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Investigating EAST (A Scotland-Gaza English for Academic Study Telecollaboration between SET Students)

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Investigating EAST (English for Academic Study Tele-collaboration) A UK- Palestine English Language Project for Engineering and Science Graduates

Abstract

How can technology be best-harnessed to innovate pedagogical approaches to curriculum design and delivery in order to enhance university students' learning experience?
This article looks at this question from the English for Specific Purposes (ESP) perspective and reports on a number of technology-enabled interventions to the design and teaching methods used on a Science, Engineering and Technology (SET) pre-sessional course.

Every summer the University of Glasgow (UK) runs an intensive ESP course for incoming international postgraduate students wanting to study SET-related disciplines. In previous years, in order to progress onto their Master's or PhD programmes, the students had to produce a written assignment and an oral presentation which investigates an engineering problem of their choosing and a range of solutions.

In August 2015 an online collaboration with a partner university in Palestine was piloted, which allowed several significant developments. During the project, 20 Palestinian students and 37 UK-based students, divided into small groups, worked together on authentic and highly contextualised SET-related scenarios from the Gaza Strip, devised by the Palestinian students. Their role was to act as critical friends, and provide content-oriented comments throughout the project, which they had been trained in on an intensive online preparatory course in constructive feedback. Based on the guidance from their peer mentors, the students in the UK analysed and evaluated possible solutions. At the end of the project, they delivered presentations to the audience in Gaza via a videoconference link.

The course was evaluated highly. In an end-of-project survey, with an 81% rate of completion, the students from both institutions commented on the range of positive outcomes of the participation, for example language practice, development of digital literacies and enhancement of content knowledge. It was felt, though, that there was an imbalance in benefits and that there is need to revise the course further to offer more opportunities for mentoring input from the Palestinian participants.

This article reports on the project and looks into how the technology-enabled interventions helped improve the course by strengthening the project-based learning elements of the previous course design, focusing on development of transferable skills, and above all bringing in real-world issues into the SET classroom. Working with authentic and specific issues, the UK-based students' output seemed of higher quality in terms of critical analysis or evaluation. The paper discusses a number of related challenges too in order to help any educator interested in introducing tele-collaboration into their curriculum to avoid pitfalls and make more informed decisions.

Introduction

In today's globalised workplace, collaboration across cultures and geographical locations, rapid exchange of information and efficient management of constantly updating knowledge require not only robust IT infrastructure but also a range of digital literacies on the part of employees and employers. The use of communication technology can be found among the four 'mega trends' that Shuman et al.[1] specifically identify for the field of engineering, alongside changes forced by the fragile world economy, student and professional mobility, and the increasingly loud voice of the social imperative. This poses challenges for educational institutions which, beyond helping students become subject experts, need to take the responsibility for preparing them to 'deal with global communicative practices online, in all their complexity'[2]. This trend toward developing skills needed to fully operate in highly globalised and cross-cultural settings as a necessary top-up to 'technical core competencies'[3] has become very clear in engineering education.

Most engineers will emerge from their degree courses needing to interact with fellow-engineers and - an even greater challenge - frequently non-engineers in both online and face-to-face settings. They need to be able to explain in an accessible way how their innovations function, and troubleshoot whenever the communication breaks down. According to Lucena et al.[4], "[t]oday, engineers throughout the world must take it for granted that they will work in other countries or be employed alongside people who have been trained in other countries". In light of this, there is a growing need for a range of underlying 'meta-competencies' in order to ensure employability as well as gain employment opportunities guaranteeing stimulating lifelong career-development opportunities. These benchmarks for success include: "an ability to learn how to learn, an ability to form learning communities, and an ability to collaborate in distributed corporate settings, across countries, continents and cultures"[3].

Universities attempt to capture the demand for the new skillset by revising and extending the existent intended learning outcomes (ILOs) to include references to the meta-competencies. Biggs and Tang[5] note that the most effective ILOs will challenge students to go further than 'solve' or 'explain', asking instead to 'apply to professional practice', 'hypothesise', 'reflect', even 'relate to principles', in short to demonstrate the so-called higher-order thinking skills, with the ultimate aim of developing a thrice-strong student: a scholar; a lifelong-learner, and a global citizen. To embrace this challenge, universities also devise lists of 'graduate attributes', which they actively promote among the student population and encourage staff to embed into course designs (e.g. the University of Glasgow 'Graduate Attributes Matrix': http://www.gla.ac.uk/students/attributes/).

These newly-identified requirements must in turn impact pre-sessional courses, i.e. language and study skills provision offered to international students prior to their postgraduate study at an overseas university. By definition, teaching English for Specific Purposes (ESP), for example for engineers and scientists, foregrounds the learners' specific needs and focuses on

context, situational practice, cross-cultural issues, authenticity of communication and materials[6] [7]. For these reasons, informational communication technologies (ICTs) have become very attractive tools in the context of ESP. The technology itself is not a method, and any use of it does not automatically result in improvement in learning or teaching[8]. Rather it is the ways in which it is used, purposefully and thoughtfully, that may lead to learning. The affordances of the so-called Web 2.0 tools are such that they allow networked-based language teaching, moving beyond simple information transfer[9]. They can provide an opportunity to collaborate and engage in authentic communication and an exchange of up-to-date knowledge closely related to the students' prospective profession, and, by so doing, to become accepted members of the discourse community. The effect on the learner can be empowering[10].

The EAST project, presented and evaluated in this article, is deeply rooted in the recognition of the expectations of engineering graduates, and in the potential ways digital technologies might 'foster global awareness in classrooms [and] students' understandings of the interrelationships of peoples worldwide, thereby preparing students to participate meaningfully as global citizens'[11]. The very name of the project, which stands for English for Academic Study Telecollaboration, aims to acknowledge the facilitation of relationships between people, experiences and knowledge at a distance, through technology. The technology-enabled interventions to the course design discussed in the subsequent sections may rely on technologies that are well-known and already widely-used. However, the article focuses on the innovative practices of the teachers and students in a particular context. By doing so, it attempts to demonstrate that technology integration that is closely aligned with the learners' needs and well thought-out pedagogical goals may maximise the learning gains for the students. In this particular context, within the framework of a pre-Masters language preparatory course for engineers, introducing networked-based learning allowed the students to develop a range of soft skills, or 'professional awareness' skills (as Shuman et al.[1] prefer to call them), increasingly accepted as key to the growth of the rounded engineer, noted above, with the more traditional 'hard' skills necessitating the development and enhancement of a considerable range of digital literacies.

Background

The EAST project is part of an intensive pre-sessional course taken by overseas students wanting to study at the University of Glasgow (UofG). It provides training in language and study skills needed for successful study in a British academic context, and is organised month on month in several blocks that progressively demand more of the students. The last block of the pre-sessional provision introduces students to subject-specific discourse and conventions, one of them being a Science, Engineering and Technology (SET) strand. As part of the curriculum, the students are exposed to authentic lectures and undertake field trips related to their discipline. They also conduct mini-research into a subject-specific problem of their choosing, to produce a 1,500-word assessed assignment of a Situation-Problem-Response-Evaluation format. This is accompanied by an oral presentation during which the students summarise their findings, and field questions from peers and tutors.

It is this last subject-specialist stage of the pre-sessional course that provided a wider context for the EAST project, and summer 2015 saw the addition of a core telecollaborative component. The engineering students from the partner institution, the Islamic University of Gaza (IUG), were asked to provide an initial engineering-related problem for the UK-based students to research over the duration of the SET strand's five weeks. The ongoing content-oriented feedback from the critical friends in Gaza was expected to help the UofG students to fine-tune their understanding of the real-life situation and analyse and evaluate possible ways of resolving it. This idea presented considerable opportunities, as well as interesting and intertwining challenges in terms of course organisation, technology and pedagogy.

Projected outcomes

Leaving aside the adoption (or otherwise) of a partnership with overseas students, the outcome of a successful course for the UofG students was clear from the outset: an overall exit grade allowing progression to their Masters course at the University. But the addition of a telecollaborative component promised additional benefits:

- enhanced language practice through development of communication skills in English;
- development of team-working skills;
- development of problem-solving skills;
- increased cross-cultural awareness;
- enhanced digital literacies.

The need for collaboration, and the development of the 'soft' skills, specifically intercultural awareness, were key as they directly respond to the demands of the engineering market discussed in the Introduction. Overseas students studying on the UofG pre-sessional course often come from learning environments that do not prioritise such approaches. Therefore, an early introduction to networked learning promised better chances for students of settling into the UofG, as well as the workplace awaiting them beyond graduation.

The IUG students, unable to join a Masters programme in the UK, would (it was hoped) gain the same core benefits listed above. Since they were participating in the project during their summer holidays, other incentives were offered:

- online training in providing constructive feedback; although this was closely linked to the role they were expected to take on during the EAST project, it was also believed that the development of their critiquing skills could benefit them when collaborating in wider professional contexts;
- an end-of-course certificate to document participation, re-imbursement of travel costs within Gaza from a small fund provided by the UofG, and the inclusion of their names on the project website.

Beyond these tangible outcomes, it was hoped that the EAST Project would also open an 'online window' to a wider academic community beyond Gaza, helping to overcome the feelings engendered by lack of mobility, and that the pilot may grow into a more rooted collaboration, with further possibilities for the future development of employability skills and/or postgraduate scholarships.

Project organisation

The beginnings of the project were logistically challenging, as only approximate UofG student numbers could be predicted; based on the previous year's enrolments, around 40 SET students were expected. Having analysed various scenarios with regard to groupings and how each of them would affect the staff workload in terms of management and monitoring, we decided that between 26 and 28 IUG students would need to be recruited. These would then be divided into pairs according to their specialisations and each pair asked to provide a set of 4 to 5 authentic engineering challenges. The UofGstudents would have to choose from the set. 13/14 research groups consisting of five members each (3 from UofG and 2 from IUG) would then be formed. Students in Gaza and Glasgow would subsequently work together at the research stage, but the Glasgow-based students would then write their Subject-Specific Essay of course alone (the essay forming part of the 'gatekeeping' function of the SET course). The final presentation would be delivered by groups of UofG students to a combined audience in Glasgow and Gaza. The task of the IUG students was to provide the initial problem, feed back mid-project on the responses the UofG students proposed, and to observe/comment on the final presentations. This looked neat and clear on paper, but in reality proved to be a much messier process.

The following sections outline the project milestones and timeline in more detail, indicating challenges and opportunities when appropriate. Phases 1 and 2 refer to time prior to the commencement of the project (although phase 2 overlaps with the subsequent stage), and Phase 3 covers the duration of the tele-collaboration between UofG and IUG students.

Phase 1: The EAST Project presented in Gaza

Prior to the start of the SET Pre-sessional course at UofG, the IUG partner selected appropriate candidates from those students who had expressed an interest in participation. The selection criteria included an engineering-related specialisation, a good communicative command of the English language, and willingness to commit to 5 weeks during their summer holidays. The bulk of those selected were from a science background, e.g. Electrical Engineering, Civil Engineering, Software Engineering, Mechanical Engineering, Engineering with Management, although three students with language backgrounds were also included to offer language support and to ensure sufficient numbers. It was decided these non-engineers would be paired with an IUG scientist, thus marrying the language and science needs of the subsequent tasks.

The IUG participants were then able to meet the UofG organisers, who further explained the EAST project and took questions. The two introductory sessions were held via WiziQ, a virtual room providing facilities for online presentations and communication in real time, available courtesy of IUG. Information was also provided via a project website, particularly its blog: https://easttelecollaboration.wordpress.com. Following two synchronous introductory sessions, 26 IUG students opted in. They joined a closed Facebook group for ease of communication, and were offered online training in providing constructive feedback.

Phase 2: Training in constructive feedback

The training in constructive feedback consisted of a sequence of 5 tasks delivered via Google Docs and spread over three weeks in July and beginning of August. The tasks followed the exploration-integration-application format, inspired by Garrison and Arbaugh's practical inquiry model[12], and were released one by one for the students to complete in groups of 3-4. The sequence started with personal reflections on the experience of receiving and providing feedback posted in multimodal format to an online noticeboard: http://bit.ly/22rKzQn. Next, in an information-gap reading activity, the students researched constructive feedback, then shared findings within their groups in order to compile a list of principles and good practices. In order to construct meaning from the exploration phase the students read short examples of feedback provided in a range of fictitious situations and evaluated them from the point of view of appropriacy, constructivity, politeness and other criteria they had agreed on earlier. The next integration-oriented task asked them to read a short piece describing a UK engineering-challenge, and then to read two examples of feedback on the piece, one constructive, one less so, selecting the more constructive of the two. The last activity, aiming at application of the skills and knowledge, required each group to provide constructive feedback on one of three short pieces on engineering challenges in Gaza (regarding power-cuts, groundwater contamination, and water shortages for agriculture).

The inputs in the last two stages of the sequence had been written by the English language teachers at UofG, who had only limited knowledge either of engineering or of the myriad difficulties facing people in Gaza. For the purposes of the desired training in constructive feedback, we posited this as a potential advantage; the IUG students, 80% of whom were studying engineering at a Master's level, would be presented very quickly with a lay analysis, similar to that which could be expected from many of the incoming UofG participants, and would need to tailor their feedback accordingly. While not seeking to ignore the scale of the problems in Gaza, we were concerned that immediate exposure to the full scale of the challenges facing the country would prove too daunting for the UK-based students, and we also hoped that our IUG partner-students would bear this in mind, particularly in the initial stages of the collaboration; it was better that any frustration from Gazan participants was expressed to us the organisers, prior to the commencement of the collaboration (when, of course, IUG participants could elect to leave without damaging the project) rather than during the project itself.

Not all the groups completed the task and, in the case of those who did, the extent of each team member's participation was hard to quantify. However, taking a more qualitative approach to analysing the content of the students' responses, some interesting insights can be drawn. The constructive feedback from IUG participants was very varied. Some attempted to remedy perceived language issues but, as organisers, we had to ensure that IUG participants avoided any language-assistance (which would cast doubt on the end-of-course language report given to the UofG students). Some, unsurprisingly, noted the lack of technical know-how of the writers; some were understandably frustrated by the unspoken political issues that underlay the responses proposed and that will condition even the best-intentioned and best-resourced suggestions; some were able to accept these shortcomings and to provide supportive comments nonetheless. All, without exception, responded in a valid manner. The feedback we as organisers were able to give on the IUG participants' comments, drawing on the different strengths of each group's responses, set up the next phase sufficiently well.

Phase 3: The EAST Project (August 2015)

Parallel to engagement in the generic constructive feedback training, the IUG participants were asked to identify the problems they hoped would be of interest to UofG students. Ultimately, only 10 IUG groups submitted, two having missed the deadline, due respectively to power cuts, and to other commitments. This shortfall created some (surmountable) organisational difficulties during the twinning of UofG and IUG student-groups.

In the end there were 36 students on the SET pre-sessional course in UofG: 60% were Chinese, 20% spoke Arabic as their first language, 15% were from Brazil (undergraduates) and the remainder from Taiwan, Thailand and Italy. When presented with the project and the scenarios, most of the students expressed a very limited awareness of the issues facing Gaza. The formation of the UofG groups-of-three was initially a messy process, but the groups (of different mother tongues) were formed successfully, each centred around a problem sent from IUG:

- Generating electricity for wastewater treatment
- Water drainage and sea pollution in Gaza
- Toxicity of pesticides in Gaza
- Groundwater salinity in Gaza
- Road traffic and effects on the environment
- Development of Arabic optical character recognition (OCR)
- I.T. applications in medicine

Having formed the groups, the students could begin collaborating, following the time frames detailed in the project brief (see Table 1 below).

Table 1: Subsequent tasks and approximate timeframes for UofG and IUG students participating in the EAST project.

Time	UofG students (sts)	IUG students	Staff
Week 1	Sts joined the communal Facebook group and scenario related groups to facilitate collaboration. Some groups opted for other technologies, eg Skype, Whatsapp, etc.		Staff could access Facebook groups and were on standby to help to troubleshoot. The use of other technologies was not monitored.
Week 2	Sts researched the selected scenario via library and the Internet.		
		Sts provided constructive feedback on the preliminary analysis and answered outstanding questions.	
	Based on the feedback, they wrote the first draft stating the problem and one fully-written response.		
Week 3			UogG staff provided feedback on language and structure.
Week 4	Sts continued researching and writing up.	Sts continued to guide by providing content-oriented comments.	
Week 5	Sts submitted essays and delivered short presentations.	Sts attended presentations via a video link and asked questions and commented. They were asked to produce short video clips illustrating the effects of the topic of the collaboration.	UofG staff provided summative feedback on essays and presentations.
	Presentation of video clips from IUG students. Presentation of certificates of participation to IUG students. Social time.		

Evaluation of the EAST Project

An anonymous online questionnaire was distributed to participants from both universities on the final day. It consisted of a series of closed and open-ended questions, the latter having

been included in order to gather some qualitative data. The response rate was high at 81%, with 27 responses from UofG students and 19 from their IUG peers.

This section presents data relating to the perceived gains in the students' development within the following five areas (aligned with the project's intended outcomes):

- communication skills in English
- team-working skills
- problem-solving skills
- cross-cultural awareness
- enhanced digital literacies

Communication skills in English

According to the Graduate Attributes Matrix from the UofG, an effective communicator is able to 'articulate complex ideas with respect to the needs and abilities of diverse audiences' and 'communicate clearly and confidently, and listen and negotiate effectively with others'. This may be a challenge for many international students, particularly when it comes to non-academic settings. Referring to the work-placement elements of many US engineering courses, Wood[13] notes that students for whom English is a second language often experience difficulties; while "their academic language ability may be sufficient to manage their coursework, they struggle to cope with the communication demands of a workplace context". This may of course be further complicated by the need to use technologies to communicate across borders and cultures.

When asked about the perceived comfort when having to communicate in English prior to the project, participants from both institutions expressed a degree of uncertainty - just over 60% felt just 'quite comfortable' (see Table 2). Glasgow-based students experienced lower levels of comfort, as demonstrated by higher percentage of those who felt 'uncomfortable' and lower proportion of those who felt 'very comfortable'. This may be attributable to the greater familiarity with collaboration and technologies among IUG students, born of necessity (the already-mentioned 'window' to the wider world).

Table 2: Before the EAST project, how comfortable were you with communicating in English with others via technologies?

	All participants (%)	UofG participants (%)	IUG participants (%)
Very comfortable, no problems at all	21.7	11.1	36.8
Quite comfortable	63	66.7	57.9
Rather uncomfortable	15.2	22.2	5.3

In regard to the evaluation of usefulness of the project for developing communication skills, more than half of the participants from each institution agreed that it was very useful (see Table 3). UofG students seemed more appreciative in this respect, perhaps valuing extra opportunity to practise their English and so prepare better for the pre-sessional course assessments. 16% of IUG students saw the project as just 'a little useful' for the development of communication skills, possibly reflecting the higher level of English among IUG participants and their greater experience of communication in English.

Table 3: To what extent was the project useful in developing your communication skills?

	All participants (%)	UofG participants (%)	IUG participants (%)
Very useful	56.5	55.6	57.9
Quite useful	37	44.4	26.3
A little useful	6.5	0	15.8
Not useful	0	0	0

Looking at the qualitative comments, some interesting insights can be gained. Students from both universities appreciated being put in a situation in which English was the sole medium of communication when working with people from different linguistic backgrounds. *'Our group was formed by 3 students of different nationalities. So we needed to speak just in English and be as clear as possible'*. This comment from a UofG student (original spelling and grammar) mirrors very closely the professional settings engineers nowadays often work in, noted in the Introduction. Increased practice opportunities had a direct impact on their perception of their level of English: *'I think the way it improve my communication skills like when i say that i moved from the intermediate level to advanced level'* (IUG student).

Having to communicate with others also had diminished affective factors, particularly feelings of fear or anxiety related to making mistakes, as demonstrated in the following comments from the students: *'I have overcome my fear of communicating with english speakers and enjoy it'* (UofG student); *'I think I have courage now to try speaking English without spend a lot of time to order the words in my mind or be afraid of grammars faults'* (IUG student); *'It was my first experience to talk with others in the English language therefore as an incentive for me in order to work on improving my experience in communication, since the only communicative for me was between family and friends...there these give me more daring and self-confidence'* (IUG student).

Communication with unknown peers also motivated students to participate more actively than they might otherwise have done: *'Presenting a work of a subject I barely knew five weeks before, to people I did not know, with different backgrounds and cultural characteristics requires twice more preparation than to present a known subject to my peers'* (UofG student); *'keeping in touch with people that I newly know them, and when they ask me*

help it is really important that how I feel that I should help them, even if I was so tired and just arrived from work or even have to work on something else' (IUG student).

The students became aware of appropriacy issues, and of the need to treat their interlocutors with sensitivity and respect: *'For example, we said hello at the beginning and use suitable words like "could you please". Also, considering about the special situation of them, we avoid asking questions which have some relationship with the sensitive aspects'* (UofG student); *'At first, I didn't know how to communicate with foreigners online and I needed to check whether it was an appropriate phrase before talking to them. But I don't worry about that now, because I don't think it's so difficult'* (UofG student); *'i was had a problem in the using of slang language in my writing but with communication with UK uni team i try to avoid this problem and i feel that's good'* (IUG student).

Lastly, they noted the benefits of the project for the development of subject-specific language: *'We have been pushed to move on the topic by expressing what you think and improved our spoken English in the process'* (UofG student); *'For example. In this project, our communication would not only be limited to the daily language. but the professional language. So it is a good practice'* (UofG student).

It has to be acknowledged though that some participants felt that communication with native speakers would be more beneficial: *'The project was very useful although if the project was with other universities inside the UK might be more useful rather than Arabic country, because they can correct some mistake in term of speaking'* (UofG student); *'Maybe contacting native speakers would be more effective on our communication skills'* (IUG student). Such perceptions are justified, although undertaking a collaboration with English native speakers would raise a different set of challenges; international students having to collaborate with native speakers often complain about such partnerships being actually counter-productive and frustrating because of communication breakdowns and misunderstandings, which are often less likely among those who already have some awareness of operating in an English as a lingua franca environment[14].

Team-working skills

No learner, even within subject-specific constraints, exactly mirrors another; each brings different experience and knowledge, from varied backgrounds, and each will have preferences in terms of learning preferences. But despite these differences, students tend to learn better when working together, and the value of collaborative learning as an alternative to longer-established teaching methods has been long-acknowledged. With regard to engineering in particular, as Schaeffer et al.[3] put it (referring to engineers across a range of specialisations) 'learning is inherently social, which makes student interaction an important part of education', and alongside the value added by fostering creativity, the engineering educator should aim towards activities that encourage interaction, and that recognise the fundamental importance of process over mere product. The ubiquity of the internet means that any learning environment will also ideally ensure that these processes require

participants to work online, to 'negotiate, construct, and reconstruct new meanings from the contributions of others, in a genuine process of shared knowledge construction'[15]. Team-working skills are sought-after in academic and professional settings alike. The University of Glasgow Graduate Attributes Matrix expects a student to be 'experienced in working in groups and teams of varying sizes and in a variety of roles' and to 'conduct themselves professionally and contribute positively when working in a team'.

As was the case regarding communication in English, the majority of participants expressed their views on the perceived ease with teamwork with some caution. And again, the IUG students seemed to feel more confident about working in teams (see Table 4).

Table 4: Before the EAST project, how comfortable were you with team working?

	All participants (%)	UofG participants (%)	IUG participants (%)
Very comfortable, no problems at all	28.3	14.8	47.4
Quite comfortable	60.9	70.4	47.4
Rather uncomfortable	10.9	14.8	5.3

This result is interesting because, in response to a different question about experience in collaborative work, almost 40% admitted they had 'none' and nearly 50% just 'a little'; the spread was more or less equal across both institutions. Similarly, just over 70% had no experience of any kind in online collaboration. Considering this, it was heartening to see the positive manner in which the students approached the prospect of working together.

In regard to the perceived usefulness of the project for developing team-working skills, a considerable majority of students from both universities thought of it in very or quite positive terms (see Table 5). The number of more sceptical students was the same as in relation to communication skills but spread more evenly across the two institutions. This may be due to the disruptions caused by electricity shortages in Gaza, and frustrations related to tight deadlines. In addition, Glasgow-based students, under the pressure of assessment, needed to switch back and forth between individual and group work.

Table 5: To what extent was the project useful in developing your team working skills?

	All participants (%)	UofG participants (%)	IUG participants (%)
Very useful	54.3	55.6	52.6
Quite useful	39.1	37	42.1

A little useful	6.5	7.4	5.3
Not useful	0	0	0

Some of the open comments shed light on how the collaboration proceeded. The students learnt a lot about processes related to team work, such as time and task management and the importance of listening to each other: *'In this project, we learn to distribute the jobs, and share the ideas. And sometime even learn to compromise'* (UofG student); *'It allowed me to share my thoughts with others and work on the distribution of work between us more…'* (IUG student); *'The solution was the main part to show that skill. Each of us would persuade others that her or his solution could be helpful for current situation in Gaza. communication, argument and clarification were all the positive results of co-working'* (UofG student).

However, collaboration did not always go smoothly. It seems that success often depended on the individual characteristics and learning preferences of the team members: *'Usually my Glasgow partners used Chinese to communicate in our meetings. No relevant team working was developed since they were reluctant in using English'* (UofG student). This contrasts with: *'team working helps in exchanging knowledge. we used to do the task individually, then compare the answers and sum up with a mixture of them. The result was fantastic! I was very happy to work in a group and have the support and courage to continue'* (IUG student).

Problem-solving skills

A course that can allow students the freedom to develop their own ideas, by experimenting, but without losing academic rigour or abandoning measurable outcomes, will in most cases ensure greater breadth *and* depth of learning overall, as it reflects the situations that students will find in the real world, where issues are often multi-faceted, and choices rarely binary. The ability to face up to the untidiness of the real world is obviously a key attribute for a student to develop; as Jonassen et al.[16] put it, 'Engineers are hired, retained, and rewarded for their abilities to solve workplace problems'. They point out the significantly different cognitive processes involved in facing the well-structured story problems often presented in engineering courses, and the complex and ill-structured problems that are often encountered in the workplace.

Looking at the data in Table 6 relating to the perceived confidence in solving problems prior to the project, the students seemed more positive in their assessment (in comparison with communication or team-working skills). The IUG students in particular considered it to be their strength, which probably results from some exposure to professional experience.

Table 6: Before the EAST project, how comfortable were you with problem solving?

	All participants (%)	UofG participants (%)	IUG participants (%)
Very comfortable,	26.1	11.1	47.4

no problems at all			
Quite comfortable	69.6	81.5	52.6
Rather uncomfortable	4.3	7.4	0

They still found the participation useful in consolidating and developing further the ability to investigate the problems and solutions. The UofG students were a bit more sceptical, as demonstrated by one third of them evaluating this aspec as just 'a little useful' (see Table 7).

Table 7: To what extent was the project useful in developing your problem solving skills?

	All participants (%)	UofG participants (%)	IUG participants (%)
Very useful	56.5	66.7	42.1
Quite useful	34.8	29.6	42.1
A little useful	8.7	33.3	15.8
Not useful	0	0	0

This scepticism may have originated in the ambiguity of the term 'problem-solving'. The engineering-related scenarios from the Gazan context lent themselves really well to a multi-faceted analysis, and to creative and innovative thinking, as the variety of unexpected constraints restricted the application of the most obvious solutions. This was a conscious choice, as 'encourag[ing] students to embrace ambiguity, avoid premature closure, and increase reflection may greatly improve their creative skills'[17].

The EAST project however presented other instances when problems had to be confronted. For example, the fact that the members within one group often represented different specialisations may have complicated collaboration even more, as this could require more negotiation when diverse views were presented. Overall, the variety of forms the problems could assume - linguistic, technological, cultural - may have led to misunderstanding of the 'problem-solving' question posed.

Some of the open comments supported this hypothesis. Looking at the data, it appears likely that many had understood the question to refer specifically to the Gaza-related problem that they had been working on, rather than a generic improvement (or otherwise) to their problem-solving skills. *'We found the references which use good methods and solutions in other countries. And evaluate whether these responses can used in Gaza'* (UofG student); *'In this project, I learn to choose the best solution for a problem, catching the context and filtering the nonsense plans at the same time'* (UofG student). However, it is hoped that the students will nevertheless use their experience to reflect on the cognitive processes that take place when solving complex problems in teams in more general terms; it seems they were able to

identify what this process entails: *'I like how they give different solutions and then start to compare and contrast between the possible solutions. This was great'* (IUG student); *'I always have these problem i never get to solve problems well... but in these project when we had some problem everyone has his own way to deal with it i really took benefits in this i learned how to think first then take actions'* (IUG student). These comments also suggest that the potentialities of the socio-constructivist framework[18] might be exploited in future by the students, who will also be able to better use online environments to 'negotiate, construct, and reconstruct new meanings from the contributions of others, in a genuine process of shared knowledge construction'[15].

Cross-cultural awareness

Among the trends in university engineering education towards experiential, collaborative, creative problem-solving, Katehi and Ross[19] posit one final key 'professional awareness' aspect to any well-grounded tertiary-level engineering course: intercultural competence. Downey et al.[20] focus more closely on the specific manner in which experience of working with overseas colleagues may be of benefit: 'Learning to engage understanding and ways of thinking about work that differs from your own would seem to be an obvious objective of any type of employment in a globalizing world. However, it has special significance for engineering education because of the core focus in engineering of problem-solving'. Schaeffer et al.[3], referenced in the introduction, champion intra-institutional collaboration between students, but if this can be broadened to embrace students in other countries, there is the opportunity to move beyond the social skills that co-operation and teamwork can foster, to a much deeper (and potentially more valuable) development of a cross-cultural competence.

In regard to the participants' feelings of confidence, cross cultural awareness did not emerge as a strength (see Table 8) prior to the course. One fifth of the students felt uncomfortable, with numbers among IUG students higher than among the Glasgow-based cohort, perhaps attributable to the socio-political context the students operate within on a daily basis.

Table 8: Before the EAST project, how comfortable were you with cross-cultural awareness?

	All participants (%)	UofG participants (%)	IUG participants (%)
Very comfortable, no problems at all	19.6	3.7	42.1
Quite comfortable	60.9	81.5	31.6
Rather uncomfortable	19.6	14.8	26.3

Table 9: To what extent was the project useful in developing your cross-cultural awareness?

	All participants (%)	UofG participants (%)	IUG participants (%)
Very useful	60.9	55.6	68.4
Quite useful	28.3	33.3	21.1
A little useful	10.9	11.1	10.5
Not useful	0	0	0

However, as Table 9 demonstrates, the post-project evaluation proved very favourable, with 61% of participants appraising the EAST as very useful in developing their cross-cultural awareness, the highest proportion across the five outcomes. The UofG students, being based in an international environment at the time of the project, appreciated the specific rather than general aspects of the cross-cultural collaboration, namely the opportunity to learn about a region and culture that they were little familiar with: '*This kind of project will aware you that what is happening around us*'; '*Let us realize the current situation in other countries;* and '*I just knew that there were wars in Gaza, but I didn't know to what extent they influence in daily life of the people there*'. The IUG students looked at the experience in more general terms: '*I learned how to respect the cultures of others....before the project it wasn't a big thing, but when I dealt with others with each one has its own culture, my view of the subject really changed...i actually get to know some cultures and really impressed by some*'; '*If you ask me what is the most useful thing that you take it from this project i will certainly say the knowledge about cultures, its great thing to share your ideas and thoughts with other people you have just know them, also you can get a full of useful when you chat with them about their habits, thoughts, living and many thing relating to their lives not just taking about the education or college :)*'. However, they also valued the fact that they could educate their international peers about the situation in Gaza: '*Listening to other people from other nationalities thinking with our problems and solve it is very supportive. Of course, we communicate with other students from different nationalities. I also participate in raising cultural awareness about my country and its problems*'.

Digital literacies

The project would not have been possible without the use of technology, and the development of digital literacies was one of the principal aims. There is often an argument that today's youth belongs to the 'digital native' generation, a generation that lives and functions offline and online equally comfortably[21]. Increasingly, however, research suggests that the students may be familiar with social networking sites, as they use them for communication with peers and family, but may struggle with appropriate uses of technology for educational and professional purposes[22]. The focus here is not so much on the skills in using software and hardware but the selection, purposeful use and critical appraisal of tools and online content; hence the use of the word 'literacies' and not 'skills' in the heading. It

was hoped the students would develop these literacies by conducting research and collaboration in online environments.

The survey results are surprising (see Table 10). First of all, almost one fifth of the participants admitted to feeling uncomfortable about using technology before the EAST Project. It is unknown whether that referred to knowing how to use hardware or software, or the digital literacies per se. The lack of confidence was more pronounced among Glasgow-based students, which may be related to their lack of experience in using technology for work or study-related purposes.

Table 10: Before the EAST project, how comfortable were you with digital literacies?

	All participants (%)	UofG participants (%)	IUG participants (%)
Very comfortable, no problems at all	23.9	7.4	47.4
Quite comfortable	56.5	66.7	42.1
Rather uncomfortable	19.6	25.9	10.5

Table 11: To what extent was the project useful in developing your digital literacies?

	All participants (%)	UofG participants (%)	IUG participants (%)
Very useful	32.6	29.6	36.8
Quite useful	58.7	63	52.6
A little useful	8.7	7.4	10.5
Not useful	0	0	0

Student appraisal of the usefulness of the project in respect to the development of digital literacies is much less favourable than for the other four outcomes (see Table 11). While communication, team-working, problem-solving, and cross-cultural awareness attract 'very useful' ratings among the majority of the participants, in the case of digital literacies, only one third felt that the experience had contributed to an enhancement.

The open comments in response to the question engendered fewer responses than for the other outcomes, suggesting that the students viewed 'digital literacies' as the particular technical skills in using software and hardware. This perception probably explains reference to actual skills that the student practised during the project: '*the project developed my writing and printing skills*' (IUG student); or understandings of how certain technologies

work: *'Actually, I think the topic doesn't have much relation to my subjects, but I found an article using the latest technology-data mining to solve it. I learn a lot and i know once are you thinking, anything has a relation to each other'* (UofG student). One IUG student asserted: *'Well, I am an Information Technology graduated girl :D'*, which points to her already high level of technology-related skills, which a simple telecollaboration may not affect to a significant degree. The understanding of 'digital literacies' appears to us worth addressing and discussing with students when the next version of the project is run as, based on the ratings for the other four skills, it seems the students did use technology in purposeful and critically valid ways.

Discussion of challenges

The University of Glasgow perspective

It must be stressed that the EAST project formed just one part of the pre-sessional course, supporting the Subject-Specific Essay and the related presentation, both of which contributed only partially to the end-of-course writing and speaking scores. As reading and listening inputs were wholly unrelated to EAST, it can be speculated that the EAST Project formed no more than 25% of the UofG students' overall assessment. There was concern from the UofG organisers that students might not consider the efforts put into the EAST Project commensurate with the potential outcomes. Though post-course evaluation did not bear this out, any future developments will need to consider the global requirements of the UofG participants, i.e. their need for tasks that will both develop and provide certifiable outputs in *all* of the skills areas needed for their future survival in linguistic and study terms in their coming Masters courses.

Regarding specifics, one area to focus on in future would be closer monitoring of the 'outline' stage. Weaker groups, perhaps overawed by the scale of the problems facing Gaza, tended to present a first draft heavily-weighted towards the 'Situation' at a global level, e.g. 'What is global warming?', showing reluctance to engage with any actual responses. If the project is repeated in the future, we should encourage them at this stage to imagine the problem as a purely scientific issue, i.e. divorced in this initial stage from the particularities of the situation in Gaza. For example, a group looking at the problems associated with global warming and agriculture in Gaza could be asked to look at the problem (and potential responses) from the perspective of a coastal community in their own country; it would be the task of the IUG partner-group to point out subsequently the applicability of their suggestions (or otherwise) in the Gazan context.

Last but not least, what needs to be taken into account is the increased workload and time demands for both students and staff, resulting from having to manage communication in online environments, mostly in an asynchronous (delayed) mode.

The Islamic University of Gaza perspective

Facing and overcoming challenges in different aspects of life is a Palestinian reality, and by equipping their students and graduates' with enhanced knowledge, 'attributes', skills and values, universities such as IUG hope to improve their future prospects. However, some challenges are beyond the resources available to these institutions. One of the difficulties IUG faced was matching the specialisation of UofG students to their counterparts at IUG. For example, IUG has no postgraduate programmes in the fields of Statistics, Marine System Science, or Mechatronics (three fields presented by individual UofG students). This challenge was resolved by choosing students who have similar specialisations, such as mechanical engineering and electrical engineering.

Another challenge was related to the timing of the EAST project, which was held during the summer holiday of IUG and (partially) during the month of Ramadan. The perseverance and determination of the participants, all of whom joined the project as volunteers, enabled them to overcome this combined challenge. The bottom line in Gaza is unemployment, particularly amongst Gaza's youth where it exceeds 60%[23], and the determination among the students to build a better future for themselves, their families and community was visible to the UK partners from the outset.

Ways Forward

Already during the introductory sessions for the IUG students, it was felt that the set of benefits for both groups was imbalanced, to the detriment of IUG. They asked about input specifically designed for them but this request could not be accommodated at the time of the pilot. UofG students also commented on this unequal distribution of benefits and felt that greater involvement of the Palestinian partners would be welcome. In fact, they made a number of suggestions of how this engagement could manifest itself:

- IUG students could present the initial problem in a more elaborate and detailed form, including multimodal formats, e.g. video.
- In the latter stages of the project, IUG students could write a short essay which formally evaluates the solutions provided by UofG students; alternatively they might provide their own solutions, in the form of short academic presentations on the final day, following on from their UK partners'.
- IUG students could be given access to UofG Library online databases during the project in order to facilitate search for sources relevant to the EAST project as well as their own, non-EAST-related research, should they wish.

One way to redress this imbalance could be to build in some form of remuneration for the work undertaken by the IUG students, especially given that the pre-sessional course in Glasgow coincides with the summer holidays in Gaza. IUG students could provide assistance with technologies, manage the students' interaction on Facebook, or oversee the Project's wider presence on social media. A mentoring scheme could be instituted, pairing UofG students with more experienced partners in Gaza, and this might also be extended to include other 'leadership by example' skills such as coaching in research, helping with goal-setting,

asking effective questions, and establishing a Socratic dialogue. Performing such duties and/or undertaking more extensive training would strengthen the employability skills of the students in Gaza.

Leaving aside the imbalances of the pilot, an issue touched on by students at both universities was the perception that lingua franca communication was less valid than communication with L1 speakers. We hope that we have made the case for the many benefits of the former in this article, but perhaps the upside of communicating with non-native peers needs to be made explicit to all students from the outset, and parallels with real-life workplace scenarios emphasised. But of course a possible extension of the project to include L1 engineers would be a very exciting prospect, one to be encouraged should partners present themselves in future (the potential value, too, to the L1 speakers need scarcely be emphasised).

Another learning outcome from the pilot suggests that 'niche' SET groups might be formed; the small number of UofG statisticians in particular struggled to find common ground with their UofG (and IUG) collaborators, and a cross-border subject-related group might be beneficial in future (this had been considered initially, but discarded for organisational reasons).

These are all ideas leading to a deepening of the collaboration initiated between the two universities; of course the project scope could also be *broadened*. One potential avenue being explored involves expansion of EAST to embrace those studying biomedical sciences at UofG and IUG (the problem-based learning approach to medical training at UofG opens up potentially stimulating options for pre-sessional language-enhancement collaboration). Looking for ways of involving other universities is also a route that appeals, hence our desire to address ASEE members directly in New Orleans, in order to gauge possible interest from a U.S. partner institution or business.

Conclusion

This article has presented a writing and research collaborative project between Palestinian engineering graduates in Gaza and international students preparing to study SET disciplines at a British university. Although small-scale, we feel that the EAST project has allowed the UofG and the IUG to promote greater risk-taking, student-student interaction, and creativity, and hope that this analysis may also offer insights of value to other universities. Specifically, we hope that the EAST project has demonstrated how technology-enabled interventions to course design may positively affect the learning experience for overseas student-engineers, enabling participants to start working towards a potentially invaluable global competence, i.e. an 'ability to work effectively with people who define problems differently than oneself'[20].

But the benefits of the project did not start and end with the student-engineers; as teachers, we engaged in the same process as our students. Through devising and co-ordinating the project, establishing and managing meaningful learning experiences in online environments, we too developed to a noticeable extent the five core skills discussed in the article. Thanks to

the 'distance' element, we feel that our classrooms and our institutions have 'become 'flatter' and more 'connected'[24], with knowledge, skills and values flowing across geographical and cultural borders. We are English language teachers, not engineers, but we feel the EAST project foregrounds the global cultural consciousness not only in terms of cultural literacy, that is learning about other cultures, but also what Kumaravadivelu[25] terms cultural 'liberty', i.e. learning *from* other cultures, something of considerable value to language-learners, to engineers, and (of course) to language-learning engineers the world over.

References

1 - Shuman, L. J., Besterfield-Sacre, M., McGourty, J. (2005) The ABET 'Professional skills': Can they be taught? Can they be assessed? *Journal of Engineering Education*, 94/1, 41-55. (43)

2 - White, C. (2007) Focus on the language learner in an era of globalization: Tensions, positions and practices in technology-mediated language teaching. *Language Teaching*, 40/4, 321–326. (325)

3 - Schaeffer, D., Panchal, J.H., Thames, J.L., Haroon, S., Mistree, F. (2012) Educating engineers for the near tomorrow, *International Journal of Engineering Education*, 28/2, 381-396.

4 - Lucena, J., Downey, G., Jesiek, B., Elber, S. (2008) Competencies beyond countries: The re-organization of Engineering Education in the United States, Europe and Latin America, *Journal of Engineering Education*, 97/4, 433-447. (433)

5 - Biggs, J. & Tang, C. (2011) *Teaching for Quality Learning at University*, Buckingham: Open University Press, McGraw Hill. (60)

6 - Grosse, C.U. and Voigt, G.M. (1991) The Evolutions of Languages for Specific Purposes in the United States. *Modern Language Journal*, 75/2, 181-195.

7 - Dudley-Evans, T. and St John, M.J. (1991) *Developments in ESP. A multidisciplinary approach*. Cambridge: CUP.

8 - Gilbert, J. (2013) English for Academic Purposes. In G. Motteram (Ed.) *Innovations in learning technologies for English language teaching*. British Council, 117-144. Online: http://www.teachingenglish.org.uk/sites/teacheng/files/C607%20Information%20and%20Communication_WEB%20ONLY_FINAL.pdf Accessed 27/01/2016.

9 - Kern, N. (2013) Technology-integrated English for Specific Purposes lessons: real-life language, tasks, and tools for professionals. In G. Motteram (Ed.) *Innovations in learning technologies for English language teaching*. British Council, 89-115. Online: http://www.teachingenglish.org.uk/sites/teacheng/files/C607%20Information%20and%20Communication_WEB%20ONLY_FINAL.pdf Accessed 27/01/2016.

10 - Warschauer, M. and Kern, R. (Eds) (2000) *Network-based language teaching: Concepts and practice*. New York: Cambridge University Press.

11 - Crawford, E. and Kirby, M. (2008) Fostering Students' Global Awareness: technology applications in social studies teaching and learning. *Journal of Curriculum and Instruction*, 2/1, 56-73.

12 - Garrison, D.R. and Arbaugh, J.B. (2007) Researching the community of inquiry framework: Review, issues, and future directions. *The Internet and Higher Education*, 10/3, 157-172.

13 - Wood, D. (2009) Preparing ESP learners for workplace placement, *English Language Teaching Journal*, 63/4, 313-322.

14 - Sovic, S. (2008) *Lost in Transition? The International Students' Experience Project. Creative Learning in Practice*. Centre for Excellence in Teaching and Learning.

15 - Mayordomo, R.M. & Onrubia, J. (2015) Work coordination and collaborative knowledge construction in a small group collaborative virtual task, *Internet and Higher Education*, 25/1, 96-104. (96)

16 - Jonassen, D.H., (2004) *Learning to solve problems: An instructional design guide*, San Francisco, California Jossey-Bass, 2004.

17 - Daly, S.R., Mosyjowski, E.A., Seifert, C.M. (2014) Teaching creativity in Engineering courses, *Journal of Engineering Education*, 103/3, 417-449.

18 - Ligorio, M.B., Loperfido, F.F., Sansone, N., Spadaro, P.F. (2011) Blending educational models to design blended activities. In F. Pozzi & D. Persico (Eds) *Techniques for fostering collaboration in online learning communities: Theoretical and practical perspectives*. Hershey, PA: IGI Global, 64-81.

19 - Katehi, L. & Ross, M. (2007) Technology and Culture: Exploring the creative instinct through cultural interpretation, *Journal of Engineering Education*, 96/2, 89-90.

20 - Downey, G.L., Lucena, J.C., Moskal, B.M., Parkhurst, R., Bigley, T., Hays, C., Jesiek, B.K., Kelly, L., Miller, J., Ruff, S., Lehr, J.L., Nichols-Belo, A. (2006) The Globally Competent Engineer: Working effectively with people who define problems differently, *Journal of Engineering Education,* 95/2, 107-122. (108 / 109)

21 - Prensky, M. (2001) Digital Natives, Digital Immigrants. *On the Horizon*, 9(5), 1-6.

22 - Jones, C., Ramanau, R., Cross, S. and Healing, G. (2010). Net generation or Digital Natives: Is there a distinct new generation entering university? *Computers & Education*, 54/3, 722–732. Online: http://oro.open.ac.uk/19890/ Accessed 29/01/2016.

23 - World Bank (2015) Main report. Washington, D.C.: World Bank Group. Online: http://documents.worldbank.org/curated/en/2015/09/25081078/economic-monitoring-report-ad-hoc-liaison-committee-vol-2-main-report Accessed 29/01/2016.

24 - Friedman, T.L. (2005) *The world is flat: A brief history of the twenty-first century*. New York: Farrar, Straus and Giroux.

25 - Kumaravadivelu, B. (2008), *Cultural Globalization and Language Education*, New Haven, CT: Yale University Press.