Triune Case Study: An Exploration into Inter-Professional Education (IPE) in an Online Environment Supporting Global Health

Nataly Martini and Raul Caceres

Corresponding author: n.martini@auckland.ac.nz
School of Pharmacy, Faculty of Medical and Health Sciences, University of Auckland, Auckland, New Zealand

Abstract

Creating inter-professional education (IPE) projects is exciting and fun; running them can often be fraught with frustration and concern. *Triune-Uganda-2009* was a project designed to emphasise the importance of multidisciplinary collaboration in addressing global health issues by inviting students and mentors from the disciplines of medicine, pharmacy, nursing, sociology and anthropology to participate in a fully online environment for seven weeks. Through the production of written reports and subsequent key health messages for a community in Uganda, *Triune* aimed to promote proactive involvement worldwide amongst these disciplines. This paper reflects back on the challenges and pitfalls of running this voluntary project and provides key messages and tips on what might work to powerfully promote online engagement amongst participants so that they are motivated to contribute effectively. Judging by participant feedback through an anonymous questionnaire and focus group discussions, *Triune's* strengths included its aims, collaborative approach and the opportunity of exposure to a dynamic, diverse and multicultural environment. Significant drawbacks of the project included lack of online presence of certain disciplines, high student dropout rates and lack of participation from mentors, particularly Ugandan representatives. Fluctuating networks in developing countries were also problematic. Whilst *Triune* demonstrated that inter-professional disciplines are able to come together to achieve a common goal relating to a global health issue via an online medium, there are a number of challenges that need to be addressed to transform a project from a great idea to one that generates extraordinary results.

Introduction

The 'globalisation of health' involves global linkages between healthcare students, workers and researchers (Anand, Hofman, & Glass, 2009). The process requires effective collaboration between a variety of health disciplines to understand and reduce the substantial gap in health that currently exists between the developed and developing world. Global collaboration is made possible through the development of online partnerships and in the past few years a number of new online platforms have been launched seeing people from different disciplines in various locations around the world join forces (Wink, 2009; Ruiz, Mintzer & Leipzig, 2006). While some of them are concentrated on isolated opportunities for collaboration (e.g. www.idealist.org;

www.interconnection.org) others are using online project management approaches (e.g. www.nabuur.com) to develop projects throughout all stages from planning to implementation. Anand, Hofman, and Glass (2009) suggest that Universities are in an optimal position to facilitate collaboration among diverse disciplines locally and internationally. They are able to create and maintain an environment that understands and values the need for global health improvements especially in developing countries, making them key players in promoting health developments.

For collaborations to be successful, Sandars, Langlois, and Waterman (2007) claim three main processes need to be involved: the building and maintaining of relationships, the ability to understand the perspective of others, and a shared understanding. Therefore selecting a multidisciplinary team of people with whom to work requires uniting like-minded people with unique attributes and skills to work together in achieving a common goal, and providing solutions to problems that a single discipline may not be able to solve on its own (Bender, 2005). However, getting health and social disciplines to collaborate can be difficult to do due to heavy workloads, different levels of experience, knowledge, literacy and backgrounds (Hernández-Leo, Villasclaras-Fernández, Asensio-Pérez, Dimitriadis, Jorrín-Abellán, Ruiz-Requies, & Rubia-avi, 2006). One way to overcome this, in part, is through online platforms.

Online collaboration provides a greater opportunity for partnership among spatially distributed individuals and participants are exposed to a wider range of views (Bennett & Polaine, 2006). This exposure can help in developing a sense of ethical and social responsibility about world health amongst students involved in inter-professional education (IPE) projects and encourage collaboration in the future (Hermann, Rummel, & Spada, 2001). In the process, trust and communication between professionals may develop with an enhanced understanding of different professional roles (Walker & Elberson, 2006).

High-quality and well-developed online IPE projects permit the creation of supportive learning environments that may stimulate and benefit participants (Anderson & Kanuka 1997; Hughes, Ryan-Johns, Smith & Wickersham, 2002). They provide a platform where all participants are on equal footing thereby encouraging students to interact with lecturers and special guests (Mason, 2000; Freiermuth, 2001; Dawson, 2006). The goal is to create a community in which participants are active and motivated to share information and knowledge and, in the process, also benefit from the collaboration (Haythornthwaite, 2006). Collaborative learning has been shown to facilitate social interaction, enhance critical and teamwork skills and promote group diversity (Gokhale, 1995).

The process of encouraging people to learn is delicate, artful, and evolutionary (Mason, 2000; Helmi 2001). Simply creating a virtual environment and linking collaborators via the Internet does not remove barriers and Campbell & Kearns (2004) suggest that the biggest challenge of e-learning is to engage learners in an online environment. Lack of traditional communication cues often lead to miscommunication, confusion and frustration, and potentially resulting in participants withdrawing or just observing (Tu & McIsaac, 2002; Arbaugh, 2004). Facilitators also need to have a clear understanding of how to engage or re-engage students who are not participating, how to promote peer and mentor interaction and recognise the importance of providing immediate feedback (Martini, Harrison, & Bennett, 2010).

Background to *Triune*

Triune-Uganda-2009 was launched in April 2009 and was the first international, fully online, collaboration to involve students and mentors (teachers and professionals) from the disciplines of medicine, pharmacy, nursing, sociology and anthropology.

Triune denotes the essence or quality of 'being three in one' and was so named as the project was designed to form unified health messages between traditional healers, medical practitioners and church leaders in Uganda. The primary aim of the project was to develop innovative health awareness messages through the production of written reports for a community in Masaka, a town located in Central Uganda, west of Lake Victoria, and composed of people from different tribes and origins. Through personal communication with Christopher Wamala, a local teacher and representative from this community, this area of Uganda was identified as having significant health and social welfare problems with a high prevalence of illnesses such as malaria, waterborne diseases and HIV/AIDS. As a result, *Triune* sought to emphasise the importance of bringing health and social science disciplines together to improve the health of communities in Masaka by focusing their work on these three critical health issues.

Secondary aims of the *Triune* project were to examine the interaction of higher education students from diverse geographical locations, educational backgrounds and professional disciplines as part of an online learning community. An important sub-text to the project was to raise global awareness about health problems and access to healthcare in developing countries and raise awareness of the impact that online volunteers can play in improving health outcomes. Much of the *Triune* project was modelled on the *Creative Waves 2007 – Visualising Issues in Pharmacy* (VIP) project: an international online collaboration designed and developed as a joint venture between the disciplines of pharmacy and graphic design (Martini, Harrison & Bennett, 2010). While VIP was considered to be successful in achieving these aims, the two diverse disciplines – pharmacy and design - worked largely in isolation of each other. This signalled the need for online projects where enhancing collaboration is a key focus, and thus a key outcome which is measured. It was thought that collaboration would be more natural and comfortable between similar disciplines and hence the idea for *Triune* was born.

The focus of this paper is on the secondary aims of the *Triune* project. While the authors attempt to cover some of the aspects that worked well in this online IPE project, the emphasis is on the limitations and challenges encountered in running this multidisciplinary, voluntary project and the efficacy of using an online environment as a learning tool to support IPE. As convenors of this project, our aim is to offer our key lessons learnt along the way and to make suggestions for modifications that might work to improve the collaborative process and produce positive student and thereby community outcomes. Although "participants" refers to all those involved in the project, the focus is on student feedback.

Methods

Theoretical framework

Triune was conceptualised, designed and developed using constructivist theory adapted for online learning. Constructivism recognises that knowledge is constructed and learning is more effective through social interaction and when the participant can take responsibility for their own

learning (Alley & Jansak, 2001; Huang 2002). It also maintains the coexistence of multiple truths for the learner and places major importance on their interaction with the learning environment and their peers in real-life contexts. This in turn encourages the creation of multiple perspectives within a variety of contexts (Vrasidas, 2000; Sultan, Woods, & Koo 2011).

Constructivism in e-learning has been widely used (Vrasidas, 2000) and is a dominant research program in science education (Baker, McGaw, & Peterson, 2007). It has also proven to have benefits over more traditional methods of teaching (Khalid & Azeem, 2012; Collins, 2008) and in particular when working with learners that bring quite different prior knowledge and experiences to the learning environment (Bae, 2004). When using this approach, the goal of the instructional designer is to guide students to think and act like experts, providing students with opportunities to think and make decisions.

Karagiorgi and Symeou (2005) recommends a pragmatic approach of constructivism when using emergent technology tools and recognises three major phases during the instructional design: analysis, development and evaluation. During the analysis phase, Karagiori and Symeou emphasises the importance of analysing the conditions that will empower learners to make choices about how and what they will learn. This shifts the model away from learners learning the same things to a model that allows them to have different learning outcomes. During the development phase, it is important to offer an abundance of tools to enhance communication and access to real-world examples that allow students to develop effective ways to resolve problematic situations. During this phase, it is also important to create a collaborative learning environment that allows learners to develop, compare and understand multiple perspectives around an issue. Finally, during the evaluation phase, it is important to focus on each student's approach rather than on a particular solution.

When creating collaborative learning environments, it is also critical to create safe environments where individuals are free from fear and can be open to constructive learning. This allows the learners to feel welcomed, comfortable, and respected (Collins, 2008). In these types of environments, learners' prior knowledge can be utilised to construct new meanings, which after verbalised could provide learning opportunities for others. At the same time, the construction of knowledge can be improved as it is verbalised (Collins, 2008; Proulx, 2006).

Approach
In *Triune,* a constructivist approach was facilitated by the use of an online learning management tool. Omnium® Software is a platform designed around the principles of structured learning communities (Dewey, 1997) but delivered through interactive communication technology. The software allows participants to communicate with each other through project-wide '*Discussion Forums'* and team specific areas called '*Team Talk and Feedback'*. Convenors and team coordinators communicate through general news items and team notices. The interface also provides *'Team File-Sharing'* areas and a *'Team Pin-up Wall'* where images can be shared, together with a project-wide resource library where briefs, lectures and other background material provided by guests and mentors can be posted.

In *Triune*, students were allocated to one of six teams, each representing an assigned health issue (AHIs). Each team had a mix of between six and seven students from different disciplines and

geographical locations and was assigned a team coordinator and a number of mentors. Lead convenors (RC and NM) with a small project team (team coordinators) devoted to developing the briefs and mentoring groups of students, were responsible for directing the students to appropriate resources or putting them in touch with mentors who could provide them with support and feedback. Students were encouraged to ask questions and learn from one another through sharing materials in their *'Team File-Sharing'* areas and communication using *'Chat'* and discussion boards.

A proposed five-stage creative process was derived from theoretical studies of the creative process over the last century (Csikszentmihalyi, 1997; Wallas, 1926; Patrick, 1937) in combination with a renowned five-stage process for e-learning developed in the U.K. (Salmon, 2002). This five-stage process - Socialising, Gathering, Identifying, Distilling/Abstracting and Resolving - was used throughout *Triune*. During the *'socialising'* stage, students met for the first time and started to work together in their team by introducing themselves and completing an icebreaker task. The teams then moved on to *'gathering'* evidence about their AHI in relation to global health issues and *'identifying'* the specific impacts on Uganda, before *'distilling/ abstracting'* relevant information and *'resolving'* it into a final report (Figure 1).
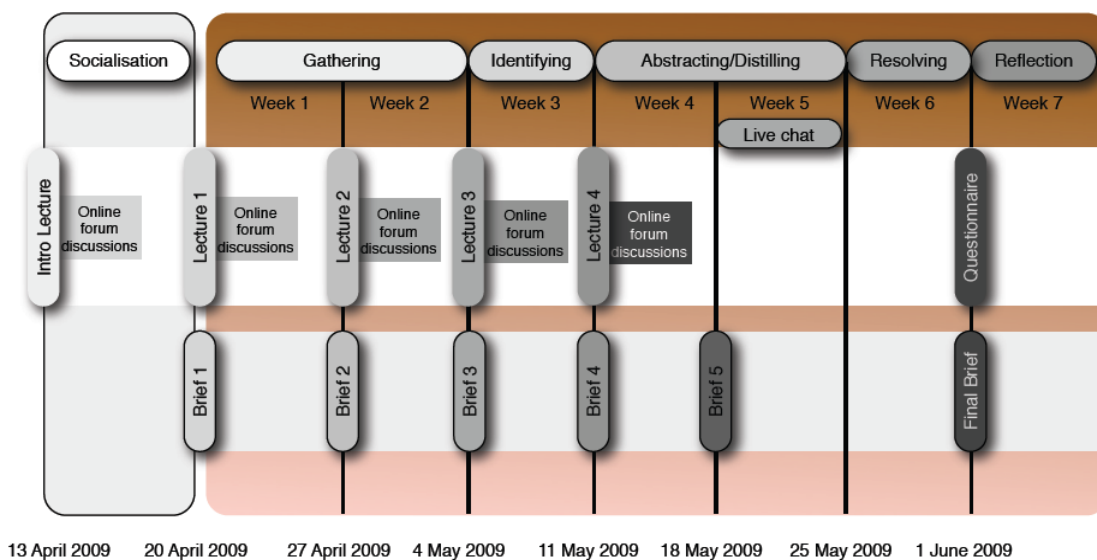
Figure 1: General *Triune* project structure including weekly lectures and briefs

The project concluded at week 7 with the production of three written reports covering each assigned health issue (AHI). These reports covered the following: 1. background information e.g. general overview of the AHI in Uganda, facts and statistics, previous interventions; 2. identified issues e.g. language and literacy, religion, culture; 3. ideas and action plan e.g. posters, jingles or songs, stakeholder analysis; and 4. ideas for future development and follow up.

Each team produced reports of up to 37 pages incorporating team members' ideas and suggestions for improving health and healthcare in Masaka. The *HIV/AIDS team* suggested strengthening the activities of the Association of People Living With HIV/AIDS (PLWHA) and promoting health fairs or joint community conferences for medical providers, traditional health

practitioners and church members. The *malaria team* had ideas for a community education and outreach programme, a peer/youth education campaign and the formation of a community malaria fund, while the *waterborne diseases team* produced several ideas to deliver messages to schoolchildren about washing their hands including jingles, posters and workshops. Moreover, as part of her own studies, a design student from the University of New South Wales selected one of the reports on which to develop further ideas for community engagement. The outcome was a selection of stickers that was not implemented in the community. Ethical consent was obtained through the University of Auckland Human Participant's Ethics Committee (Reference number 2009/C/013) to conduct the questionnaire and focus groups and observe online interactions in chats, message boards and general discussion forums on the *Triune* online interface. Observations included looking into how many postings the participants made to the team chats and main discussion forums and noting the quality of the interactions i.e. how much information exchange was provided and what type of exchange generated discussion.

Participant Recruitment
Team coordinators, whose responsibility it was to facilitate discussions, encourage students and mentors to participate and provide feedback, were recruited by RC based on their experience in online peer-to-peer environments on different international development projects. A majority of students (89%) and mentors were recruited through emails sent to health and social science institutions around the world advertising the project. Information was also sent out to online organisations such as e-Drug, Afro-nets and Pharmacy Education Taskforce and some mentors were directly invited by convenors to take part in the project. Interested participants submitted an online application form, which was reviewed by the *Triune* project convenors. Participants were selected based on their field of study or area of expertise, which included the disciplines of medicine, pharmacy, nursing, sociology and anthropology and others whom the convenors felt would make valuable contributions to the project. Inclusion criteria included English language proficiency and the average time they could dedicate to the project, which for students was recommended to be 10 hours per week. A total of 121 applicants applied of whom 50 were students and 71 were mentors. Overall 44 mentors and 44 students were accepted, including five pharmacy students from the University of Auckland, who undertook the project as their fourth year research dissertation.

Students came from 17 countries and mentors from 22 countries spanning six continents (Figure 2). There was a greater representation of participants from New Zealand and Australia, which could be due to the convenors and researchers being from these two countries. Mentors included eight representatives from Uganda (two pharmacists, a pharmacologist, a clinical medical director, social worker, anthropologist, chairman of an NGO for rural development and a water sanitation company representative).

Figure 2: Map of where *Triune* participants resided

Team Allocation
Students were divided into six teams, where each team had a mix of students from the various disciplines and geographical locations. Two teams were allocated to one AHI relevant to Masaka, Uganda, i.e. malaria, waterborne diseases and HIV/AIDs. Teams worked with mentors and team coordinators over seven weeks to produce a written report on their AHI through research, feedback and brainstorming sessions. Each week there were tasks to be completed which were outlined by briefs written by the convenors. These included activities such as reading and responding to online 'lectures' written by special guests, getting involved in 'live chats' and other more social activities such as geo-marking their location on an interactive world map and leaving a message for the Ugandan facilitator, Christopher Wamala. At the end of Week 3, teams from each AHI were merged in an attempt to increase student productivity.

Sources of Data
Data were collected from online application forms on field of study, year of study and country of residence. One of the main sources of data was an anonymous questionnaire, adapted from the VIP project, and directed mainly at the student participants. A *News* announcement was made on the project interface at the beginning of Week 7 to inform participants to complete this questionnaire. Further announcements were made in the *Team Notices*, which were automatically emailed to participants. The questionnaire included several open-ended questions to assess factors that could have influenced participation levels in *Triune* including motivation, online social presence and incentives and a series of questions using Likert scales to assess participants' views on strengths and limitations of *Triune*.

Another source of information included a few focus group sessions, carried out by student researchers in Weeks 6 and 7 of the project using the *Team Chat* function on the interface. Participants were informed that these were taking place through a *News* announcement and *Team Notices* posted at the beginning of Week 6. A thread was created in each team's *Team Talk and*

Feedback forum called "Focus group – feedback". This was to allow participants to agree on a mutual time that was suitable for the focus group sessions to take place. Due to time zone differences and technical difficulties some information was acquired via email. Data from *Team Chat* and email discussions were saved electronically for data processing.

Data Analysis
A thematic analysis approach (Dixon-Woods, Agarwal, Jones, Young, & Sutton, 2005) for qualitative analysis was used to analyse qualitative data originating from participants' responses to five open-ended questions in the questionnaires and six focus group questions regarding factors that could have affected participant motivation, challenges faced during the project, and the overall experiences of participants. Data were entered into NVivo 7.0 and coded into broad themes and sub-themes identified a priori and those emerging from the data. The researchers discussed the nodes as a team and reviewed and identified subthemes until consensus was reached.

Results

While the intention was to obtain equal representation from all invited disciplines in the project, there was an overrepresentation from Pharmacy (Table 1). Twenty (45%) students, nine (21%) mentors and two team coordinators (TCs) answered the questionnaire (Table 2). Not all questions were answered or were applicable to TCs. Only four students and one mentor participated in the focus group chat.

Table 1: Number and discipline of students and mentors accepted to participate in *Triune* and response rate (RR) to questionnaire

Discipline	No. of Students (%)	RR (% of discipline)	No. of Mentors (%)	RR (% of discipline)
Pharmacy	21 (48)	14 (67)	7 (16)	5 (71)
Nursing	6 (14)	0	1 (2)	0
Sociology	6 (14)	2 (33)	3 (7)	1 (33)
Anthropology	5 (11)	3 (60)	4 (9)	0
Medicine	3 (7)	1 (33)	5 (11)	3 (60)
Other	3 (7)[*]	0	24 (55)[**]	0

[*] Public health, biomedical sciences and health management
[**] Included mentors in areas such as reproductive health, pharmacognosy, microbiology, public health and various NGO representatives, amongst others.

More than half of the students stated they were in their third (n=11, 25%) or fourth year (n=14, 32%) of study. Students who were in their fifth or sixth year of study included two undergraduate students (medical and pharmacy) and four postgraduate students (anthropology, health management, pharmacy and sociology). As degrees may differ around the world it is not possible to contextualise this data against course length.

Table 2: Student and mentor responses to their online experience of *Triune*

	SA n (%)	A n (%)	N n (%)	D n (%)	SD n (%)
It was important / valuable to work with students and teachers from different countries	24 (83)	5 (17)	-	-	-
Collaborating with international students from diverse disciplines made you more aware of health related issues in your country of residence.	9 (31)	12 (41)	3 (10)	4 (14)	-
Collaborating with international students from diverse disciplines made you more aware of health related issues outside your country of residence.	22 (76)	6 (21)	1 (3)	-	-
Feedback received from your team coordinators and mentors positively affected your motivation	13 (45)	12 (41)	3 (10)	1 (3)	-
Feedback and participation from your team members positively affected your motivation.	15 (52)	12 (41)	1 (3)	1 (3)	-
Seeing others online motivated you to stay online and participate.	14 (48)	13 (45)	1 (3)	1 (3)	-
You found it easy submitting your ideas and opinions to the rest of the participants.	11 (39)	15 (52)	2 (7)	1 (3)	-
Your level of knowledge affected your confidence to post a message.	1 (3)	3 (10)	6 (21)	11 (38)	8 (28)
Problems with access to the internet affected your active involvement in the project.	4 (14)	8 (28)	1 (3)	9 (31)	7 (24)
You found that merging the teams negatively affected your participation	1 (3)	2 (7)	7 (24)	12 (41)	7 (24)
Receiving a *Triune* certificate at the end of the project motivated you to participate.	4 (14)	9 (31)	7 (24)	6 (21)	3 (10)

Findings

Students were considered active if they had posted at least twice to the DF and/or TT&F areas per week. By week 3, 14 (32%) students had either formally withdrawn, stopped participation or did not make an appearance. The teams of the remaining 30 (68%) students were merged to increase productivity, however by week 7 of the project only 17 (57%, n=30) students were still actively participating in *Triune*. Of these, five were New Zealand students. Five mentors had posted five or more posts to the main DF. Over the course of the project two special guests did not contribute lectures or live chats as agreed, one team coordinator discontinued participation and more than half of the mentors did not make an appearance.

Motivators to Participation

Participants felt that the project was of educational value and had broadened their perspectives. For the majority of participants collaborating with diverse disciplines not only made them more aware of health issues outside their country of residence (100% of students, 88.9% mentors) but also within their country of residence (75% students, 77.8% mentors) (Table 2).

All the participants agreed that it was valuable to work with people from different countries (Table 2) and that the multidisciplinary nature of the project was *"a precious opportunity" (sS1).* A mentor from medicine acknowledged that *"rarely do such a diverse group of professionals collaborate and discuss like this" (mM2).*

Participants saw the importance of bringing unity of people and ideas through collaboration to create better solutions for the community and one of the biggest driving factors for engagement with a multidisciplinary team was *"seeing people come together for a common cause" (TC2).* A pharmacy mentor felt that the "*inter-disciplinary nature of the project was brilliant and so timely in our globalised environment"* and that *"positive health outcomes must be collaborative" (mP3).*

When asked what motivated participation in *Triune*, a common theme that arose was the project aims. One sociology student said, *"I found the Triune aims and objectives extremely meaningful, practical and realizable. It provided me with a fresh perspective and added depth and joy to my everyday life, work and research. It made me feel like I was able to be a part of something global with a community of passionate people who truly, genuinely and sincerely want to make a difference and* who *will" (sS1).*

Barriers to participation and modifications that may generate a more positive result

Working online
The project interface acts as an important medium to lead and inform participants as they explore it. There was an assumption by project convenors that the interface was self-explanatory and was easily adapted to; however some participants had problems orientating themselves initially. Curtis & Lawson (2001) suggest that this can be improved by supplying information about the interface and functions along with the participant information sheet. Wiesenberg & Stacey

(2005) also recognized the importance of having several different teacher roles to deal with the different online issues. This would allow for other parts of the course to go on uninterrupted while the issues are being addressed.

For almost half of the students and a quarter of the mentors, poor or irregular Internet connectivity affected their contribution (Table 2). Eight students did not have internet access at home and had to use University facilities or Internet cafes. This was a problem for a student as he was unemployed and couldn't pay for Internet access. Two other students were sick during the first few weeks and logging in irregularly often meant trying to catch up with the discussions, which proved to be overwhelming for them.

To increase online activity and to bring in a human element to the discussions, live chats were organized; however, due to the time zone differences some participants couldn't attend or had to "*wake up at awkward times to make it to these sessions.*" Transcripts of these chats were posted in the project resources but students found these to be disorganised and difficult to follow.

While the online environment affords some flexibility in time structure, time zone barriers is a common difficulty experienced in international online projects (Martini, Harrison & Bennett, 2010). To provide opportunities for synchronous interaction between participants, live chats need to be well structured, which may be improved by providing "live chat tips" prior to the chat and involving strong and skilful moderators to regulate the flow of discussions. Regular weekly team chats might also promote motivation in the early stages of the project through creating stronger social connections between participants.

Despite these challenges, the *Triune* interface still offered a forum for effective asynchronous communication that participants could use to overcome some of the limitations of face-to-face multidisciplinary collaborations (Lumague, Morgan, Mak, Hanna, Kwong, Cameron, Zener, & Sinclair, 2006).

As *Triune* consisted of text and pictures as its main means of communication, further tools such as real time video conferences and/or video/audio podcasts for special guest appearances, for example, may be considered to explore visual and audio supplements to online education and collaboration (Beaudin, 1999); however the use may be limited in countries with slow networks. Bearing this in mind, a mobile capable platform could be better suited to participants in e.g. Africa where mobile technologies have grown rapidly over the past decade and are a more reliable tool for communication than the general Internet. The project interface may also be redesigned to reduce the number of mouse clicks to certain areas such as *Team Talk* and *Feedback Forum* to increase its usage.

Teamwork
There were mixed responses around "teamwork". While some students felt it was the best part because it was "*amazing to know what others are thinking" (sP7)*, a few participants experienced a lack of teamwork or effort as "o*ther people were not always willing to participate in the project and do the required tasks, some were not even active" (sP4).*

Collaborating online was seen to be essential but also frustrating at times. Seeing others online and actively posting encouraged others students to participate. While collaborating online brought people together globally, the process relied on the participation of others and the poor presence from mentors and some students was seen as discouraging. Over 85% of all participants agreed that feedback received from team coordinators, mentors and students positively affected their motivation (Table 2). Seeing others online motivated most (93%) of participants to stay online and participate; those who chose to observe rather than actively contribute were seen by one mentor as *"window frames" (mP0).* The least motivating aspect of *Triune* for a pharmacy student was *"seeing [how] many times my questions, especially in discussion forum, [were] not being replied [to]" (sP1)* and a mentor felt that *"many students and mentors didn't participate to their best" (mM3).*

There was a lack of input from mentors, especially from Uganda. Most mentors played more of an observer role than a participatory role and less input from the mentors meant more work for the team coordinators in trying to direct students in their team tasks. Finding mentors that have a track record in online project participation and who have something to gain from the project may lead to increased mentor participation and thereby student involvement. Another approach may be to create a formal project partnership between Universities, especially in the country where the project is targeted, to promote a sense of ownership amongst participants.

There were a few comments suggesting that the project briefs and tasks should have been made more self-explanatory and simpler to understand. One student shared that he wasn't clear on what an "action plan" was and so providing short definitions, descriptions or examples might be helpful, particularly to younger students and non-English speakers. A better facilitation of the project by convenors and team coordinators would address the issue of participants not being clear about the weekly tasks. Much of this relies on team coordinators being fully briefed and confident in their approach. Planning ahead should also include an anticipation of team merges in the event of a high student and mentor dropout rate. In turn this may be overcome by actively recruiting more participants, through better project promotion or allowing for a longer period for recruitment. Case studies investigating the design and structure of online projects may assist implementation strategies, facilitation of tasks, discussion and resource distribution (Curran, 2002; Wang, Sierra, & Folger, 2003; Teng & Taveras, 2004-2005).

Language
One student expressed frustration at trying to *"understand what some people meant when they were expressing themselves, because English was obviously not their first language" (sA2).* Other language barriers arose from the use of health jargon such as *"difficulties with the terminologies about the traditional healers"*. An anthropology student felt that *"when our discussions ventured into scientific stuff about drugs I couldn't contribute much"* and a pharmacy student *"felt more drawn to speak to people from pharmacy because I thought they'd understand me better."*

Multidisciplinary collaboration is difficult and does not always work (Macdonald, Stodel, & Chambers, 2008). Werner (1996) suggests that some of the reasons for this may include differences in disciplinary orientation, level of knowledge and experience. In *Triune,* participants indicated that the use of jargon specific to each discipline were difficult to comprehend; however

apart from the lectures, discussions focused on subjects that were non-discipline specific and therefore input required was quite general. None-the-less, it is important to recognise that in order to implement the successful integration of students from differing disciplines in a collaborative project, discipline-specific terminology needs to include examples and explanations so that everyone feels included and appreciated. Special guests providing lectures or live chats could benefit from a template and should be informed to keep presentations simple and in layman's terms as much as possible.

Confidence
While over 90% of participants who answered the questionnaire said they found it easy to submit their ideas and opinions to others in the project, 13% felt that their level of knowledge affected their confidence to post a message (Table 2). For those who used 'live chat', 10 (55.6%) students and no mentors were confident enough to initiate a chat, three (16.7%) students and four (50%) mentors were confident to enter an already engaged session and five (27.8%) students and four (50%) mentors waited to be invited.

A sociology student felt that *"if I did have more background knowledge, discussions could have been more in-depth sooner" (sS1)* and another student found themselves *"holding back a bit in the beginning but as the project went along I was able to express myself more" (sP10).* Some mentors also seemed to feel a little out of their depth as expressed by a medical mentor who *"felt under-qualified to provide any meaningful feedback/experiences" (mM2).* A pharmacy mentor suggested that it was *"both background knowledge and experience that affects your contribution as these two are vital, especially if you are positioned as mentor" (mP0).*

Student participants in their final year of study had overall higher activity rates than those in the first three years of study. While this result is skewed by the compulsory participation of five University of Auckland students who were undertaking the project for credit, research has shown that the year of study influences students' participation in a project (Martini, Harrison, & Bennett, 2010; Nicol, Minty, & Sinclair, 2003). Since maturity, knowledge, and education increases as the students' year of study progresses, reflected in their thoughts and level of critical thinking (Macpherson, 2002), we could propose that their participation in the project was higher as they were more confident in posting their thoughts and ideas. Conversely students of lower years of study may perceive themselves as having lesser knowledge and experience of the health issues raised and the fear of appearing ignorant in certain areas can lead them to being less inclined to participate (Martini, Harrison, & Bennett, 2010). While one might be tempted to invite students in their final years of study to participate in projects like *Triune* based on this argument, one could also argue that students of lower years of study may be more open to exploring new ideas as they are less influenced by educational dogmas.

Volume of work
It appeared from the majority (93%) of responses that the volume of work required in the project was sufficient and 76% agreed that the time given to respond to the weekly briefs was adequate; however, only 17 (39%) students were considered to have remained active until completion of the project. Surprisingly one medical student and one pharmacy mentor felt the overall volume of work in the project was insufficient, yet none of the medical students were considered to be active participants.

The biggest concern for most of the participants was finding the time to commit to the work required by the project. This was clearly expressed by one student, who said: *"the amount of work, though it was not too much it just coupled with other things happening in real life (exams, assignments etc). It became a bit demanding" (sP9).* A mentor also expressed a *"lack of personal time to put in more effort" (mP3)* due to work schedules. Another mentor expressed dissatisfaction with their experience of *Triune* due to personal frustration with "*work schedules which became huge with lots of outreach and inaccessibilty to internet" (mM1),* but expressed a wish to be involved in future projects.

The success of the *Triune* project depended on the goodwill of the participants to contribute their time, knowledge and effort. Participants' had to be interested, passionate, driven and motivated enough to appear online and contribute to the assigned tasks. The lack of these attributes from participants could have led to discontinuing participation. To ensure continuing participation in voluntary projects having passion and being motivated is essential, whereas it is expected that in compulsory projects participation levels are higher (Hall, Drab, Campbell, Meyer, & Smith, 2007). It may be that collaborating with a few Universities in developing a project as part of a for-credit course would address some of these issues. Activities could be linked to formal assessment and mentors activities could be acknowledged as part of their local workloads. However, as Beghetto (2005) points out, assessment practices have a strong influence on motivational beliefs, which in turn can stifle creativity. It is therefore imperative that if such projects are to be assessed, that creativity is protected by using the appropriate assessment techniques.

Alternatively, the length of the project may be extended to spread the workload or an attempt could be made to tailor the time of initiation of the project with students' exam schedules. Depending on how many institutions are involved and the differences in academic timetables across the world it may not possible to find a suitable time for everyone.

Poor communication
Three team coordinators were selected by convenors based on their previous engagement with communities and superb online volunteer skills. Whilst familiar and passionate about the *Triune* aims for the community, none had previously worked on a University student project. One suggested that there should be "*100% focus on the local community rather than what students are getting out of the project"*. Unwittingly this created miscommunication and tension between convenors and team coordinators – who all resided in different countries – and different perspectives on what it meant for the project to be successful.

As participants were only given seven weeks in which to complete the project, convenors often made on-the-spot decisions to encourage active contribution. This meant that activities such as the "*Brainstorming session*" were not discussed with team coordinators prior to posting the activity online and consequently there was little opportunity to suggest changes or seek clarification in time, which left coordinators feeling confused, anxious and undervalued.

For a project to be successful it is essential that key players in the project i.e. team coordinators and mentors are fully informed how the project will be managed through all stages of the project. Regular meetings – at least weekly – are imperative to keep the communication going. With

group meetings, a voice-over-Internet Protocol service such as Skype increases the speed at which information is transferred and, with good protocols, allows for one person to communicate at a time. Text chat, used in *Triune* team coordinator meetings, often resulted in numerous people typing simultaneously and with so many details to pay attention to, became difficult to follow. Vital communication was therefore lost in the process.

Providing incentives to participate

In Week 3 students were informed of the availability of a *Triune* certificate as an incentive to acknowledge their contributions and further encourage participation. Initially, this incentive appeared to increase the number of postings, but the effect was short-lived. When asked in the questionnaire how they felt about being offered a certificate, 45% of students and 33% of mentors agreed that receiving this reward was more likely to motivate them to contribute to the project (Table 2).

Research has shown that participants are more likely to join projects and complete set tasks if they are rewarded with incentives (Howell, Saba, Lindsay, & Williams, 2004). However, for geographically dispersed participants who belong to different institutions, incentives such *Triune* certificate is unlikely to be formally recognised in their own countries or institutions. For global health projects it might be worth considering entering into a formal agreement with an international organisation such as the International Health Organisation (IHO), World Health Organisation (WHO) or humanitarian organisations such as Médecins Sans Frontières (MSF). Participants are more likely to be familiar with these organisations and can relate to their vision. Alternatively, joining forces with professional disciplinary organisations e.g. the International Pharmaceutical Federation (FIP) to offer badges as a form of acknowledgement, might provide participants with a more formal, certified accomplishment.

A substantial amount of work is being done in the area of gamification and educational games where game-like techniques are used to raise engagement with tasks. In online voluntary projects, participants are expected to be self-motivated and disciplined to complete weekly briefs; however, when the project extends to several weeks, motivation alone is not enough. Ghergulescu and Muntean (2011) explains that to be highly engaged in a task, intrinsic motivators such as altruism need to be combined with extrinsic motivators such as points, levels or badges (as seen in games) to provide the necessary call to action.

Key lessons learnt

1. **Open and clear communication with pivotal contributors is fundamental for project success.** One of the biggest challenges in *Triune* was that team co-ordinators were not clear on the student learning objectives or how the project would be managed, which caused upset. If non-academics are to be involved in an academic initiative, it needs to be made clear from the beginning what the desired student learning outcomes are. Project leaders need to be clear with what their expectations are of the team including that of the students and mentors.
2. **Risk management/mitigation planning.** Although *Triune* planning started a year before project commencement, a key Ugandan facilitator dropped out of the project a month before

the project was due to start. Having a plan B would have relieved much of the stress. Advertising to students and mentors was left too late and was reflected by the underrepresentation of participants from certain disciplines and geographical locations. It is also worth investing a good amount of time planning on what things you will use to motivate and encourage participants along the way.

3. **Timing.** The timing of Triune overlapped with student examinations and assessments. While no time of the year is perfect, it is important to find a time that works for the pivotal people in your team and take care to avoid major examination times for students.

4. **Synchronous personal engagement.** While online projects rely heavily on synchronous and asynchronous communication, in *Triune* weekly personal meetings with five University of Auckland pharmacy students played a huge part in the success of the project. These meetings were held to answer any queries, clarify instructions and encourage participation and motivation of them and others in their teams.

5. **Acknowledgement.** In voluntary projects, people do not have to participate. The fact that they even chose to should be acknowledged. Participants are more likely to continue contributing if they feel someone is reading their posts and is appreciative of their contribution. Sponsorship to provide gift cards from recognised online marketplaces (e.g. iTunes) could also be considered.

6. **Social presence.** Social presence builds a sense of community and increases the amount of feedback, which encourages and improves participation of other team members. In addition to providing regular and personal feedback to students, co-ordinators and mentors should be encouraged to initiate conversations with students in *chat* to check in with them and determine whether they need any assistance. Both mentors and students should also be encouraged to share personal experiences related to the topic.

7. **Get to know the disciplines you are inviting**. Find out what they do, what their professional standards or ideals are, and general *modus operandi*. Know that it's going to take a while for students from different disciplines to feel comfortable with each other and when you are running a short project, there isn't much time for this. Encourage fun group activities and plenty of facilitation and acknowledgment.

8. **Don't give up!** Even if the project isn't going the way you expected it to, you never know who is being inspired along the way and who will go out into the world transformed by the experience.

Conclusion

Working with multicultural and multidisciplinary teams with different expectations and motivations is challenging. Managing the expectations through open communication at all levels of the project was identified as a key element to manage some of the risks that could result in reduced participation and engagement.

Through all its challenges, one cannot argue that uniting so many diverse students, mentors and professionals together for seven weeks in an almost-completely voluntary project is extraordinary. Participants were strongly in agreement that the unity of people and ideas was an important component of collaboration and their expectations of coming up with a tangible solution was a driving force for their participation. While the potential that can be harvested from online collaboration was a highly motivating factor for most participants, this was not

translated into tangible outcomes for the community. In order to implement the suggested action plans that came out of the *Triune* team reports, it is vital to identify specific ideas that have potential for success and uptake by the community. Furthermore, partnerships with global health organisations and funding agencies who are in a position to take great ideas and translate them into practical results need to be established.

Ultimately the benefits that can be obtained when collaborating in an inter-professional education initiative in terms of participants' education and public health outcomes are seen to be worthy and unlimited. Since *Triune,* both project convenors have continued to work in initiatives utilising peer-to-peer learning and digital technologies to engage learners and communities in issues of global importance. New areas of exploration include the use of gamification to increase student engagement and participatory media as a learning tool to increase awareness on a variety of issues.

Acknowledgements

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