

Virtual Collaboration on Real Problems

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Introduction

Tangaza College in Kenya, Mekelle University in Ethiopia and Delft University of Technology in the Netherlands cooperate in teaching and learning, by means of staff exchange, students internships and virtual communication. On this virtual communication - by means of e-mail, website communication, Skype etc. - this contribution will be focused. The problems and the potential of it will be shown. But at the same time this virtual communication is embedded in a broader framework. In the estimation of the authors it can only function within a framework of long-term partnership and cooperation. Within this cooperation technological expertise and contextual demands are brought together, aimed at successful technology transfer from the West to Africa, at the same time building up the social institutions, skills, capacities etc., necessary for development. This can be considered an innovation system that consists of internships, master theses, common research etc., but also accommodates NGOs and vocational training institutions for the implementation of the practical aspects of academics. It is the contention of the authors, that virtual communication can be meaningful only within such a broad and inclusive framework.

Two Experiments in Virtual Cooperation

During the years 2008 and 2009 two experiments have been conducted in virtual cooperation. The first one was only between Tangaza College in Kenya and Delft University of Technology and involved a group of 10 students from each side. After this first experiment Dr. Ndegwah, from Tangaza College, visited Delft University of Technology in order to help prepare the second round; which included Mekelle University, in Ethiopia, and also involved about some 10 students from each partner institution. For the students as well as for the teachers, these two experiments were an impressive learning experience in intercultural cooperation. It gave the students a sense of shared responsibility for a common future and a new perspective on their own situations.

In the first round students worked on the themes health, entrepreneurship and water. Their work resulted in some reports describing the situation in Africa and some ideas of which one in particular had concrete impact. During the discussions it appeared that small business entrepreneurs (locally referred to as hawkers) have problems in selling their products in the streets of Nairobi. There was lack of space and when the sellers occupy parts of the streets, they are chased away by the city council *askaris* (police). The Dutch students suggested to the Kenyan students to arrange a specific day(s) in a week and make at least one street (preferably Moi Avenue) free for a market to sell products; just like it is done in the Netherlands. This was to be taken up with the municipality, negotiated and arranged officially; in accordance with the preferences of the stakeholders. Such an idea, of an official market in the streets, which are otherwise used for traffic, is not usual in Kenya. The suggestion was taken over by the Kenyan group and they discussed it with the municipality but they never got it arranged due to the changes in office bearers (councilors) after the elections. The municipality, nonetheless, saw this as a source of income and the new office bearers availed space for the hawkers (Muthurwa), where they could sell their ware without being interrupted by the city council *askaris*. Negotiations were later going on about the price they had to pay for their stalls, as the KES 20 (20 Euro cents) levy was too high for most of them. The students couldn't finish their work completely, in this first round, because of the (2007) postelection riots in Kenya.

In the second round, which included Mekelle University in Ethiopia, the students worked on the themes energy, water and solid waste. The energy group focused on the supply problems of Kenyan metal welders in Nairobi, where usually the welders use energy from the National Grid. It appeared that the lack of continuous supply of energy from the grid was the cause of many problems for the welders; because of the long hours they were sitting idle, waiting for the energy supply to start again. The students researched alternative resources of energy, like solar power, geo-thermal or bio-energy, which in the long run could be meaningful for the welders. For the short run the students came up with the suggestion that the welders should organize themselves more efficiently, so that they could act as a more powerful negotiator with the energy companies. In addition, the energy could be distributed during the day according to a distribution plan so that they at least would know in advance during which hours they could do the welding work and when the power supply would be cut.

The water group focused on the causes of the lack of water supply, especially in Ethiopia, within the region of Mekelle. Here quite some explorative work was done and here it also appeared that virtual communication is much enhanced, if it is supported by other forms of cooperation. It was a coincidence that two interns from TU Delft were doing an internship at the time in Mekelle; researching all the different aspects of the water provision problems. They cooperated very well with the students in Mekelle and came up with a surprisingly detailed problem tree that gives insight in the interconnectedness between quite different aspects of water scarcity. The interns at the same time designed an evaporation water

collector, which could harvest two litres of water per hour, by means of evaporation and condensation. The work so done can be built upon by follow-up projects.

Communication Problems

The participants, in the virtual communication experiment, had to overcome many communication difficulties both physical and cultural. The most important, however, was the physical communication problem, i.e., poor connectivity with Africa. The consequence of this low connectivity was that the groups had to work quite independently; and put things together, in the end, in a common final document. The same poor connectivity problem made it difficult to chat, on a one to one basis, and exchange real life experiences; which could have offered hindsight to the other groups, about the people they were dealing with. In the second round this problem was solved, through asynchronous communication, in which the project set up a website, in which every participant presented himself or herself. Nevertheless, immediate online communication was severely hampered; and results were not as satisfactory as the makers of the website had been hoped. The reason for this is that there are many important things people would say about themselves to others that could offer real insight into their past, their personalities and their localities; but they usually inadvertently ignore them, since they are too common, and seemingly insignificant; thus denying virtual communicators opportunities to know more about their partners.

Other communication problems are caused by lack of social knowledge of the other group's context. Usually we forget to tell the other party about that which we take for granted ourselves, because it is part of the daily practice. It was very clear for the African students, for example, that traveling to an internet café takes a long time and can end up in a disappointment: since, suddenly, there may be no connection or no electricity (as a result of a blackout or a server may be down and so forth). For them, that was not a big deal, since it happens many times. It is so self-evident that they forgot to tell the Dutch students how it works; and yet the latter always have computers and internet at their disposal. Moreover, they have it for free; whereas the Africans have to pay when in the internet café. In another episode, Dutch students sent their photographs to their African partners and asked them to do the same. The African students did not do it, but they did not explain why. The Dutch students felt in the dark. What is happening? Only at the evaluation did it come out, that the internet was so slow, that it took the African students up to half an hour, waiting behind a computer to send or download a picture. They, however, did not inform their Dutch counterparts about it; maybe because it was so evident for them that explaining would have amounted to a boring tautology. It could also have been that they felt embarrassed and lagging behind; because they had to work with hampered connectivity. Alternatively, they might not even have been aware of how fast the internet can be; since they never experience high speed internet. To ease this problem, virtual communicators need to say as much about themselves, as possible, without ignoring anything about themselves, their locality, institutions, organisations and companies.

Another difference was in the conceptual approach. The students from Delft started from a broad perspective, asking conceptual questions like: what is entrepreneurship? The African students primarily wanted to solve more practical problems; which was a cause of miscommunications. Clearly this is also where the opportunities for creativity are present. These two approaches need to dovetail into each other in order to generate fruitful outcomes. On the one hand, a too narrow focus on the day to day problems may suppress the creativity to think 'out-of-the-box'; and thereby prevent us from looking at the problems from a new perspective. On the other hand, the focus on conceptual distinctions and abstract reasoning makes people prisoners of their own thinking, however broad the concepts may be. The two perspectives need to come together, and complement each other.

Dutch students also appeared to be used to a different kind of working discipline: one that does not only count for appointments, but also for timetables. For them back casting from the future changes the present course of action; in order to adapt to the goal in the future. That is the function of having a plan. Acting according to the plan, therefore, means that the present is looked upon and experienced and dealt with as a function of future results. For the African students this is different. Of course it may not always be possible for the African students to meet the plan; merely because of the fact that they have to adapt to more difficult day to day circumstances, but the mindset too is different. In the African context, you may be working according to the plan as agreed upon; but if somebody enters the room you are working, the human presence gets priority and the work will be postponed. It is a known fact that Africans working together with Western managers, sometimes, become irritated; because the managers only attend to them after finishing the job they are working on.

Particular rules can enhance virtual communication. During a workshop in which Dr. Ndegwah was also present in Delft, seven rules were made are summarized as follows:

1. A team needs to establish the rules for its work first, in order to have efficient interaction and communication.
2. If team members do not expect benefits from the cooperation, they will not put much effort in it. In virtual situations that is even truer than in face to face cooperation. It is important to identify the interests of all the participants beforehand. It can be a social benefit or it can be in the deliverables, but if they put no value on it, they will not invest in it.
3. Willingness to share benefits and successes with other shareholders is an important condition for virtual cooperation: otherwise it will not work. A lot of international teamwork is going on in a very sloppy way; because people only remember their tasks when the next meeting gets visibly close on the agenda. Often they do not do much in between, because of their busy schedules. It is often very difficult to keep up the speed, but one can prevent that by making a phone call in between, sending a short text message, and so on.
4. It is important to appoint a group leader, who is responsible for the results; and who manages the group dynamics, as well as the communication. It is quite difficult to have clarity about the goal among all the participants. Often people attach different meanings to words, even when using the same language. An important rule in this respect is that open disagreement is allowed. That helps to sort out the points on which you really agree. On the points on which you really agree, however you should also really act; which leads to the three points below:
5. If you have an agreement, act upon it. If that does not happen, make it explicit. That may be difficult across cultural differences, but it is very important to establish the rule, that if you have an agreement on a particular decision, the participants have to commit themselves fully.
6. Make a very explicit list of everything what is expected from everybody. People may commit themselves to a particular task, but as soon as they are off-line, they often forget what they promised. Use the virtual sessions to discuss the progress. If a task is too difficult and complex to do it virtually, then do not do it at all, or do not act as if it is happening.
7. Emotions need to be made explicit, because you cannot see them. For instance, if you are enthusiastic about something, say it, because people do not see or feel it. Positive reinforcing is part of what you communicate.

Logical Framework Analysis

In the second round, in cooperation with Mekelle University, Tangaza College and Delft University of Technology made use of the so-called Logical Framework Analysis Method. This method is broadly used in European funding schemes and in many other forms of social analysis and policy making. The core of the method consists in constructing a problem tree

and connecting to that a solution tree. If, for instance, lack of energy is defined as the problem, then a whole range of secondary causes of this energy problem can be identified: such as lack of materials, lack of skills, lack of awareness (concerning particular possibilities which might be there but are not used), lack of organization, lack of government regulation or hampering government regulation. These causes, in turn, can be traced back to other deeper causes; and at each deeper level more specific causes can be identified. The results can be put in a graph so that it really looks like a tree. Of course the problems differ from context to context; and they should be researched by means of deep interviews, questionnaires etc., in the local situation. It cannot be done behind a desk. The challenge in this approach is to reach a deep level of specification of the problems so that in the end problems can be identified so specifically, that concrete actions can be suggested to do something about them. Lack of skills, for instance, would not be enough because it does not give a clue of what the solution would consist of. If you want to change something about the problem you would want to know what kind of skills are lacking. Is it lack of skills for building and maintaining solar panels, or would biogas be the preferred solution, and then if one of these solutions would be preferred how big should an installation be dimensioned and what needs should it serve? Or is it maintenance skills, organization skills? And, finally, whose skills are lacking? A problem like "lack of skills for building small biogas installations for use by farmers" would be more concrete. Something can be done now. Maybe a business can be created, which has this knowledge. Maybe some farmers can do it besides their usual job. If the problem is, that the farmers are not interested, an information campaign for the farmers would help to make them interested in the first place. This can be suggested in a solution tree analogous to the problem tree, if at least - in this case - local farmers would really be served by having their own biogas installation. That too needs to be established. In that case the problem could be defined as "We don't know whether the local farmers can be served by private biogas installations" and the solution would be "Carry out a social and technical research on the meaning of biogas installations for the local farmers." Note that in the solution the causes are implicitly already split into technical (does it work?) and social (do the farmers feel this is an improvement?). If that is more suitable, it would have to be worked into the problem tree as well.

Lack of awareness, on the treatment of batteries and solar panel installations, could be mentioned, as a way of example. In places where solar panels are installed often the batteries do not reach their entire lifecycle (3 to 4 years) because they are not well taken care of: too much power is drawn from them or they are exposed to the hot sun or used for purposes they were not designed for. If this is identified as a problem, an awareness or information campaign could be devised as a solution. An awareness campaign is something to be done by an NGO, or by the government. Building up skills and competence to maintain an installation would be something for vocational training institutions to take care of. The design of a suitable system, in turn, would be something for technicians and engineers, coming from institutions of higher education. If the logical framework analysis (often together with other tools) is used like that, it can lead to the identification of a range of specific problems, connected to very specific solutions, in turn connected to actors (institutions); which are willing and competent to do something about it. In the end this means, that scientific research can lead to very concrete action plans, either to be adopted by local governments, or international funding institutions.

The use of the method appeared not to be easy for the students. Here the students from Delft had a relative advantage, coming from a management faculty, where such methods are better known. The students in Tangaza College, coming from the Institution of Social Ministry, had more difficulty in applying them as well as students from Mekelle University, coming from the Department of Industrial Design. In this regard a difference in cultural attitudes probably also plays a role. There are two fundamentally different points of emphasis

on attitudes that can be deduced from the interaction between African and Dutch students. If somebody wants to know how things really are, according to the codes of African culture, then one listens to the story and receives an artful expression of real life experience, appealing to the imagination. That is how Africans make the story convincing so that people move on to action and do something about it. In Europe, on the contrary, if somebody wants to know how things really are, analytical tools are used. How many people are poor? What do they still earn? What would be their basic requirements? How much energy would they use, if it would be available? For what purpose? How much water? How much water for cooking? How much water for washing? Imagination and verbosity wouldn't be good enough to convince (at least northern Europeans) to rise to action. They want to know the facts and figures. This implies a different mindset, which is also related to another difference in cultural attitudes, i.e., the attitude towards time. To the African mind, it seems strange to plan ahead actions for, maybe, two or three years; calculate how many man-hours are involved in it, and how much it would cost, as if you really are going to implement it like that. And then the question is; does that take seriously the problem which is right here before you at the moment? This is an issue of intercultural learning: how to do justice to two sorts of life experiences at the same time?

Innovation System, Coordinated Effort

The method of the logical framework analysis already points to the broader issue of a chain of cooperating institutions. A wide range of institutions may be involved in a complementary way to bring about a list of solutions, identified by means of the problem tree and the solution tree. This takes cooperation as another issue of concern, because cooperation between possibly competing institutions is already difficult to bring about in Europe, and it is even more so in the more collectivist culture of Africa. But it is necessary to get to real solutions of complicated problems. We can call this an innovation system. Institutions of higher learning, both from the West and from Africa, can contribute to the development and design of devices and technologies. The technological knowledge can come primarily from the West, in this case Delft University of Technology, but it needs a step of cultural contextualization to make it suitable to the needs and circumstances of the local culture. African institutions of higher learning may have less specified technological knowledge, but they have a much broader and deeper picture of the finesses of the African culture to which the product should be made suitable. So they can contribute in this regard. If a product is designed, it should be further adapted to local circumstances in terms of end users, businesses, systems of maintenance and so forth. In this regard, vocational training institutions and NGOs can give their contribution. They can help to achieve useful dialogue between end-users and put vocational and business skills and capacities in place. In the end, independent small and medium scale businesses can be run with the technology.

This actually is what we are working on within the triangle of Mekelle University, Tangaza College and Delft University of Technology. Within this framework student internships can play a role, staff exchanges, common research, cooperation with other institutions, NGOs, vocational training institutions; and, indeed, virtual communication can still play a role despite its difficulties.

Virtual Communication and Learning

How can virtual communication be designed, in future experiments, to yield the most benefit on the basis of our experiences so far? Since low connectivity is a problem to reckon with, for the coming few years, it would be advisable not to have big groups working together on the same issues. Small groups are more feasible. They can overcome the communication problem more easily and, if they receive clear assignments and of course also depending on their own efforts the results, can be tremendous in terms of mapping and solving concrete sociotechnical

problems. At this point in time, the problem is that this type of learning is not part of the official curriculum, in any of the three institutions, so it cannot be effectively institutionalized as yet.

But there are more opportunities. We already mentioned the example of an internship that is dovetailed to the virtual cooperation. If interns from Delft, well acquainted with the methodology, can cooperate with students in Mekelle and Nairobi; and do research together, their work might be much more effective, also in terms of quality assurance. Such interns would have a better entrance into the African society, thanks to the cooperation of African students; and, in turn, the African students would learn from their result oriented analytical approach. At the same time they can be supported by a small group of Dutch students in the Netherlands itself. The interns can mediate in the cooperation between Africa and the Netherlands because they are in close contact with the African students and can build a bridge. This bridge needs to be built not only in terms of knowledge transfer of technology transfer, but also in terms of communication between different sets of values and mindsets. These can easily create misunderstandings and even irritations. An example would suffice: the Dutch students asked many informative questions on the use of energy and water. The African students could not answer all these questions, because they were too much, but in addition didn't see the point, because they didn't share the analytical framework of the Dutch participants. They got irritated. For the Dutch students it was irritating that the African students just did not answer the questions and yet did not say why. Such type of misunderstandings can only be overcome by people who can partake in both cultural perspectives. Another possibility of virtual communication, which can also be helpful, is to give lectures by Skype or by phone. Send the PowerPoint presentation to the other side so that they can follow the slides and give a lecture for a live audience; so that questions can be posed and discussed at the same time. We also discussed the possibility of creating a website of virtual assignments for students from both sides to apply for.

Conclusion

Virtual communication between African and Western students offers many possibilities, which have not yet been explored. We have already tried two times and our intention is to continue our search for effective mutual cooperation, which includes virtual communication. But it can only function effectively, if one important condition is fulfilled – the framework of longer-term cooperation and partnership. By longer-term cooperation we think of embeddedness of virtual learning in common research; in cooperation along the lines of the innovation system we have outlined. By partnership we mean that it takes a communicative effort to overcome cultural differences and misunderstandings. One important rule of intercultural communication says that the end of the communication is, in reality, the beginning. By this it is meant that, in intercultural communication, the participants sooner or later unavoidably get irritated; because they simply do not understand why the other partner reacts like s/he does (or does not react at all). "This does not work" they will end up thinking. But intercultural communication requires that exactly this type of misunderstanding is overcome. If mutual understanding is not self-evident anymore, then their communication should not stop, but move on to the second gear; because it is then when communication really is required. This can only work, however, if face-to-face communication and longer-term partnerships support it; because only then the participants have the understanding and patience to overcome disappointments and irritations.

In this regard there is something to learn for Western participants. The Western attitude of doing things quickly and effectively often ignores the personal dimension, which is so important in the African culture. Only if people have become friends, partners in a common enterprise, they can cope with irritations and disappointments they cannot make

sense of. If a friend does not respond to the mail, sooner or later you will ask him "Did I offend you?" and if you did he will say so and you can adjust things. If such a long-term perspective and relationship is not the underlying communication basis of virtual communication, then it will not be sustainable. However, if virtual communication is embedded in true cooperation and partnership frameworks; it can give meaningful contributions and have a large impact.