Female engineering academics in the Global South and North: An exploration of language of instruction, using Story Circles and Focus Groups

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Abstract

Sustainable and inclusive development would benefit from an increase in female visibility and leadership in the field of engineering. Particularly in the Global South, engineering is crucial to development, and increasingly attractive to female students, but intersectional barriers restrict employment / career advancement. Our earlier research, published by ASEE in 2016 [1], looked at engineering project-work aimed at improving language skills, combining engineering students in the UK with peers in Gaza, an area which is facing daunting politico-humanitarian challenges. This research looks again at issues relating to the language of learning and teaching in the UK and Gaza, but this time focuses specifically on the experiences of female engineering *faculty*. A 'Story Circles' methodology [2] was adopted, in combination with follow-up focus groups. In these safe spaces, practices surrounding the use of English in engineering were explored, allowing academics to compare approaches and experiences. Though the study has been interrupted by the current war, results to date suggest that there are many more similarities than differences facing female academics in their respective regions. The research also offers methodological insights regarding the use of online Story Circles, and a basis for future work when peace returns.

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1: Introduction

The English, Work and Feelings project (abbreviated from now as *EWF*) aimed to look at the experiences of female engineering academic staff using English as a Medium of Education (EME) at the Islamic University of Gaza (IUG), and their peers at a range of UK universities who teach Engineering using English as second language. The research focussed in particular on the following two research questions, the first as a necessary foundation for the second:

- RQ 1: How does gender impact the teaching of engineering in the Global South? Do engineering academics perceive other barriers, beyond gender?
- RQ 2: What are female engineers' experiences relating specifically to language-use in the classroom?

We were interested in exploring the extent of L1 use at IUG (i.e. Arabic), and whether teachers viewed the use of Arabic in the classroom as a way of overcoming a perceived deficit, or as a resource to be embraced. We also hoped to explore participants' readiness to both work with content and to express their *feelings* in English. The adoption of an innovative Story Circles [2] approach aimed to create a situation in which, as far as possible, participants would feel comfortable talking to / learning from one another.

The Story Circles methodology, centred around the creation of intercultural understanding within a safe space, has over the course of *EWF* proven massively pertinent. We never could have anticipated the horror of the 7thOctober atrocities in Israel, nor the unrelenting bombing of Gaza that has resulted. The destruction of IUG on 11th October, and the killing that is still (at the time of writing) taking place, has left project-partners and participants in Gaza with survival (their own, and of loved ones) as the only objective.

Though the project has been interrupted, we publish what has been done to date.

2: Literature review

English as a Medium of Education (EME)

English Medium Education (EME) can be defined as the use of the English language for instruction in regions where the majority's native language is not English [3]. It is a 'broad church' [4] encompassing diverse approaches influenced by a complex interplay of cultural, geographical, and political factors.

These approaches share a common understanding of the value inherent in blending linguistic and content-based opportunities which immerse students in subject matter through the medium of the target language, as opposed to treating language skills in isolation. EME educators often position themselves primarily as content deliverers, viewing their responsibilities as focused on subject matter rather than language acquisition [5], though the language/content balance differs significantly from context to context. It is often claimed that EME enhances employability and career development, though evidence for this is limited, since according to Galloway [6] the popularity/uptake of EME has 'outpaced empirical research', with gaps in the literature particularly around the use of EME in Higher Education. Regarding the Global South, Sah [7] suggests a 'dark side', i.e. that EME may be restricting students' creativity. Regarding less wealthy countries in the Middle East (with

Palestine specifically-noted) Abdel Latif and Alhamed [8] confirm a lack of data, though among lecturers with Arabic as their first language, moving between Arabic and English appears to be common, particularly in STEM subjects. Zughoul [9] ascribes this to a lack of L1 learning and teaching materials, and, in some scientific areas in particular, an absence of technical terminology in the L1. Abdel Latif and Alhamed [8] ascribe this to students' perceived lack of proficiency, with skills-shortfalls that vary from country to country.

In a previous ASEE study with IUG student-engineers working telecollaboratively with counterparts at the University of Glasgow, UK, students reported greater confidence in approaching content when using English within their subject-area, but less readiness to discuss matters beyond the formal curriculum [1]. The research suggested that students didn't lack 'voice' [10], yet nonetheless felt constrained in expressing it. In Gaza, the situation is unusually complex. On the one hand, students' enforced immobility might heighten a desire to talk 'beyond the walls' [11] and to inform Global North peers of the exceptionally harsh challenges that they face on a daily basis [12]. It might conversely lead to a self-stigmatizing silencing (as Gazans, as Muslims, as women…). Given that public-facing feedback from IUG students at the end of the University of Glasgow telecollaboration differed significantly from non-public-facing feedback provided directly to the course-leader [13], we wondered whether Gazan participants were hiding their true feelings. If so, was this due to lack of confidence in their communication skills, linked to having to express themselves using English? Or was it something deeper, i.e. a belief that their true feelings regarding the mandatory use of English in the classroom / of inequality in general / of the siege of Gaza in particular might constitute a 'disqualified discourse' [14]?

We were interested in further research, this time on engineering *academics* in Gaza - Badwan [15], talking specifically of Palestine, includes self-rated shortfalls in proficiency among the staff ('faculty' in U.S. English) members themselves. The following statistics also explain our decision to focus on the position of *female* academics: 41% of undergraduate engineers are female, yet there are very few female engineers at higher career levels (only 3 Ph.D. holders and 1 masters degree holder in Gaza lecture, compared to 46 male Ph.D. holders and 2 with masters degrees) [16]. The fact that women staff members / students often have to balance careers with significant caring duties at home clearly complicates the position of female engineers, particularly in Gaza, and we wanted to explore participants' views on the space that interactions in English allow them, within the broader space of career progression.

Within engineering in the UK, too, the longstanding difficulty of female career advancement remains largely unaddressed [17]. It is further complicated by the market-driven turn within UK higher education in the past 30 years [18], which can at times work to exclude disadvantaged groups. Again we were interested in probing the potential language aspects of this patriarchy, by talking to female engineers working within UK academia, who have English as their second language.

3: The context

3.1 The Gaza Strip

The Gaza Strip is a tiny part of Palestine along the eastern Mediterranean coast, practically surrounded by Israel, with a small border to the south with Egypt. Following the 2007 election of Hamas, Gaza was declared 'hostile territory' by Israel and free movement of goods and people across the border was ended. The border with Egypt is subject to severe

restrictions, too. A consequence of this isolation has been extremely high unemployment. The Palestinian Central Bureau of Statistics [19] classified 20.8% of Palestinians as unemployed, rising to over 46.2% in the Gaza Strip. The situation is particularly dire among university students, with 60% facing unemployment after graduation [20]. Furthermore, Gaza is one of the most densely-populated areas in the world, with two million inhabitants within an area 25 miles long and around 7 miles wide. There were already acute health, welfare and educational impacts caused by the enduring siege conditions, even before the appalling escalation of October 2023.

3.2 Engineering, education and gender in Palestine

Despite these incredible challenges, overall literacy in Palestine remains above the Middle East norm and education is greatly valued. As Imperiale [21] puts it:

> In such a context of pain and pressure, quality education is considered to be a potent tool with which to nurture the wellbeing of individuals, and to contribute to the development of Palestinian society, within a broader search towards social justice and equity.

Engineering as a career is greatly valued within Gaza, in part because of the rapidly-growing population and frequent destructive conflicts, but also because careers (particularly in electrical engineering and telecommunications) offer good online employment opportunities. Access to engineering jobs for women is notoriously challenging worldwide, and particularly so in the Gaza Strip where 'traditional' engineering routes, involving for example site-visits, are often culturally inappropriate, a factor which further enhances the attraction of online work.

There are six universities in Gaza, five of which offer courses in Engineering. Three of these courses take place in mixed-gender classrooms, though at IUG, students are taught in single-sex classes, with separate classrooms in separate buildings; laboratories are shared, but with different time-slots. Female students are taught by both males and females, but female teachers can only teach female students (which therefore creates significant workload problems for female lecturers, who are required to teach more courses per semester than their male counterparts). This study does not present any viewpoint on the respective advantages of mixed-gender vs single-sex teaching, though it is worth noting that undergraduate classes at IUG are very attractive to female students; at IUG, the proportion of male and female undergraduate students is usually 50:50, whereas at the University of Palestine (where classes are mixed-sex), for example, males make up over 90% of undergraduate students. At postgraduate level, the proportion of female students at IUG falls to around 20%.

3.3 The role of English in Gaza

As in many parts of the Middle East, English is a required school and/or university subject, but there is no mention of language of instruction in the most recent Ministry of Higher Education Palestine report [16], i.e. there is no specific language of learning and teaching policy stipulated for HE institutions countrywide. Specifically at IUG, in all branches of engineering, English is favoured institutionally as the language of learning and teaching, but it is again not mandatory. At bachelor-level selection for an engineering degree depends on the total GPA of the 'Tawjihi' (secondary school certificate) which with an 80% pass-mark is more rigorous than other university disciplines (Medicine excepted). Though there is not a

separate category for the English language per se, students who attain this entry-level grade are usually very able. At masters-level there is a discrete English language entry-stipulation; students have to either provide an IELTS certificate of at least overall 6, or to attend an intensive English course as part of their curriculum. Other than Islamic sharia and Arabic literature, all examinations and assignments at IUG are in English. The use of English in the classroom at IUG varies according to the engineering field, with English more central to the needs of the curriculum in computer, electrical and mechanical engineering, and slightly less key in civil and architectural engineering. In the former subjects, lead-author Amani Elmgadma (a female engineer) felt that content in Arabic is seen as outdated, that the use of exclusively Arabic sources would result in a 'knowledge gap' and that lecturers often move into Arabic to engage students in discussion, remaining with English for technical terms. We hoped to test these beliefs.

4: Methodology

4.1 Story Circles

The methodology chosen was Darla Deardorff's Story Circles approach [2]. This aims to promote non-hierarchical knowledge production, allowing the 'researched' a safe space in which to voice their own stories free from researcher interventions/power dynamics. Deardorff herself specifically highlights its potential for fostering peace in areas of conflict, making it highly appropriate for the Palestinian context. In our study, what Byram [22] has termed 'cultural others' were the respective peers in another region of the world, speaking another language and perhaps having unfamiliar beliefs / practices, but also those within one's own institution and local environment, where differing perspectives based on gender may be under-acknowledged, even invisible; in order to raise awareness of relative privilege, we therefore included male engineers / researchers in the first Story Circle.

Story Circles work as follows:

The researcher is not present in the circles, does not ask questions, intervene or prompt answers or lead the interview/conversation, as occurs in more traditional interview methods. The researcher simply sets up a discussion-task – first a 'warmer', then a more probing prompt (the evolution of these prompts is shown in the vertical sections of figure 1) - and leaves the room. The participants themselves 'lead' and moderate the task - the circles each agree on one person taking the role of moderator, charged with keeping time and moving the circles through their stories.

The research takes place in a 'circle', where all participants are equal, ensuring that 'voice' is given to everyone, and that everyone is listened to. Anonymity is ensured. The researchers have access only to whatever each group chooses to subsequently report back.

4.2 Ethics

Our project received approval from university ethics committees both at IUG and NU. A participant information form was sent to prospective participants (in both Arabic and English) and those who agreed to take part were required to complete a consent form before the event, with anonymity guaranteed (pseudonyms are used throughout this paper). This warned participants that the conversation might touch upon potentially sensitive issues within

their personal experience, and that they were free to leave without the need for explanation. The need to respect others and uphold positive intent was highlighted.

4.3 Summary of interventions

Figure 1 provides a summary of the interventions. We were surprised at the outset, and throughout the Story Circles / focus groups, at the overall benevolence towards EME among the female lecturers, and each alteration of the prompt represented an attempt to give space to greater reflexivity among the participants regarding potential losses, as well as gains, from the use of EME in the classroom.

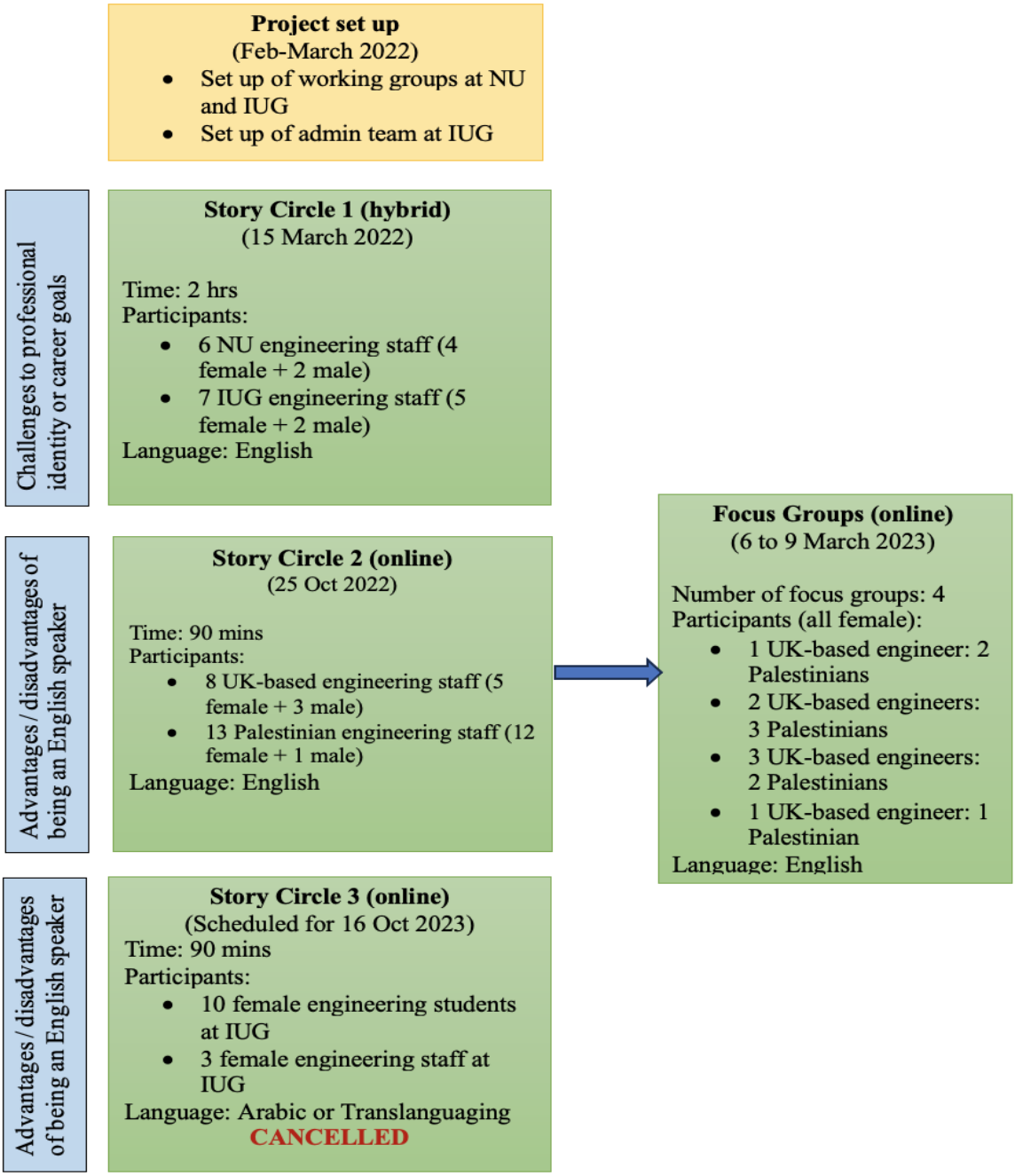

Figure 1: Timeline of interventions

5: Story Circle 1: Hybrid delivery

Story Circle 1 was key in testing the Story Circle approach, and provided responses of direct relevance to Research Question 1.

5.1 Story Circle 1

Five of the NU participants were engineers, and two from affiliate fields, namely Architecture and Business Management. They reported Tamil, Urdu, Farsi, Arabic (x 2), Polish and Italian as their first languages. Two of these were male. In Gaza there were eight participants, three from electrical engineering, three from computer engineering, and two from architecture. All participants at IUG identified Arabic as the first language; all had studied initially in English in Gaza, while three had taken further degrees in English-speaking or EME institutions, namely in the UK, the USA, and Malaysia. Five of the eight IUG participants were female.

5.2 On the day

For the initial (and closing) plenary phases, seating was arranged around tables in a semi-circle facing each other and with a view of the screen, on which colleagues could see their counterparts in the other country (see figure 2). All participants included in the following photographs have granted permission to use their images (with the exception of one female, whom we have been unable to trace since the destruction of the university, and whose identity we have protected).

Figure 2: plenary layout in Gaza

After the initial plenary, the NU-IUG Teams link was ended, and at each site the participants started working face-to-face.

At NU, the Story Circle participants were divided into two groups (see Figure 3). At IUG, the furniture layout of the room made it difficult to form two smaller groups, so the Story Circle there was a larger group, composed of all eight Gazan participants.

Figure 3: Story Circle layout at Northumbria

At this point, the facilitators left the rooms at NU and IUG. Participants responded to the prompts included in Figure 1.

5.3 Procedure and Findings

Following the Story Circle experience, participants then had a twenty-minute pause, a less formal 'coffee-break', during which they connected in small groups to colleagues in the partner institution via Teams (see Figure 4). During this coffee break, the facilitators at each site looked at the feedback from the 'scribes', allowing a pooling of interim findings at the end of the session.

Figure 4: The 'coffee break'

We then returned to the main room for the final plenary, again linking both institutions via Teams, in which the scribe for each group summarised their respective feedback verbally with colleagues and the floor was opened for questions and answers.

Starting with the responses of the IUG participants, several in Gaza mentioned intersectional barriers. They highlighted not only gender-related issues as weighing negatively, but that the combination of gender, politics, poverty and disability impacts individuals in particular ways. Several mentioned an issue central to RQ1, i.e. the career-impacts that come with gendered attitudes to care of children, e.g.:

> *Women face double boundaries to complete their postgraduate studies when they have family and children that prevent them from traveling and leaving their home country* (IUG female)[1]

Female participants at both IUG and NU specifically noted that these childcare commitments had also restricted the actual timeslots available to run the Story Circle session itself – given the two-hour time-difference, we had to avoid a time too early for the school-run in the UK, or too late for the school-run in Gaza. However, the participants didn't mention the family responsibilities in a negative tone, rather emphasising the need to consider having their children with them to facilitate their postgraduate research journey

At IUG, the coping strategies suggested during the group feedback on the day of the Story Circle drew upon their faith, as well as working on personal and professional development. In subsequent questionnaire feedback, all eight IUG participants noted the structural barrier of macro-level politics, namely the siege Gaza has been under for two decades, which results in a threat to security, a lack of resources, and poverty. The need for resilience was made, explicitly:

> *We have to continue, even with challenges, that way we can succeed* (IUG male)

The NU-based academics found the Story Circle methodology itself as a significant and positive takeaway, allowing a direct exploration of feelings. They were surprised by the similarities of experience among group members, despite their apparent differences in terms of discipline (within the broader field of Engineering), gender, language, age and nationality. They talked of a spiritual and emotional 'coming-together' through their stories and the sharing of these stories was described as 'empowering' and produced a range of emotions, tears, happiness and surprise. They noted a powerful juxtaposition:

> *The questions were simple, yet the stories were deep* (NU male)

[1] All comments from participants are reported verbatim.

The group as a whole reflected that there had been an openness in the process which provided an opportunity for reflection. This seems to have included being open about challenges:

> *We are fragile and this is not weakness, it is vulnerability shared that can be a strength* (NU female)

While both groups pointed to gender bias, at Northumbria this seemed to be less explicit, yet was still present. A (male) participant at NU expressed surprise that such bias had been experienced by all females in the group, towards colleagues and students, even in the UK:

> *Men are 'apparently' not sexist in UK, but their way to work and treat women colleagues is contradicting this feeling, e.g. treating women as 'secretaries'* (NU male)

The comments above show that participants had found the methodology to be of value. Story Circle 1 had also provided data relevant to RQ1, and we felt that the approach clearly held promise as a way of exploring issues relating to EME in a more directly-targeted fashion.

5.4 Learning outcomes to take to the next phase

Deardorff's Story Circle methodology (as noted above) normally involves face-to-face delivery. The telecollaborative nature of the project imposed an online mode, though we had attempted to build in a f2f element.

However, when the Story Circle went ahead, a lack of appropriate physical-space at IUG combining internet link-up with flexible table-layout meant that there was only one (large) group of eight in Gaza, rather than the two smaller groups as planned. The resulting imbalance in group-sizes at each site meant that a tight timetable (key to an activity such as this) proved impossible; in a Story Circle, each person must be given the same amount of time to speak, and for this reason the Gazan group was unable to explore the Story Circle question to the same depth as participants at NU. Co-ordinating timings for the informal 'coffee-break' at the midpoint proved a particular challenge. This had an affective impact, reducing the time available for this informal interaction between participants in the two sites (figure 3. suggests how well-received this was), and also an impact on the sharing of findings, since facilitators had only limited time to feed back the scribes' comments before the session ended.

In summary, Story Circle 1 provided the following lessons to the research-team.

- It had proved hard to run two separate Story Circles, one at IUG and one at NU, to the same rhythm.
- The 'hybrid' nature of the event, i.e. face-to-face at both IUG and NU with Teams-enabled plenaries and coffee-breaks, was a challenge in terms of work schedules and childcare commitments.

Overall, it seemed that a way to foster more rigid timekeeping among groups needed to be found, without endangering the empathy needed to make the Story Circles work. A fully Teams-based mode of delivery was therefore adopted for the subsequent Story Circle. Two hours was also felt to be a difficult time-commitment, particularly among the female staff at IUG who have disproportionately heavy teaching-loads compared to their male colleagues.

We had thought that language might already have been touched on during Story Circle 1, but this didn't actually occur. We now needed to target language more explicitly, to discover whether language of learning and teaching was an issue they had overlooked among the many other challenges to their identities and career-goals, or was simply not considered an issue at all.

6: Story Circle 2: Fully online delivery

6.1 Preparing for Story Circle 2

At this point, given the online mode, we felt there would be value in opening the discussion up to *any* interested engineers, in Palestinian or UK universities.

We looked for potential UK-based and Palestine-based participants. Contacts from the first Story Circle were snowballed, with experience of having studied engineering via EME as a prerequisite for involvement among the UK-based group. 17 UK-based academics (5 male), and 25 academics in Palestine/Jordan (2 male) expressed an interest in participation.

6.2 On the day

8 UK-based academics with previous experience of EME participated (2 male), of whom six had been educated in the Global South (four in Palestine, one in Morocco, and one in Bangladesh). 13 Palestine/diaspora-based academics (2 male) were present. The procedure was the same as for Story Circle one, with three significant differences:

- In Story Circle 2, all was conducted inter-institutionally (including the breakout rooms, which had been intra-institutional [i.e. f2f] for Story Circle 1).
- The overall timing was reduced to 90 minutes.
- The question was changed, to focus more specifically on the theme of language. Where this question in Story Circle 1 had been 'Tell us about a specific incident in which you encountered a challenge to your professional identity or your career goals', this now became 'Tell us about a specific instance when teaching / learning in English proved of benefit / held you back in your career'

6.3 Procedure and Findings

The comments, again collected by a scribe from within each group, tended to focus on the instrumental value provided by a confident knowledge of the language, rather than functions attaching to it as a language of teaching and learning, for instance, the position of English as an 'enabler' and 'door-opener' both academically and professionally. A note on the 'trickiness' of the engineering vocabulary was similarly generic.

But some comments did touch on the specifically EME aspect of the discussion, with scribes commenting (for example) on difficulties in finding direct equivalents for L1 terms when teaching engineering through English. Non-classroom impacts were raised, too: fear of making mistakes or facing breakdown in communication when faced by 'native' speakers of English; that an EME approach was potentially leading to a simplification of the English language itself for engineering exchanges, with a 'diminishing depth' of vocabulary; finally, that even those feeling confident using English to teach engineering to their students feel less comfortable when expressing culture and emotions in English. Interestingly, some members

stated impacts in using the L1 fluently when discussing a technical concept with laypeople – precisely because their studies and/or work mainly use English – which suggests a potential workplace / community-based challenge when communicating with colleagues, clients or end-users in the L1.

The following comments were made during the final 20 minutes that was dedicated to a plenary session, when interaction took place in public (names have been changed, to preserve anonymity). The first speaker, Sara (from Gaza), seems to be saying that English for her provides an efficient vector for information:

> Sara – *I prefer to use English as a professional language. When I use e-mails in Arabic, it puts me into more of an emotional setting… and I don't face that when I'm writing in English. I like to have a straightforward conversation or e-mails in the workplace. It kind of feels like I'm able to do that more in English than in Arabic.*
>
> Facilitator - (joking) 'So English keeps you away from your emotions! Maybe I'm exaggerating…Do you think that I'm exaggerating?'
>
> Sara – *No, I don't want to generalise that the language (English?) lacks emotion, but feel that I'm able to go straight to the point in English…in the Arabic language I struggle to write straightforward, short e-mails that are not misunderstood.*

Sara's response to the facilitator also suggests that she wasn't ascribing a loss of *feeling* to communicating in what she terms a 'professional' language, which reflects points Ozanska-Ponikwia makes [23] regarding the potential of an L2 to allow greater freedom to express emotions. Sara was talking to a facilitator from the Global North, and may of course have been influenced by politeness / power issues inherent in the research-process (to which we will return in Section 9). Yet the following continuation of the exchange suggests not:

> Facilitator – 'There may be situations in the workplace, beyond teaching or e-mails, where you need to interact, say, with your boss in the workplace.'
>
> Sara – *I am teaching at the university, but also practising in the field, and I find that English is good for more assertive e-mails as a female when I'm working with other engineers outside of the university.*

The following exchange, with Hani, a male engineer who left Palestine ten years ago, provided a more evidently negative impact of teaching via English. He started by praising the Story Circle 'warmer', which had allowed him to talk with fondness of his youth and the vine-leaves that his mother prepared for a snack, but the interaction continued thus:

> Facilitator – 'You said the fact that you've lost some confidence in Arabic is 'odd', but do you think it's bad?'
>
> Hani - *I have a 4-year-old child, she was born in the UK, I would like to make her learn the language (Arabic?) especially when it comes to writing, it's a cultural dimension, it's quite important to me and to her mother as well…..um, yeah, I think it is bad. I mean I used to be proud of writing in Arabic, but not any longer.*

When asked if he would prefer to teach in his own language, Hani was unsure, but he clearly sees a link between his faltering mastery of Arabic to his cultural identity (had the 'vine leaves' served as a spur?), namely a feeling of cultural loss.

6.4 Learning outcomes to take to the next phase

Although the reduction of the time available from 2 hours to 90 minutes (instituted in response to feedback from participants in Gaza) might have been expected to reduce the quantity of data available, we had still gained interesting results from Story Circle 2. At this point, we began to already notice two emerging themes:

Firstly, there was a generally positive attitude towards the use of English as a Medium of Education, which (as sociolinguists) we found interesting.

Secondly, the bulk of comments in open discussion had come from participants educated via EME *who were now working in the UK*. We couldn't know if this was also true of the points relayed to us by the scribes, but nonetheless, we were unsure whether this tendency to view EME in a positive light was generalisable to all 21 participants, or a reflection of those with greatest mastery of English. The possibility too of politeness / power issues has already been noted.

We began therefore to wonder about the potential efficacy of the Story Circle methodology in gaining data, when used online. The scribes had been able to gather some data of relevance. However, the most interesting data had emerged in the final 20 minutes, the phase embracing entire-group discussion. We could see that the participants had enjoyed the session, and they expressed a willingness to return for a further meeting. This further meeting forms part of Deardorff's methodology – she calls this follow-up a 'Reflection', as it allows time for participants to digest their Story Circle experience, and to consider how it might impact their own attitudes, in this case to the use of English as teachers of Engineering. We felt that participants seemed ready anyway to discuss, without the warm-up provided within the conventional Story Circle methodology. As not all of the Story Circle participants were present in the subsequent reflections (some dropped out / some new participants asked to join) we have re-named these sessions 'focus groups'.

7: The all-female focus-groups

7.1 Preparation

We decided to propose an even shorter session for the next phase – just one hour. After a 10-minute warmer, to introduce any new participants, the focus group sessions would look at two questions that directly targeted Research Question 2.

We therefore decided to run the next encounter without the initial 'ice-breaker' question provided within the full Story Circle procedure, i.e. to move directly to what Deardorff terms the 'Reflection' phase. Given the drawbacks (noted already) of proposing just one session, and then hoping that all were free from commitments on that given day / at that given time, we opted instead for four sessions spread over a week, at different times of the day, to maximise attendance. Again, it was decided to start from times which best suited the Palestinian participants, and then see who in the UK could fit in with these.

The other big change was to opt for all-female groups, to be facilitated by female members of the research-team. The choice of data collection within a conversational framework allows researchers to discern and respond to the non-verbal cues exhibited by the participants [24]. This hadn't been possible previously, as the presence of male engineers had prevented (some) female participants from joining us without hijabs. Though all-female groups wouldn't remove the power imbalances inherent in any Global North-South encounter, nor the issue of varying levels of proficiency in English, we were interested to see how the removal of the gender-variable might affect the discussions; though females comprised 80% of the participants, comment by the male members had preponderated. We were now confident that we had access to a sufficient number of female engineers from the Global South (in Palestine, and around the UK) to warrant such an approach.

Phase 3 of our research, the focus group sessions, took place over four days in March 2023. The participants were posed the following two questions:

'We have been told that teaching in English brings many advantages for engineers: but do you and/or your students <u>lose</u> anything by teaching/learning in English?'

(Later in the session)

'How does being a female engineer using English impact what you've just said?'

The first question denotes a further evolution of the prompts. Story Circles 1 and 2 had demonstrated an interesting tendency among subjects to stress the instrumental benefits of knowing English (viz job-seeking, overseas research opportunities) without really questioning underlying potential drawbacks (e.g. power issues, cultural loss). We had hoped that a loosely structured approach would allow participants to elaborate freely upon broad questions, thus enabling a thorough exploration of the research topic.

The addition, i.e the initial part of the first question, encouraging participants to set aside (if they could) the advantages offered by teaching and learning in English, was our attempt as researchers to open space for more criticality. We might legitimately be criticized for 'leading', yet ultimately this serves to make the relative paucity of findings critical of EME (which we will discuss in Section 10) even more worthy of note.

We chose female researchers (from within the research team) as facilitators. This, alongside the intentional absence of male participants, and a decision to record audio (but not video), contributed to cultivating an environment that we hoped would be supportive.

Teams was used, to facilitate the participation of individuals dispersed across various geographical locations. Of the Global South participants, only three (all from IUG) had been present at the earlier Story Circles, but the e-mail inviting new participants provided informed-consent information (in both English and Arabic) giving context to the research that had occurred up to this point. Each session was audio-recorded and transcribed utilising Teams software. To ensure the preservation of participant confidentiality, pseudonyms are again assigned to replace real names during the analysis phase. The UK-based participants were all female engineers educated via EME.

7.2 On the day

There were in total 15 participants in these all-female focus groups.

- Session 1 - 1 UK-based: 2 from Palestine
- Session 2 - 2 UK-based: 3 from Palestine
- Session 3 - 3 UK-based: 2 from Palestine
- Session 4 - 2 UK-based: One was Syrian, currently teaching engineering via EME in a Chinese campus of a UK university, and the other was Palestinian, educated in Gaza and currently working as an engineer in NE England.

8: The focus-group data

In addition to further comments on the instrumental value of English (i.e. English for employment and career progression, already emphasised by participants), we identified four additional themes:

1. Moving between L1 and L2 in the EME classroom
2. EME and gendered impacts
3. EME and wider intersectional impacts
4. The personal: EME and feelings / identity

As per the responses to Story Circle 2, pseudonyms are used for contributions from participants.

8.1 Moving between L1 and L2 in the EME classroom

Of the 7 Palestine-based academics, 5 agreed that, for their students, EME creates challenges. Interestingly, Sali noted that, although all materials are in English, and that she teaches what she described as the 'core' in English, very few students will reply in English to questions that are posed in English:

> *Interaction only happens among the students if I jump into Arabic and [then] students really understand.*

Sara, who has worked in Malaysia, saw a parallel between the communication difficulties of using English with those of a Malaysian colleague teaching in Gaza, who would use formal Arabic with her students. Of the two Global South participants now based in the UK, Laila noted that her Arabic-speaking students tended to 'cluster' around her after lectures, to ask questions of her in Arabic. Manar, also now working in the UK, noted that though all universities in Gaza claim to teach engineering in English, teaching is principally in Arabic, with technical words in English. Sanaa made a similar point, stating that, despite encouragement, students tend to read in Arabic, and that she herself offers just one lecture per month in English. She also observes a very interesting tendency among her students, one that is perhaps an exemplar of what Pennycook [25] terms 'linguistic resistance':

> *I see when I make the exam in English, they answer the exam in Arabic.*

One Spanish participant, Puri, felt very positive about the freedom that her own proficiency in English afforded (she used the word 'privileged') but then spoke of courses she had run

using EME with students in Senegal who had been, she said, forced to use Google Translate in order to follow lecture-input, noting:

> *Well, that's a bit rubbish, isn't it?*

She went on to add that students from the Global South educated via EME were also, in her view, often excluded from journals, publications and research.

8.2 EME and gendered impacts

Unsurprisingly, the value of good English skills for women came across very strongly among our participants, but most did not make specific links to the use of English as the language of learning and teaching; they seemed to see discrimination on the grounds of gender as a very serious institutional and societal issue (and one they were keen to discuss), but one only tangentially touched on by language.

When a UK-based participant described her experiences of attempting to challenge gender inequalities in academia, and the underrepresentation of women in leadership roles within UK academic and professional institutions, this resonated with Amar's experience at IUG:

> *There is a gender thing playing out because in our institution, when you go for promotion…If we look at the professors in our institution, they're mainly men and there's a real block to being promoted.*

This, she feels, results in a lack of female role models in leadership positions, which in turn perpetuates the notion that leadership roles are more suited to men.

Another Gaza-based participant, Sali, raises an important issue related to gender and career advancement in academia. She observes:

> *I think there is another point… regarding gender, because we as women care more about our family…. So, for men you can have a man about 30, and he has his PhD, but for a woman, it's not easy.*

However, at the same time it needs to be noted (as per Story Circle 1) that there was a palpable sense of pride among the IUG participants, in that they were able to combine careers with bringing up their families, despite the increased teaching-timetables that single-sex classrooms bring to female lecturers and despite the limits on promotion.

Mai explicitly stated that she 'can't see a language issue' regarding EME and Engineering, but then goes on to note that the choice of engineering may be linked to possibilities for culturally-appropriate career paths for women:

> *Females don't like fieldwork, so we go into academia.*

Unlike on building-sites within Gaza, where interactions will be largely in Arabic, and where site-visits by females are considered culturally-challenging, the online-world (particularly that of the Electrical, Telecommunications or Computer Engineer) is one that permits far greater cross-linguistic contact, with a reduction in culturally-inappropriate encounters. This attraction to work-situations where code-switching between languages is possible seemed to

us of relevance to the language used in the classroom, and to further explain the propensity to code-switch, i.e. moves between English and Arabic in the IUG classroom might not simply be occurring to overcome communication difficulties, but could be perceived by female engineering students as reflecting the type of interactions that they already envisage for their future careers (whether at university, or online).

8.3 EME and wider intersectional impacts

Several in the focus group sessions shared experiences where their multiple identities intersected, leading to unique challenges. Manar, a female engineer from Palestine who now works in England at an engineering company, discussed the challenges of being an international female, wearing a hijab, and having what she perceived as lower English proficiency. She pointed out how these factors can lead to a misinterpretation of her assertiveness:

> *As a female, when I'm …. asking like for my right, people usually get it the wrong way. I try to interpret why they doing this. I thought I'm using the wrong words…[but] may be being a female and also in a hijab?*

A UK-based lecturer in architecture from Italy made a related point, noting how female assertiveness is sometimes interpreted as aggression by male colleagues.

Many participants displayed awareness of these intersectional identities, influencing their self-perceptions within professional contexts. Laila's introspection (she works at a UK university) revealed internal conflict regarding her inclusion in committees, with a concern that her participation might be tokenistic:

> *I'm a female, I'm a hijabi, I'm from Syria. So, whenever there is an opportunity to be added on such meetings or committees ['EDI' meetings, or 'DEI' in US English], I feel maybe I'm not proficient enough to be able to be there…. This has something to do with how we think about ourselves as females but perhaps again because we are in a man-dominated field.*

This reflection again underscores the intricate interaction between language, religion and gender, adding the key issue of self-esteem.

The group as a whole went on to discuss the difficulties they have encountered in transposing their own subject-knowledge into English on courses delivered via EME, one noting that non-English sources that they have previously used are often not available, and therefore do not enter into reading lists on English-medium courses. One Gazan participant, Dina, shared how improving her English proficiency facilitated her involvement in international projects alongside her job, leading to career advancement, stating:

> *Our research, homework submission, reports - everything in English, because most of the good journals are English journals.*

Though her comment was positive regarding EME, the implication here also carries an element of an intersectional exclusion, this time with a cultural bias, i.e. that sources outside of the English language 'mainstream' face barriers in terms of knowledge

formation. Another IUG participant, Nadia, acknowledged this exclusion directly, noting that by doing data-searches in English, students might miss Arab-focussed projects:

> *If you research in one language, you don't see a spectrum.*

Beatriz (from Portugal) expressed her excitement at having had the chance to face up to her own stereotypes during the focus group, by encountering other participants and seeing their success as female teachers from Palestine. This highlights the pivotal role of personal narratives in reshaping perceptions, and the value of online communication between Global North and South as genuine contact:

> *... there are a lot of myths that they say 'Oh yes, like there in Palestine, they're all, you know, women are suffering. They don't have a life and they put these things in your head.' It's like: 'is it really?' ... they make you feel like people are in cages and clearly [name of participant] is not in a cage; She's happily teaching her students, and she's telling me that women are doing very well.*

Continuing, Beatriz also noted that she had been socialised into an expectation of female submissiveness under Islam. At the end of the focus group:

> *It's crap!*

One final issue, interesting again in intersectional terms, is that Manar (from Gaza) noted what might be seen as a class (certainly a wealth) issue, stating that students from private schools are advantaged, coming to universities (where EME is the default) with a head-start in English:

> *From public schools, it's really hard.*

8.4 The Personal - EME and identity / feelings

Regarding the expression of feelings, there was an interesting interaction between the two diaspora-based Arabic speakers. For Manar the problem is not just the technicalities of the English language, but also the underlying discourse-style. She found it hard to adjust to the need for conciseness in simulated report-writing when she moved to university in the UK for her Masters:

> *Just 500 words?!*

When writing in Arabic, she said there was no similar need to be concise, and Laila agreed, telling herself:

> *Laila, stop writing in a story-telling style!*

She says that her Arab PhD students still have the same tendency that she showed as a student. Manar said that she subsequently met her English teachers on a visit back to Gaza and upbraided them (jokingly):

> *Why did you teach me like this? Thinking we are good? You disappointed me!*

Her reported comments were light-hearted, but it seems that, beyond some students' lack of confidence with fluency and accuracy in English, there was also a stylistic disconnect between writing in one language (where more space for exploration of context and emotions may be acceptable) or the other (where an arguably western-centric discourse-style [26] is favoured, with less space for feelings). This may also be a disconnect related to the type of assessment required at the end of a course, a point that Abdel Latif and Alhamad [8] also make.

Regarding the expression of identity, the focus group narratives revealed a recurring concern regarding the marginalisation of non-English experiences and knowledge within engineering and many other technical fields, a point that may result from the narrowness of material available in EME course-materials. This is very evident in Noura's reflection on students exclusively using English in 'research engines' when asked to do assignments:

> *…like they go to English research engines. They try to find projects only in English and then they lose the sense of what about…Palestinian perspective? Sometimes we want vernacular architecture or something that is completely connected to the identity, but then they go to a completely different…project because they only search in English, they don't search in Arabic, so they lose actually…*

We have already touched on the potential loss of diverse perspectives and local insights that are often available when using languages other than English, and the consequences of relying solely on English sources, but here the participant is taking it a step deeper; Noura talks specifically of 'identity', and this reflection on the specific impact of *language* on her identity adds another layer to the discussion. Laila, the UK-based Syrian academic, goes further:

> *I feel like when you learn a foreign language, it comes with a character, like you feel different when you speak a foreign language. And, sometimes, I miss myself in Arabic… I feel like I'm a different person when I speak…English or… German …*

This is a particularly interesting quotation, as we can't be 100% sure that Laila is talking about a negative impact of EME here, although 'I miss myself' seems to carry a sense of loss. Regardless, she is suggesting that different languages bring out different facets of her personality, and while she values the capacity to communicate in English, she acknowledges that her mother tongue, Arabic, carries a unique sense of self.

Opportunities for face-to-face interaction are unusual, given the very limited possibility for travel beyond Gaza. But here, Abeer reflected on her experience at a (rare) opportunity to attend an international conference, where she was using Arabic with fellow Arabic speakers:

> *...[individuals] from many countries gathering for entrepreneurship there, so someone from, I think, Serbia watches us: I'm from Palestine, someone from Lebanon, someone from Egypt. We are talking fluently with each other communicating. So, I told him sorry we are speaking in Arabic…[…]… I am more comfortable to communicate… [in Arabic] even if we have the papers, the conferences in English.*

Abeer resorted to her L1, with reluctance (and a feeling of embarrassment, it seems). This participant's reflection suggests that in social exchanges, i.e. an informal domain, she felt uncomfortable, switching (even in the presence of a non-Arabic-speaking interlocutor) to Arabic, her L1. This phenomenon may be driven by the need for precise communication and

better comprehension, but we feel touches principally on participants' feelings (though Abeer certainly saw this as a shortfall in her own level of proficiency, too).

9: Discussion

Culture- and knowledge-centred losses driven by EME were certainly noted by the Story Circles/focus group participants, but these didn't prove to be the central feature of the findings that we, the Northumbria-based researchers, had expected at the outset.

This was both surprising and interesting. Each iteration of the *EWF* Story Circles and focus groups saw a greater encouragement for participants to consider language of learning and teaching as a variable for evaluation (see the evolution of the questions in Figure 1), yet other issues remained stubbornly more salient throughout. Although the responses were nuanced and complex, reflecting the great complexity of the EME situation in the Global South [4], participants from IUG in particular appeared to be generally favourable to use of EME in the engineering classroom, and were *more* concerned about issues relating to levels of proficiency (particularly that of their students). As a standout point, participants seemed to find it hard to distinguish between the value of English per se, and the gains/losses of learning/teaching engineering via English. It may be that English-as-hegemon – 'the erroneous assumption that views English proficiency as education itself' [27] – almost precludes consideration of an alternative possibility, i.e. a place with space for L1 delivery, or for translanguaging. Alongside the proficiency-related concerns, an ingrained institutional / societal patriarchy and wider geopolitical issues were seen as constituting more serious barriers to female engineers in Gaza than language of learning and teaching. This was a principal finding relating to RQ1, and concerning female empowerment, issues such as imbalanced timetabling, inadequate childcare provision impacting promotion, and a deep-rooted systemic patriarchy were at the forefront of responses from the IUG participants.

Looking specifically at the second aspect of RQ1, intersectional barriers beyond gender were mentioned with clarity. Many of the focus group participants had come into their university careers via a private or partially-private education, which suggests an income-related barrier to women seeking a career in engineering, i.e. a number of female engineering lecturers from the Global South in this study appear to have been advantaged by an English-medium school education. Sahan et al. [28] point out a danger here, i.e. the creation of 'social elites'. Complex interactions of language, ethnicity and *social class* seem to be at work that need to be considered. While these complexities mean that we cannot support Piller's categoric claim [29] that 'EME further privileges the privileged and further disadvantages the disadvantaged', this research provides some evidence that an EME approach at university favours engineers who have already had access to an EME approach at school. Whether these privileges are gendered is not clear, but the research does offer support to a 'Matthew effect' link [28] regarding EME provision for female engineers educated in the Global South.

Regarding RQ2, our research provides perhaps the clearest findings. Milligan et al. [30] pose the following as a key question to ask regarding language-use in the classroom: 'Is the learner taught and assessed in a language s/he understands and speaks well?' Though (as we have said) many participants seemed unconvinced by the value of translanguaging, moving between languages occurs in almost all IUG classrooms to ensure comprehension, for instance the 'jump' by lecturers into Arabic to promote interaction, or the students' insistence on answering in Arabic exam-questions that were posed in English. Switching from English back to the students' L1 was also mentioned by Global South-educated female engineers now

teaching in the UK (for example, in quick post-lecture Q & A sessions after lectures). In many classrooms at IUG, lecturers perceived many undergraduate students' English language proficiency to be inadequate for the understanding of engineering concepts, and it was common practice to use English for technical terms. Lecturers seemed to see the solution to this as better preparation of their students in English language skills, rather than alternatives such as an 'Arabization' of the curriculum, or a translanguaging approach, but the cancellation of the final Story Circle and focus group meant that we were unable to probe their feelings, and those of their students, on this central issue (see 'limitations', below).

Milligan et al. also ask [30] 'are teachers proficient in the language(s) of instruction?'. In the focus group sessions, UK-based participants contributed four times more often than their Gazan peers. Was this relative reticence due to lack of confidence in their English language skills? Or to the issues of 'voice' outlined by Risager [10]?

A final key question posed by Milligan et al. [30] and regarding language-use in the classroom is: 'does instruction draw on the learner's prior experiences and resources to construct new knowledge?'. This is again relevant to RQ2 and there would appear to be evidence here for negative impacts among some participants. Some based in the UK mentioned a concern at losing contact with their underlying Arab culture. Similarly, those in Gaza noted that content-searches taking place perforce in English might overlook (say) indigenous engineering challenges / solutions, with a longer-term and perhaps more insidious impact on what they perceived as their Arab culture. Difficulties in communicating with end-users, through their lack of terminology in the L1 to describe on-site practices or concepts, was also a common theme. As a related point, research taking place using sources available only in English may lead to a gradual divorce from the local culture within which a healthy engineering ethos needs to develop, i.e. the impact of English on underlying knowledge-production [29], in turn further inhibiting meaningful consultation with the local community.

10: Limitations / Directions for future study

The loss of the final two sessions, which an Arabic-speaking member of the Northumbria research-team was to facilitate with IUG staff and students (see Table 1) in two separate sessions, is of course the principal limitation. But there were others, related to the methodology, the findings, the participant-group, and to the situation in Gaza. We end with an idea for future research.

Our first is methodological. The Story Circles certainly created an atmosphere of sharing and trust, and produced interesting data, yet the need to work through 'scribes' to preserve anonymity was a drawback. Furthermore, bandwidth issues and internet access, and working across time-zones / within female participants' busy work/childcare commitments meant that the participant continuity from Story Circle through Reflections, as recommended by Darla Deardorff, was usually not possible; both the hybrid and the fully-online delivery-modes proved problematic.

Moving from methodology to findings, we can identify three limitations. Firstly, the use of 'English-only' EME appears to be unusual among the respondents, with the majority of teaching situations involving some space for use of both L1 and L2, but participants' opinions on whether this constitutes a perceived 'deficit' approach needs further research. Our study didn't support what Sah [7] suggests as the potential 'dark side' of EME, but again, whether in the Story Circles or the focus groups, any sense of freedom through

learning engineering content in English tended to be expressed by Global South users of English *who had had the opportunity to study or work beyond their country of origin*. The considerable differences between EME contexts in the Global South and in Anglophone/Global North HE contexts must be acknowledged.

Looking at a second findings-related limitation, appreciation of the utilitarian nature of English was salient, i.e. its value as a tool for efficient ('straightforward') transmission of information or even as a global transmitter of knowledge; this emerged in all phases of the research. Others touched on the need to 'unlearn' ways of expressing themselves in Arabic, with interesting comments on possible changes in ways of thinking, but some comments – a participant's appreciation of bonding with his past by talking of eating vine-leaves / another's jokey 'anger' at her English teacher's having taught her an unnecessarily roundabout writing-style as an undergraduate in Gaza / a sensation of 'missing oneself' in an L2 – have clear links to the expression of emotions that warrant further research. In short, the '*F*' in *EWF* would have benefited significantly from the Arabic/translanguaging meetings planned for October 2023 sessions.

As a final limitation linked to the findings, that the L1 speakers spoke quantitatively more during the focus group sessions was also interesting, and the reasons behind this – proficiency? politeness? power? – could again have been probed in the sessions we lost.

Regarding broader limitations, a point needs to be acknowledged regarding the participant-groups. During the entirety of *EWF* all respondents (to the Story Circles and focus groups) were to an extent 'privileged' within their wider societies. Though they will have faced different challenges, their simple presence at university-level within an English-language-centric worldwide educational system means that English has already opened doors for them. They may have taken on unconscious biases and be reluctant to imagine alternatives (perhaps a university-system where the classroom permits other languages, or a mixing of languages) for fear of losing their 'elite' status [28]. The participants were a self-selecting sample. An interview with engineering academics in Arabic, or with translanguaging encouraged (and not just with engineers who already feel comfortable in English) could probe this area very usefully.

Another broad point to note as a limitation concerns only the research-phases within Gaza; the Gaza Strip faces problems which are outliers even for the most deprived and challenged areas of the world. In the Global South, without English-language skills, cross-border labour mobility and employment prospects in engineering are restricted. But in Gaza, deprivation, blocks on travel beyond the Strip, and appalling levels of graduate unemployment were features long before the current devastation. Brown and Schweisfurth [31] emphasise the centrality of understanding context when working with the Global South, and Pennycook [32] talks specifically of the value of studies that provide 'close and detailed understandings of how demand for English is part of a larger set of images of change, modernization, access, and longing'; in Gaza the final point – the 'longing' – must be unusually salient in comparison to other Global South situations; a longing for justice, for peace, and (now) for simple survival. It must therefore be true to say that not all findings concerning EME practices within Gaza will transfer easily to Global South universities beyond Gaza.

Finally, as a direction for future study, this paper has only provided comments from female engineers from the Global South who have taught engineering via EME. But the Story Circles/focus groups also showed that female engineers teaching in a second language also

face remarkably similar challenges within the UK university-system; though not the focus of this paper, they reported being treated disrespectfully by other male engineering colleagues, and having to accept caring / career-break impacts, and talked of systemic slights within UK engineering departments. Their Gazan interlocutors were fascinated to hear of this, and the linguistic/cultural aspects of these issues would be a fruitful area for investigation.

11: Conclusion:

In terms of methodology, the value of the Story Circles in creating a supportive environment for *EWF*, a multicultural space, and (for the IUG participants) a feeling of support beyond the walls enclosing Gaza were common comments emerging from the project. They provided a safe haven for engaging in conversations, facilitating discussions on the intricacies of gender-related challenges. The sharing of stories seems to have fostered a solidarity among engineers, helping to overcome the sense of isolation among the Gazans. Similarly, in some cases it overcame stereotypes, e.g. a perception among Global North female engineers of a submissiveness among their Arab counterparts was markedly proven wrong, in this case fostering a *gender-based* sense of solidarity. Above all, we feel, it created trust between the partners.

When we probed specifically at issues surrounding EME during these sessions, there was a sense of loss – an acknowledgement of risks to identity. Even though many admit to very considerable use of L1, i.e. Arabic, in their teaching, some were concerned that the ability to really understand the needs of the local community may be compromised if resources are all in English.

But two other issues were more salient, we feel. Firstly, *EWF* suggests that there are still very serious issues of bias, prejudice and discrimination facing female engineers with L2 English in Global South (*and* Global North) universities. Across the phases of *EWF*, participants seemed to attribute these more to the intersection of their gender identities in a male-dominated HE environment, than to their non-native speaker identities or to any perceived impact of the language of learning and teaching. Complicating this finding was that the frustration at this situation sat alongside participants' pride and resilience (particularly those from Gaza) in their achievements in terms of creating a career while bringing up a family.

Secondly, issues relating to power, i.e. to the researchers' concerns at the outset that teaching and learning engineering in English might be contributing to issues of hegemony (ongoing western-slanted ways of thinking; continuing economic dominance by the Global North), were less of a concern among participants than the feeling that students simply struggle to comprehend. In short, L1 use by female engineers in nominally EME classrooms is very common, but academics (in Gaza in particular) seemed more worried about proficiency, particularly that of their students, than about power.

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