still too focused on developing students’ traditional design skills such as sketching and model making (Norman 2010) and

that more contemporary skills such as learning in an online environment have not been formally introduced to students as much as they should (Yang, You, and Chen 2005). The international nature of this project necessitated communication using a variety of ICTs. Therefore, since the ICTs are an integral part of the learning environment, this project aimed to formally include contemporary elements in the form of ICTs in the undergraduate design program's diet.

THE GLOBAL STUDIO

The Global Studio is a response within higher education to shifting trends in design practice regarding the emergence of globally networked organizations and the consequent shift in ways of working (e.g., Asokan and Payne 2008; Hoppe 2005; Horváth, Duhovnik, and Xirouchakis 2003). The Global Studio is a cross-institutional collaboration conducted between a university based in England, industry partners, and international universities. Its purpose is to equip students with an appreciation of cross-cultural and distance communication.

The Global Studio follows in the tradition of the Design Studio with its emphasis on project-based learning and learning in and through doing (Schön 1985a). The emphasis on project-based learning in the Global Studio is underpinned by the assumption that this pedagogical technique contributes to embedding established design practices into the student's own repertoire (Bohemia and Harman 2010). An area of innovation developed in the Global Studio involves linking student teams across the globe in order to undertake product/service development projects. The idea is to enable students to gain experience in working with peers in distributed international group settings. This presents "home students with [an opportunity to develop] a portfolio of globally relevant skills and knowledge without them leaving their home country" (Harrison and Peacock 2010, 878).

In the Global Studio, all students are given access to an online site, which provides a common interface and space for staff, students, and industry partners to collaborate on assignments. The use of such technology has led to the production of learner-authored content, thus facilitating a student-centered learning and teaching approach (Bohemia, Harman, and McDowell 2009). The shared online project sites also provide students with an opportunity to learn from and with peers from their own and participating universities and manage their own time frames in order to simulate a real-world design studio scenario. A central premise of the Global Studio is that, throughout the project, collaborating students are co-dependent on one another's inputs. This introduces a sense of risk to the Global Studio project. Earwaker (1992) suggests that for growth to occur among students, risk should be inherent to the experience of higher education.

INTRODUCTION TO *THE GIFT* PROJECT

The idea for the theme employed in this Global Studio project was inspired by anthropologist Marcel Mauss's (1950) classic book, *The Gift*. Mauss theorized that giving, receiving, and reciprocation are social activities fundamental to human interaction. These interactions, which are part of cultural practices, "carry meaning and value for us, which need to be meaningfully interpreted by others, or which depend on meaning for their effective operation" (Hall 1997, 3).

Project Scenario

The following project scenario was developed to provide a context for the project:

As a student, you will be visiting an international university as part of a student exchange program for three months. You will be staying with a host family. What gift would be appropriate for you to bring that represents your university/school?

Project Organization

The project required small teams of students from each institution to collaborate with their designated small team from another participating university in order to complete given tasks. Of specific relevance to this article, the theme of gift-giving described earlier was used. Altogether, this international collaborative project involved close to 240 students (allocated into eighty teams; see Table 1), eighteen academic staff, and 6 postgraduate students from seven international universities.

The English university provided each set of students with a specific project site powered by WordPress. There were no restrictions on access to any of these sites for students throughout the duration of the project. In addition to the paired teams' project sites, a Master Project Site constructed through WordPress was used to disseminate information to everyone. For example, the Master Project Site included information relevant to the overall schedule, project scenario, updates on what was required during the project phases, and so on. Although this Master Project Site was intended only for lecturers to disseminate information, some students used it to post information in a hope that other students would read it. Posting students, for example, included teams who were looking for errant collaborators located at another institution.

Table 1. Number of Returned Questionnaires From Each Institution

	Australia	England	Taiwan	Japan	Canada	China	Korea	Total
Number of groups	8	21	17	8	8	10	8	80
Number of students	14	57	62	21	16	30	33	234
Returned number of surveys, mid-project	12/86%	44/77%	44/71%	0/0%	11/75%	12/40%	19/67%	142/61%
Returned number of surveys, exit	9/65%	54/96%	46/74%	20/95%	9/56%	12/40%	0/0%	150/64%

METHOD

Data from students were collected at the midpoint ($n = 142$, 61%) and at the end of the project ($n = 150$, 64%; see Table 1). The surveys consisted of questions, most of which included Likert-scaled items, on perceptions about the activities at various stages of the project, including tasks such as writing the design brief, virtual communication, designer–client interactions, and cultural awareness. Students were prompted to qualify each of their answers by adding text. The questionnaire also included open-ended questions.

Data analysis indicates that students from different locations articulated different concerns associated with the cross-institutional peer learning facilitated by the ICTs. One of the key factors is whether or not English was the student’s native language.

RESULTS AND DISCUSSION

Most students (70 percent) indicated that working with peers from another university was a useful experience, and some commented that they were inspired by other students or by seeing how differently they approach their work:

Learning the ways they worked in comparison to ourselves was very interesting. . . . Proved that communication is vital and without it the project would just come to a stop. (e4m)

And even though the project proved to be challenging, students recognized that learning gained from it was beneficial:

Although I have found it very difficult and the project hasn’t gone as well as initially hoped, we learned a lot from it for the next time we collaborate with foreign students. (e5m)

Even though it has not gone that well, talking to students from other countries was the best part of this project. (e3m)

For all students, this was the first time an international collaboration had featured in their time in higher education, and many said it was beneficial:

It’s the first time I’ve done a project with foreign people and it has shown me how to communicate with them better. (m32)

Students acknowledged the challenges associated with this type of work environment:

First time doing a multinational project so it has given me some understanding how difficult it may be in getting people to work. (e6m)

The lack of interaction between the groups and “not working hard enough” were the key two reasons raised by students who felt that working with peers from another university was not useful. Only one student indicated that the poor level of outcomes provided by counterparts contributed to negative feelings:

I think talking with people from other country it’s a nice experience, but I don’t think that I learn much from this project because of the less interaction in our group. (t6m)

Across the board, student feedback from the midpoint of the project indicated that 58 percent of students felt that working with peers at another location had improved their communication skills. However, at the end of the project, this figure had risen to 76 percent. Interestingly, for the English-speaking natives, between the midpoint and end point questionnaires, this project had had a greater effect on levels of usefulness in improving their communication skill. For example, mid-progress data indicate that only 36 percent of Canadian students felt their skills had improved, but this rose to 78 percent at the end of the project. These differences could be attributed to differences in levels of anxiety. Harrison and Peacock (2010) report that initial contact between English and international students cause both to experience anxiety but that this anxiety is reduced over time. In light of this, we suggest that it is important to provide sufficient time for students to practice cross-cultural communication across distance in order for them to overcome anxiety.

Feedback from many students (79 percent) indicated that using the WordPress collaboration site was useful:

I’ve learnt Wordpress and it’s interesting because personally I would like to make a personal blog by Wordpress. (e2m)

By having the collab site you were able to see everyone else’s work which was a great help. It gave you a boost if you were ahead of other people and a kick if you could see that you were behind. (eL)

Some students reported that this Web site had been a hindrance to their learning, and many indicated this was due to the interface of the site:

... accessing to this site was confusing. For example, we had hard time to find the way to upload our picture and some video references. We need more specific instruction about it. (k3m)

The interface of this website was too complicated and confusing. Now I kind of get how it works—at the end of the project. (k13m)

Beyond the interface, students from countries that did not use the Latin alphabet experienced additional problems. The server software could not compute files that included in their file names characters other than the standard Latin alphabet and/or numerals. This meant that although students were able to upload non-Latin files on the server, these files (which included items such as images and photos) were inaccessible on their WordPress project sites. This issue was discovered only well into the project, and unfortunately IT staff at the UK university where these project sites were hosted were unable to find a solution to the problem. The IT support staff commented on the frustrating nature of this issue:

... due to the language encoding set used on the server it was not possible for the data base to recognize and successfully encode Chinese, Korean, and Japanese characters. In addition, WordPress is, by default, configured to use UTF-8 which, in its default install, cannot work out those character sets.

In order for these files to be made accessible to other students and staff, the IT staff had to download the files, manually rename them using Latin characters, and then upload them again on the project sites. Although students did not express this in their surveys, we suspect that this situation might have contributed significantly to increased anxiety. This was evidenced by students attempting repeatedly to upload affected files and not succeeding due to their failure to rename their files using only Latin characters. This uploading issue challenged one of the assumptions noted earlier in the article—namely, that hosting the project sites online would offer, as far as possible, a sense of neutrality about the project.

Many students independently introduced other methods of Web 2.0 communication and indicated that this benefited their learning experience:

Skype is great because it's free and relatively clear. File sharing is very useful too. (ca10m)

Prior to this project I did not have Skype, I found it to be a very useful tool to get to know about our partners. Skype allowed us to share more personal details. . . . (ca1m)

A minority of students indicated their learning experience was hindered by the use of Web 2.0:

I believe I would have done better without the online component.

We couldn't even tell who was meant to be in each group as they were all just crowded around the same webcam. It didn't feel as intimate as it could/should have. (eL)

Some students reported that their learning was hindered by a lack of communication with their collaborators:

We have not had much contact with our collaborators so my communication skills haven't been tested. (e23m)

. . . prior to the final presentation date, we as a group, received little information from the [collaborating] students, as a result we were unable to give advice and feedback on how the presentation was. (eR)

Although participating students had relatively good expertise in using digital technologies, overall feedback suggests that many lack broader digital literacy skills, particularly the organization of information and files. This affected the collaboration between distributed project team members as indicated by the aforementioned quotes, potentially limiting students' learning opportunities. The *Higher Education in a Web 2.0 World* report (Committee of Inquiry into the Changing Learner Experience 2009; Hutchings 2008) concluded that not all students are equally familiar or comfortable with Web 2.0 technologies. For example, Hutchings (2008) reported that "half . . . of first year university students may not be familiar with technologies such as wikis and blog formats, while the other half may be much more au fait" (2). Feedback from students participating in this project appeared to echo Hutchings's findings that the notion of digital nativeness appears to be flawed:

The WordPress, while the most useful, due to having everything in one place, was not a well inpresented easy to use system. Many students could not use it till well into the project. (eQ11,136)

. . . the Wordpress site often acted as a barrier to sharing content. uploading and even simple posting and navigation was a hassle. we tried to communicate with Facebook but our partners didn't use Facebook. . . . assembling files and typing up information not only required lots of time but it also shielded the recipients from lots of information we wouldn't think of sending. (mQ21,54)

Consequently, the aforementioned issue challenged another of our assumptions, namely, that students are digital natives and consequently have the required capabilities to use Web 2.0 technologies effectively.

The development of cross-cultural distance communication skills is becoming increasingly important in globally networked professional communities of practice (e.g., Bohemia and Harman 2008; de Vere and Gill 2010; Del Vitto 2008; Horváth, Duhovnik, and Xirouchakis 2003; Horwitz 2006; Nemiro 2004). As stated earlier in this article, it has been argued that contemporary design programs in higher education are still too focused on developing students' traditional design skills such as sketching and model making (Norman 2010) and that contemporary skills such as learning in an online environment have not been formally introduced to students as much as they should (Yang, You, and Chen 2005). We propose that students in higher education should be further exposed to such technology as they facilitate the development of skills that promote employability in the contemporary knowledge economy (Bohemia and Ghassan 2011; Cassidy 2006).

For many students, this collaboration presented the opportunity to work with peers who did not share a mother tongue. Interestingly, many students for whom English was not the first language indicated the project had aided their progress in practicing English:

We are forced to use English to communicate, but this is really help to improved English. (t24m)

I did a lot of conversations in English for the first time. (j13e)

It is interesting, however, that only one group whose primary language was English reported attempting to communicate in their collaborator's home language:

We did try to translate some of what we wanted to say into Korean. (eL3)

Many students for whom English was not the first language reported feeling anxiety, frustration, or being embarrassed by their perceived lack of skill in this area:

. . . the most difficulty is to communicate in English. Due to our different mother languages, sometimes I cannot express my idea completely. (cn12m)

Japanese students, including me, should study and talk English more times. (j16e)

I always worry if I answer the Australia's partner slowly, he will feel impatient, so I often terror-stricken every time online. (t11m)

Ellis (1994, cited in Cheng 2000) suggests that experiencing anxiety can have a negative effect on learning a second language. Many English-speaking natives reported that they had learned how to communicate effectively with peers for whom English was not the first language.

In the vast majority of cases, student feedback from this project has indicated that for the English-speaking natives, instead of attempting to learn their collaborators' language, other strategies were employed. These included "adjusting diction accordingly, re-phrase questions and hav[ing] to talk a little slower and a little louder using more simple English so that we were able to get our point across" (eL). Such strategies could be regarded as examples of the notion of Foreign Talk (Ferguson 1975) referred to earlier in this article. Many English-speaking students indicated that collaborating with internationally based peers taught them "to be patient and taught [them] how the smallest details can alter perception[s]" (e1e). To facilitate their communication exchange, many English-speaking native students reported supplementing their use of verbal or written language with other methods. For example, [we] "learnt to communicate using more pictures and less words" (e5e).

Some students found that communicating with students who did not share a high level in a common spoken or written language hindered their learning experience:

We couldn't communicate so smoothly. Because we use different languages. So if we have support for this, we could collaborate with others. (j19e)

We only had contact throughout the whole project with the same person as the others said their English was not that good. It would have been nice to have opinions and even for them to show us the work that they each did. (eL)

The world of design practice is increasingly a global one. It has been suggested that contemporary industrial design students should be able to communicate in languages that are foreign to their own (Yeh 2001, cited in Yang, You, and Chen 2005). Interestingly, for many Far Eastern students, this collaborative project presented an opportunity to attempt to improve their English skills. On the other hand, the vast majority of English-speaking natives indicated that using strategies described in the notion of Foreign Talk was a preferred option. For many English-speaking natives, visual storytelling appeared to be another strategy employed in bridging the communication barrier. The aforementioned difference in levels of *expected* communication in a foreign language suggests that another of our initial assumptions was challenged, namely, that for students, there would be a sense of neutrality about the project.

Based on this project, we propose that cross-institutional peer learning provided students with insights with regard to issues associated with working across cultures and distance. The vast majority (88 percent) of all participating students reported that the learning experience was better or the same as in other modules of instruction in design. Overall, comments suggest that students appreciated working cooperatively with peers from other universities. For some, this element provided a sense of competition where they benchmarked their skills against other students; for others this provided insights on how their international peers can approach the given tasks differently (Ghassan and Bohemia 2011). Although many student groups were critical of their peers' lack of interactions, they appreciated the authentic learning experience, which was facilitated through incorporating cross-institutional peer-learning activities.

CONCLUSION

This project was challenging for participating academics and students in terms of organizational and operational issues. However, it provided students with a valuable opportunity to experience a cross-institutional peer-learning environment using Web 2.0 technologies that afforded an opportunity to develop contemporary employability skills.

Although Web 2.0 technologies provide exciting new learning opportunities, particularly related to the production of learner-authored content, students have found learning how to use these technologies to share and structure content successfully a real challenge, thus bringing into question our assumption about digital natives.

Another assumption—that, as exchange between students was conducted on online project sites, there would be a sense of neutrality about the project—was also incorrect, especially as the server hosted at the English university could not serve files with names using other than Latin characters. Therefore, it is vital to recognize that technology is not culturally neutral, especially in international educational collaborative projects.

The students involved in this project had not been in contact with one another prior to its commencement. At the beginning of the project, we assumed this situation would precipitate a sense of neutrality between the students. However, the difference in levels of *expected* communication in a foreign language between students from the UK and from Far Eastern Asian universities challenges this assumption.

As educators, we all do our best to meticulously plan student projects. The need for planning is perhaps especially important when working across time zones and with a variety of institutions. We propose that the proliferation of Web 2.0 technologies and their incorporation into the learning and teaching environment means that academic staff and students will need to develop

skills in digital literacy to participate effectively in distributed project-based collaborative work.

As well as this, we propose that such collaborations require students to be experienced with working with peers whose mother tongue is different from their own. Therefore, we propose that students should be exposed to these types of activities more regularly in order to build these highly relevant skills into their repertoires. We also propose that it is important to provide sufficient time for students to practice cross-cultural communication across distance in order to overcome initial anxiety students might experience when working with international peers.

We recommend that further studies should be undertaken into the mechanisms that can facilitate cross-institutional peer learning enabled through ICTs in an age of global collaboration and communication among professional designers.

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