

## Article

# How UK HE STEM Students Were Motivated to Switch Their Cameras on: A Study of the Development of Compassionate Communications in Task-focused Online Group Meetings

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**Abstract:** HE's pandemic-driven shift to online platforms has increased social and learning disconnection amongst students. In online group work/teamwork, many are reluctant to switch on their cameras to be more present to others. Compassion in group work/teamwork is defined as noticing, not normalizing, one's own and/or others' distress or disadvantaging and taking wise action to prevent or reduce this. This notion of compassion is being assessed in the HE sector using filmed task-focused in-class group work meetings to identify levels of both inclusivity and criticality around the team. This study investigates the use and outcomes of using the compassionate communications strategies (that were developed in and for the offline classroom) in online team meetings. In this mixed-methods study, two groups of four international STEM students, each from a sample of five UK universities, were video-recorded in task-focused group work meetings (TGMs) before and after an online interactive 90-min training session ('the intervention') on the Cognitive Skills of Compassionate Communications (CSCC) in teams. A comparison of the (pre and post CSCC intervention) quantitative and qualitative data results indicated, post-intervention, a significant increase in students' screen gaze attentiveness to each other, and reasons why students' motivation to switch on their cameras had changed.

**Keywords:** cognitive skills; compassion; team/group work; online; screen gaze



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## 1. Introduction

Because of the COVID-19 pandemic-driven shift to online teaching and learning in Higher Education (HE), disconnection amongst and between students has been entrenched [1,2]. This has become a problem for undergraduate and post-graduate students all over the world irrespective of their demographic, social, educational, or economic backgrounds. The term 'social distancing', used by many governments in many contexts, including for public space (instead of the term 'physical distancing' properly used by the WHO [3]) has contributed to increased feelings of social isolation or loneliness. In studies of students, this has had negative psychological consequences, such as poorer overall cognitive performance and reduction of quality of life [4–6].

This paper argues that students' isolation, particularly during the pandemic, is further exacerbated by the now widely reported reluctance of students to switch on their cameras and thus be visible to others during their online teaching and learning experiences [7,8]. Thus, as both Bauer et al. [1] and Stanford University [2] identify, the move to online delivery of Higher Education (HE) teaching and learning during the pandemic is entrenching disconnection amongst and between students.

A number of possible solutions have been suggested [5,9–11] to encourage students to engage in active learning in online communities, including putting on their cameras. There is, however, hardly ever discussion of the explicit role of the science of compassion as a cognitive, psychobiological motivation [12] in enhancing one's own and others' social and learning experiences [13] in online group work/teamwork. We argue that this is key to overcoming the issues discussed above and we address the relevance of the science of compassion for online learning in this study.

Compassion-focused Pedagogy in group work (CfP) was developed from research conducted, in and for offline (e.g., physical face-to-face class) group work/teamwork in higher education [9,14–16]. That research found that students given start-of-module compassionate communications training experienced enhanced learning and social cohesion in task-focused teams compared to controls [13–16]. A key, assessable feature of CfP is an evidence-based understanding by students, of the significance and use of practical, evidence-based strategies for initiating and sustaining attentive, communicative, inclusive eye contact amongst group members throughout their meetings [13–16].

Under the current pandemic-related circumstances, an investigation into the adaptability of such strategies in relation to groups/teams that meet online was urgently needed. This paper is such a study. It refers to 'screen gaze' for the online context, since 'eye contact' as experienced in groups/teams that meet around a table is not possible in online group/teamwork meetings. Nevertheless, in online meetings as in offline meetings, strategies for students to co-manage their group meetings compassionately require students to be comfortable to express and observe their own as well as others' non-verbal communication (especially screen gaze and facial expressions), something that can only be achieved if they actively look at the screen. In other words, they need visual access to the responses and interactions of group members throughout the whole online meeting.

A reason for this is that humans are a highly social species that has evolved to work, survive and learn—in groups. Our prehistory shows the evolutionary significance of facial expressions and gestures in hunter-gatherer human communications, and this is linked to the understanding of others' behaviours [17–21]. That is to say, much of our face-to-face communicative competence is informed by the evolutionary history of human non-verbal communication using a range of complex facial muscles that no other species has. However, this ability to simulate and 'read' (comprehend) non-verbal communications of others is severely encumbered or impossible during online group meetings if learners do not switch on their cameras. Thus, the development of social relationships (that non-verbal interchanges can richly support) can be delayed or abandoned in online group meetings [22,23]. Colonnello [24] refers to as a release of oxytocin that plays "a central role" in enabling individuals in groups to "synchronise or tune with others" [24]. This is pertinent to when students can see each other and make compassionate use of non-verbal signals to encourage equal participation in discussions (e.g., through nodding, learning to listen more attentively, showing understanding, disagreement or confusion as people speak). Jenson et al. [25] identified that the syncing of group members coming to the assistance of a single member may be related to the role that oxytocin plays as part of the [brain's] reward system. In other words, as Neff et al. [26] confirm, oxytocin can support a more interdependent self-concept that is facilitated by compassion and its mediation of neurobiological affiliation processes in individuals [27], including through the release of oxytocin which acts to de-activate the social threat alert system in the brain [28,29].

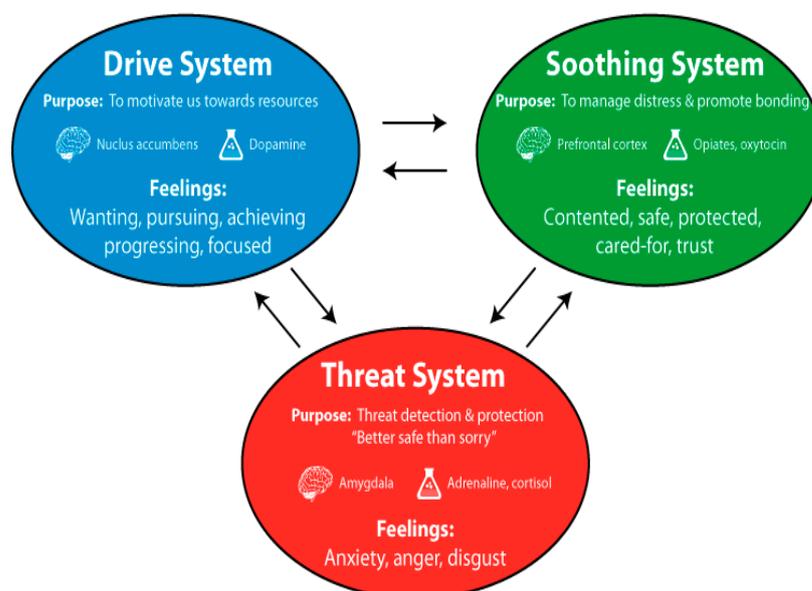
Thus, it can be concluded that if cameras are not switched on during group work/teamwork meetings, opportunities for the compassion-related non-verbal communications that help sync students to each other are lost; it is now more difficult to support one another, even if they are motivated to do so. Moreover, when students' cameras are switched off, tutors might not be able to identify who is speaking, or prompting, or who may be supporting the speaker in their physical location. It might also be impossible to decide whether a group member is script-reading when they speak to the group. In summary, it is crucial for students as well as tutors and examiners to be able to see all students during their

online group work/teamwork meetings for optimal communicative efficiency in authentic teaching and learning in online student group discussions.

Hence, the current study investigated whether and, if so, how students can be motivated to switch their cameras on (technology allowing) during their online group meetings by learning about practical, compassion-focused communications suitable for online group meetings.

### Theoretical Background

The theoretical basis of the current study is the psychobiological model for Compassionate Mind Training (CMT) which was developed by the Compassionate Mind Foundation [30–33]. As the Compassionate Mind Foundation [30] explains, humans switch between three mood-regulating systems: the threat, the drive and the soothing systems (Figure 1). As Mindfulness and Clinical Psychology Solutions [34] also confirms, “Each system is associated with different brain regions and different brain chemistry. Distress is caused by an imbalance between the systems, often associated with underdevelopment of the soothing system”.



**Figure 1.** The Brain's Emotion Regulation System. [Source: [34] adapted from Gilbert, P. (ed) (2005) *Compassion: Conceptualization Research and Use in Psychotherapy*, Routledge].

Our brains are hard-wired to be alert to threats (fight, flight, freeze). This threat system has enabled many species to survive. Problematically though, this system can disable the human brain's capacity to engage in higher-level thinking such as decision making and problem-solving [35]. The second mood-regulatory system, the drive system, enables us to strive to achieve what we want or need (or what we believe we need). Over stimulation of the threat and drive systems leads to an imbalance between the three mood regulatory systems in which the soothing system is left underdeveloped. This may cause psychological difficulties in both groups and individuals. The soothing system, the third mood-regulatory system in the brain, is activated by giving or receiving care from self or others and allows us to think more calmly, rationally and to focus. The soothing system of the brain can be trained in ways that facilitate maintaining the balance between these three systems [36]. These mood-regulatory systems in our brains and their functions are shown in Figure 1 (above).

The balance between these three systems becomes damaged in people who tend to oscillate primarily between the first two systems, that is, between aversion (the threat system which operates through fight, flight or freeze responses to perceived social or other threats) and striving (the drive system which is seen in the brains' efforts to address the threat) [36]. The pandemic has caused sustained social disconnection of students from their peers and this kind of isolation can draw people into loops of brooding, rumination

and (particularly anticipatory) worry, including about the ability to succeed compared to others [37]. This relates to a striving to avoid inferiority as has been found amongst university students [36].

The current study investigates whether these issues could be addressed in the context of student team or group work through explicit pedagogical attention to compassion as a cognitive, not emotion-based, social competence. This is in line with the above model's underlying elaboration and understanding of compassion as central to stimulating and maintaining the soothing system by connecting the caring system, common to all mammals, with the neocortex where reasoning and imagination processes are situated. To be clear, the use of reasoning and imagination (the human neocortex) to elaborate care for self and others (the human mammalian brain) is what is meant here by compassion [30].

That is not to say that many types of emotion cannot accompany the enactment of compassion as defined above [38]. Nevertheless, compassion in itself is a psychobiological motivation [39] which, *during* task-focused group meetings specifically, can be understood as an intention to notice (not normalise) one's own or others' distress or disadvantaging, and then to take (wise) action to reduce or prevent this [37]. This underpins the evidence-based strategies that students (and staff) can use for compassionate management of their task-focused discussions/meetings in relation to their group work [13,37,39]. Precisely because these are practical skills of vigilance and appropriate action taking in group meetings, these skills are now credit-bearing on some degrees as at the host university for this study [13,14,37,40]. However, this pedagogy was developed pre-COVID-19 in the UK and not for online group work meetings but specifically for the face-to-face (classroom) context. Therefore, the current study investigates the applicability of this Compassion-focused Pedagogy (CfP) to students' online group work management skills. In this study, however, three other theoretical aspects: constructivism [41,42], constructionism [43–45], and reinforcement theory of motivation [46] (a well-known process theory) have also been considered as follows.

The approach of the current research confirms the nature of social interactions as being part of learning [41] and this informs constructivism. Aligned to constructivism, [47] it highlights the significance and responsibility of focusing attention on learners and on creating collaborative, interactive environments for them which is the focus of the current study's group work design. Critics of constructivist methods consider that learners must display their learning outcomes in a tangible manner to shape and sharpen students' thinking going forward [47]. Constructivism is also criticised for offering sometimes minimal guidance [48–52]. Hence this study's intervention—to train students in the Cognitive Skills of Compassionate Communications (CSCC) during their task-focused group meetings—was designed to allow the kinds of interactions that might lead to tangible outcomes, namely assessable evidence of inclusivity and criticality.

In this sense, the study aligns also with constructionism which advocates that learners need more instructions to produce tangible outcomes and so that their learning outcomes become authentic [48]. The CSCC training that was delivered to students focused on how to share information with each other (in this case from self-chosen, peer-reviewed articles relevant to their STEM disciplines) and so feed each other's learning. Tangible outcomes of this e.g., in students videoed, on the hoof, critical perspective-taking on this shared information in their group meetings, could in principle be carried out in future, (as for offline) again without need for the real-time supervision or even the presence of a tutor. Here the study resonates with Sugata Mitra's [53] notion of the Self Organized Learning Environment (SOLE).

In relation to SOLE and to this study, reinforcement theory is also relevant. It focuses on the consequences of human behaviour as a motivating factor which could be positive or negative. As Gorden [54] confirms, Skinner's [46] reinforcement theory of motivation identifies positive reinforcements—in this study that could mean encouragement, attention, appreciation, validation—as promoting the potentials for more frequent enactments of desired behaviours such as venturing more in response that participants might otherwise

be missed, both socially and intellectually. Hence, in relation to the current study's training intervention, this theory too provides insights into the management by students of their group work.

## 2. Materials and Methods

### 2.1. The Research Setting

The study was conducted online with international, Sri Lankan, STEM students studying in a sample of five UK universities from May–September 2020. There were two groups of students. Each group consisted of ( $n = 4$ ) members. All participants of Group 1 were from one UK university—a pilot trial of the intervention. Group 2 consisted of participants from four UK universities. All were STEM students in keeping with the World Bank's funding of Sri Lanka in the education of, specifically, its STEM students in emotionally intelligent communication skills [55]. Sri Lankan students were in any case a suitably challenging choice for this study because of the well-reported tensions between Sinhalese, Tamil, and Muslim students from Sri Lanka. These tensions are a legacy of the 30-year civil war [56], and intersectional violence in the country remains a problem, including amongst Sri Lankan students. This caused the Sri Lankan government to shut down all universities in the country—some for as long as two months—as recently as 2019 [57–59]. Sri Lankan students were therefore a good sample for intervention based on compassionate group management skills, provided they could be motivated to switch on their cameras as part of optimally compassionate communications skills building in the online group meeting context.

### 2.2. Research Questions

The primary research question:

Can students be persuaded/motivated to switch their cameras on (technology allowing) during their online group work meetings by learning about the cognitive skills of compassionate communications in their online group meetings?

Sub research questions:

- a. Is there a significant difference in screen gaze behaviour of the respondents before and after the CSCC training intervention?

The hypotheses were developed as follows.

**H<sub>0</sub>** — *There is no difference in students' screen gaze behaviour that could be attributed to training in the CSCC.*

**H<sub>1</sub>** — *There is a difference in students' screen gaze behaviour that could be attributed to training in the CSCC.*

- b. Are there any observable changes in respondents' behaviours during their group work meetings before and after the CSCC training intervention?
- c. How do respondents perceive their group work meetings before and after the CSCC training intervention?

In particular, the first sub-research question is answered through quantitative data analysis and the second and third sub-questions are addressed through both quantitative and qualitative data analysis.

### 2.3. Participants and Procedures

The students taking part in the study were recruited from the five UK universities involved through, first, convenience sampling as follows. The student union of each UK university was contacted and asked to invite Sri Lankan STEM students to participate in the study. Stratified sampling was then used in the interest of combining Sinhalese, Tamil and Muslim students and representation of both genders in each group. Please see the Tables 1 and 2 below for more details of the study sample.

**Table 1.** Student Participants—(Group 01).

Students	S01	S02	S03	S04
STEM	Engineering	Engineering	Computer Science	Computer Science
Age Category	18–25	18–25	18–25	36–45
Gender	Male	Male	Female	Male

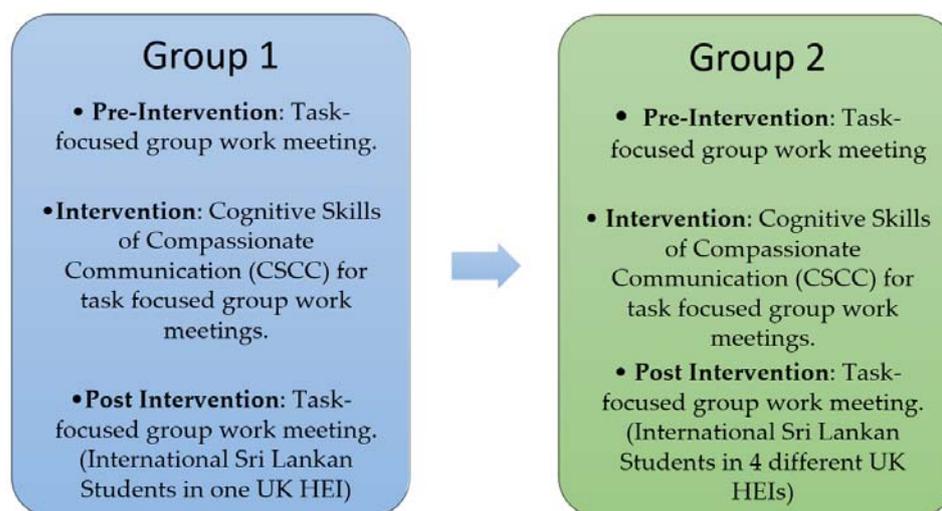
**Table 2.** Student Participants—(Group 02).

Students	S05	S06	S07	S08
STEM	Engineering	Computer Science	Information Technology	Science and Technology
Age Category	26–35	26–35	26–35	18–25
Gender	Male	Female	Male	Male

All procedures received ethics approval from the Ethics Committee of the researchers' university (Ethics Protocol Number: cHUM/PGT/UH/04345).

Following the circulation of an email with a poster providing relevant information on the group work meetings, participant information sheet and consent form, a briefing for each respondent was carried out over the phone by the primary investigator. After obtaining signed consent from the participants, a pre-study meeting was held with each participant via MS Teams. This was to ensure: the availability of network connections and a webcam to facilitate the group work meetings online, to discuss possible dates and time slots, to provide clarification where needed and to invite each participant to choose two separate subject-related journal articles. Thereafter, dates and time slots and the group meetings were scheduled in consultation with all the participants.

All group work meetings and focus groups and/or interviews were video-recorded and transcribed verbatim. Figure 2 below shows an outline of what each group experienced over the whole online exercise that was then conducted via MS Teams.

**Figure 2.** The framework of each group's activities online.

Next, Table 3 provides more detail on that framework.

#### 2.4. Data Collections and Data Analysis

Data collection was conducted through task-focused group work meetings which consisted of a journal article presentation by each group member and a follow-up group discussion of that article (four separate journal articles by four group members) before the CSCC training intervention (pre-intervention). Then, again the same procedure was followed (with four separate journal articles) by the group members after the CSCC training

intervention (post-intervention). Fieldnotes were taken in real-time and from the video recording of each (pre- and post-intervention) group meeting. Next, focus groups were conducted after each group work meeting. In addition ( $n = 2$ ) questionnaires were administered just after the pre- and post-intervention group work meetings. Overall, this study employed mixed methods (qualitative and quantitative), which are outlined below.

**Table 3.** The overall procedure of the Study for Groups 1 and 2.

Stage	Procedure	For Group 1 and Then Again for Group 2
1	Pre-intervention	Four students per group participated in a video-recorded, (control) Pre-intervention Task-focused Group Meeting (PreTGM) online as follows. Each student presented a journal article chosen from their own STEM field and then joined the follow-up group discussion of it where the whole group discussed it. This procedure was repeated by all students in each group. Then students participated in a video-recorded focus group and/or semi-structured interview to explain their lived learning and social experiences of this discussion (the control). They were invited to compare this experience with any other online student task-focused group work meetings they had participated in previously (including but not limited to COVID-19-related changes to the mode of teaching). All participants were provided with a link to access and complete two questionnaires online (made available via the Bristol Online Survey platform). Please see Section 2.4.2 for these questionnaires.
2	Intervention	The intervention was a 90-min training session in the Cognitive Skills of Compassionate Communications (CSCC) for task-focused group work meetings. During this interactive session, group members were introduced to the key theory of compassion in terms of brain function. This included an explanation of the psychobiological modal of compassion [30]. Then, the practical strategies for employing CSCC were introduced. This is particularly in relation to dismantling monopolizing/dominating behaviours, including by non-verbal means and without silencing anyone; and non-contributing behaviours, using tone, name and critical thinking to invite quieter students frequently into mindfully-created safe spaces to contribute to the group discussion. Students were guided on how and when to deploy and recognise the skills and how, in relation to compassion theory and participants' suggestions, these could be adapted (from their use by groups/teams meeting offline) to online group meetings. The teacher/trainer was always the same for each group. The CSCC training was conducted in the English language. The teacher's role in this study was to facilitate the learners to understand the theoretical base and the practical applicability of the CSCC in online group work meetings.
3	Post-intervention	Participants were invited to apply the strategies they had agreed to (in 2 above) and then in their same groups as before they conducted Post-intervention Task-focused Group Meeting (PostTGM) online. Each student presented their second self- chosen STEM-related journal article and then joined their whole group discussion of it. This procedure was repeated by all students in each group. Then they participated in a focus group and/or interviews to explain their lived experiences of the discussion in comparison with (i) the control discussion above; and (ii) other online group meetings in which they had participated previously so that the results between pre-and post-intervention could be compared. All participants were provided with a link to access and complete the same two questionnaires online again (made available on the Bristol Online Survey platform).

#### 2.4.1. Qualitative Data and Their Analysis

Template Analysis (TA) was the overarching approach taken to identify key themes arising from the transcriptions of group work meetings and focus groups/interviews. TA is a thematic analysis method suited to research in applied psychology [60]. A useful aspect of TA is that, like Grounded Theory (GT) [61,62], it requires the researcher to compare data sets constantly as they are collected. However, TA does not allow the data to be atomized into such small pieces that important themes may be lost which is a key criticism of Grounded Theory [63]. To support the use of TA, NVivo (Pro 12) software was used to code the data. Transcriptions of all pre- and post-intervention group work meetings and focus groups were uploaded into the NVivo (Pro 12) software for analysis. The ( $n = 8$ ) transcriptions were repeatedly trawled for codes that might otherwise be missed, and this also allowed constant cross-coding within each of the identified themes. In coding data, first free codes (grouping the similar words, phrases and meanings) were identified. Then, focused (interpretive) codes (grouping the codes that convey similar meanings or contribute to constructing a single argument) were identified to derive interpretive meanings [64]. As the third and final step in the data coding, it was now possible to identify what the emergent overarching themes were.

#### Task-Focused Group Work Meetings (TGMs)

Video recordings were made while student groups conducted their pre- and post-intervention group meetings. This is in keeping with extant research on optimal task-focused, online discussion group size. Transcriptions of pre- and post-intervention group work meetings were analysed separately by applying TA. To identify the themes, the coding of data was carried out as above (Section 2.4.1) using NVivo (Pro 12) software. Next, the themes that emerged from the pre-intervention group meetings were compared with the emergent themes from the post-intervention group meetings.

#### Pre- and Post-Intervention Focus Groups/Interviews

The focus groups/interviews conducted after each pre- and post-intervention group meeting were also video recorded and, transcribed. All focus group/interview transcriptions were uploaded into NVivo (Pro 12) software, and the data were coded using the same procedure as above (see Section 2.4.1).

#### Micro-Ethnographic Analysis

In addition, a close analysis of the video-recorded student behaviours was carried out using McDermott's [65] micro ethnographic methods for analysing filmed classroom behaviours. Specifically, in this study, McDermott's methods were used to analyse the filmed behaviour of each respondent, second by second, in their meetings before and after their training in CSCC. To be clear, analysis, second by second, was conducted on the filmed behaviour of:

- a. Each presenter as they presented to the group.
- b. The other three group members during each presentation (the 'listeners').
- c. All four students during the immediate post-presentation group discussion of each article presented (the 'discussants').

It was then possible to draw out from this qualitative data, particular themes that appeared most aligned with the group's overall behaviours and compare these before and then after the 90 min CSCC training. Any critical incidents (interactions of note), how they occurred and how they were responded to throughout the unfolding interactions in the group could be observed repeatedly for close analysis via the video footage. Then the results of these both pre-and post-intervention qualitative analyses were compared to explore changes, if any, in individual and/or group behaviours after the CSCC training.

#### 2.4.2. Quantitative Data and Their Analysis

The quantitative data collected from the pre- and post-intervention task-focused group work meetings and the two questionnaires were analysed as explained next.

##### Task Focused Group Work Meetings—Screen Gaze

Data related to the pre- and post-intervention task-focused group work meetings were quantitatively analysed using three tools: Jupyter software in Python, R Programming Language, and Microsoft Excel. These were applied to data derived from second-by-second scrutiny of every student's video recorded screen gaze behaviour i.e., throughout every presentation and every group discussion during both the pre- and post-intervention task-focused group work meetings. These data were fed into Jupyter software in Python to identify and compare the overall average group screen gaze before (pre-intervention) and after the CSCC training (post-intervention). Then, the Wilcoxon Signed-Rank Test was run using R. This was to explore whether there was any statistically significant difference or not between screen gaze behaviour of the group members before and after the CSCC training. Alongside this, Microsoft Excel was used to generate graphical illustrations of the averaged screen gaze results of every member of the group during each presentation and each follow-up discussion before and after the CSCC training. Finally, the qualitative and quantitative results were triangulated.

##### Two Questionnaires, Each Delivered Pre- and Post-Intervention

One questionnaire explored students' previous experiences of their own and others' group work behaviours (See Appendix A). The other was the Compassionate Mind Foundation's Compassionate Engagement and Action Scale (See Appendix B). Both the questionnaires were used before the pre-intervention group work meetings and then again after the post-intervention group work meetings. The statistical software SPSS (version 27) was used to analyse the four data sets provided by these two questionnaires. Each questionnaire is briefly explained next.

###### i. Questionnaire on Group Work Behaviours

Both pre- and post-intervention, the questionnaire on Group Work Behaviours (see Appendix A) explored the participants' experiences of those group work behaviours that had been cited by staff and several hundred students at the host university as—in their experience—most damaging to the effectiveness of *offline/physical* group meetings [13]. Both Gilbert, T and Harvey et al. [13,16,66], had earlier identified that monopolizing (talking so much in offline group meetings that others have little chance to speak) and non-contributing (or speaking very little in the meetings) were the two behaviours that most undermined inclusivity and group critical thinking in offline group meetings. (Those results pertained to the view of most student respondents in two UK universities and across four disciplines.) It was not clear whether meeting online might or might not alter the responses, and so this needed to be investigated. In addition, two Likert scale questions on the confidence of students in engaging in group work meetings [67] were added. Questions were also added on their perceived level of English language proficiency and their demographic information, respectively.

###### ii. Questionnaire: Compassionate Engagement and Action Scale

The Compassionate Engagement and Action Scale developed by the Compassionate Mind Foundation [30] (see Appendix B). It identifies levels of self-compassion (contrasting strongly with the competitive individualistic elements of self-esteem) [26,68], compassion for others and sensitivity (recognition) of compassion to oneself from others. All three categories are known to mediate each other [30].

These two questionnaires were to better identify and explore changes, if any, in the respondents' experiences of self and others that might be attributable to the CSCC training for group work conducted online.

### 3. Results

Results indicated an increase in sustained screen gaze attentiveness in line with group members' motivation to switch their cameras on in their online group work meetings after the CSCC training intervention. Apparent behavioural changes were found to occur (between the pre- and post-intervention task-focused group work meetings) across both groups according to the qualitative data analysis conducted by the above three methods. Below (see Section 3.3) are examples of types of behaviour before and after the intervention that were thematically representative of the students in each group.

In addition, statistically significant differences (before and after the CSCC training intervention) were found for screen gaze attentiveness.

#### 3.1. Quantitative Analysis of Task-Focused Group Work Meetings—Screen Gaze

##### 3.1.1. Statistical Analysis—Wilcoxon Signed-Rank Test

In each group meeting before the CSCC, each student presented a self-chosen journal article and then participated in a group discussion of the article. The same was done (with different self-chosen journal articles) after the CSCC training intervention. Hence, each student presenter, those who listened to each presentation, and the discussants (the full group) during the follow-up discussion were separately considered for analysis, taking into account the different roles they fulfilled in each case. The hypotheses for this analysis were as follows:

- The null hypothesis—there is no difference in students' screen gaze behaviour that could be attributed to training in the CSCC.
- The alternative hypothesis—there is a difference in students' screen gaze behaviour that could be attributed to training in the CSCC.

The  $p$ -value for the test of the null hypothesis that there was no difference in screen gaze of the group members before and after the training on CSCC was 0.001 (\*  $p = 0.001$ ).

**Presenters:** The screen gaze of each presenter was analysed separately for each group. This revealed an increase in sustained screen gaze attentiveness of all the presenters after the CSCC training intervention. However, this increase was statistically nonsignificant at  $p = 0.05$ .

**Listeners to the presentations:** Analysis revealed a statistically significant increase ( $p = 0.001$ ) in sustained screen gaze attentiveness of those listening to the presenters, after the CSCC training intervention.

**Discussants:** During the discussion component of the group work a statistically significant increase in sustained screen gaze attentiveness of the group members during PostTGDs was found ( $p = 0.001$ ).

Overall, the analysis showed an improvement for all group members' sustained screen gaze after the CSCC training intervention. Moreover, this increase was statistically significant for listeners and discussion group members ( $p = 0.001$ ) in both groups. Although there was an increase in screen gaze attentiveness of all group members while they were presenting after the CSCC training, it was found to be statistically nonsignificant in both groups.

##### 3.1.2. Averaged Screen Gaze

In both groups' a substantial increase in the averaged percentage screen gaze was evident through the quantitative data analysis. For example, Table 4 presents the pre- and post-intervention data on averaged screen gaze of each member ( $n = 4$ ) in Group 1 during the first presentation and the follow-up discussion.

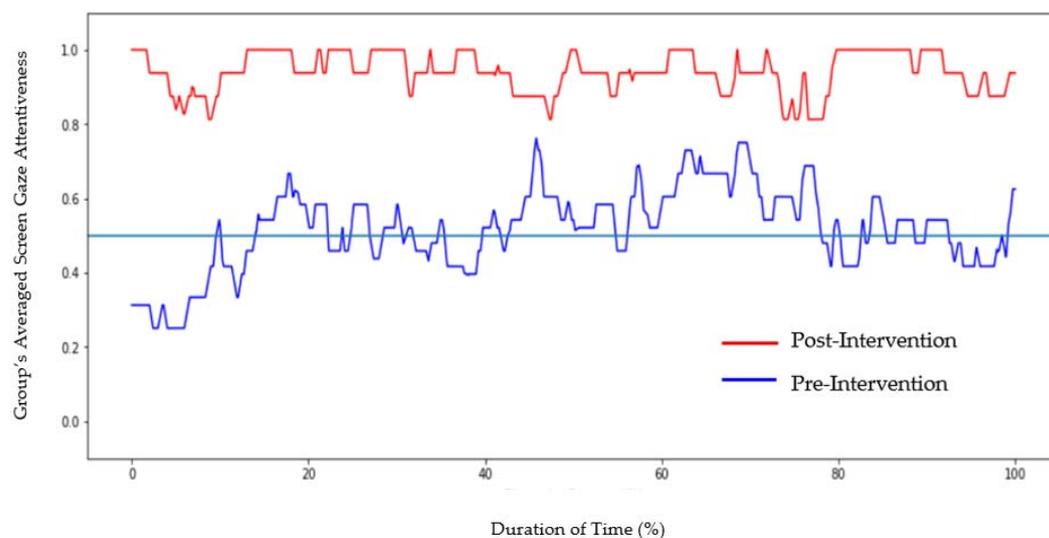
**Table 4.** Averaged Percentage Screen Gaze of the Group Members during Pre- vs. Post-Intervention Presentation and Discussion of S2's Journal Article.

Task	Group Member/Role	Pre %	Post %
S2' Presentation of Journal Article	S2 Presenter	09.40	65.75
	S1 Listener	00.00	47.95
	S3 Listener	25.64	70.55
	S4 Listener	72.65	100.00
Discussion of S2's Journal Article	S2 Member	19.28	86.90
	S1 Member	33.73	94.64
	S3 Member	53.41	100.00
	S4 Member	66.27	100.00

### 3.1.3. Jupyter in Python Analysis: Whole Group's Averaged Screen Gaze during Pre- vs. Post-Intervention Group Discussions

Figure 3 compares the averaged percentage screen gaze of Group 1 during the pre- vs post-intervention group discussions. In Figure 3 below, the Y-axis indicates each group's averaged percentage screen gaze values as follows:

- 0 = no one (0%) offered screen gaze attentiveness at any time in the meeting.
- 0.25 = only one group member (25%) sustained screen gaze attentiveness.
- 0.5 = two members of the group (50%) sustained screen gaze attentiveness.
- 0.75 = three members of the group (75%) sustained screen gaze attentiveness.
- 1 = all four members (100%) sustained screen gaze attentiveness.

**Figure 3.** Whole group's averaged percentage screen gaze attentiveness during pre- versus post-intervention discussions.

The red line representing the post-intervention averaged screen gaze of the whole group remained near to 1 indicating sustaining screen gaze attentiveness by all four members at any time during the follow-up discussion. In contrast, the blue line representing pre-intervention averaged screen gaze of the whole group remained near to the straight line which represents 0.5. Hence, during pre-intervention, only one or two group members sustained screen gaze, and at no point in time did all group members simultaneously sustain screen gaze during the group discussion. It was found overall that the example result presented above in Figure 3, was representative of participants' 'before and after' screen gaze behaviours across both Groups 1 and 2.

### 3.2. Quantitative Analysis of Questionnaires

Results of the two questionnaires analysed employing the Wilcoxon Signed-Rank Test for both Groups 1 and 2 are shown below.

#### 3.2.1. Questionnaire on Group Work Behaviours

The findings from the Wilcoxon Signed-Rank Test confirmed the increase of students' screen gaze attentiveness after the CSCC training. This was apparently mediated through videoed/observable changes from pre-intervention negative group behaviours (itemized in the questionnaire) into positive behaviours that were related to, for example:

- 4.13 *Allowing others to speak too fast for everyone to understand them;* and
- 5.14 *Not asking for more explanation when understanding becomes too difficult.*

Moreover, post-intervention increases in their confidence to engage in group discussion was identified in their pre and post responses to;

- 6.1 *How confident are you to engage in group discussion?*

An enhancement of their understanding of the group discussion topics was seen post-intervention (compared to pre-intervention for example (for 5-point Likert scale question):

- 7.1 *Group discussion with other students usually leads to a better understanding about a topic.*

Overall, the results of the questionnaire analysis indicated a statistically significant difference in some aspects of the group work behaviours after the CSCC training intervention of  $p = 0.1$  (See Table A1, Appendix C).

#### 3.2.2. Questionnaire on Compassionate Engagement and Action Scale (The Compassionate Mind Foundation)

Comparison of before and after CSCC training intervention questionnaire data through the Wilcoxon Signed-Rank Test indicated a statistically significant difference of  $p = 0.5$  in students' responses related to Compassionate Engagement and Action Scale. This included stronger evidence than before the CSCC training of participants' compassion towards themselves and of their noticing compassion from others as in their responses to the following Likert scale statements:

- 4. *I am emotionally moved by my distressed feelings or situations.*
- 6. *I reflect on and make sense of my feelings of distress.*
- 38. *Others take the actions and do the things that will be helpful to me.*
- 39. *Others treat me with feelings of support, helpfulness and encouragement.*

(See Table A2, Appendix D).

### 3.3. Qualitative Analysis

#### 3.3.1. Template Analysis of the Task-focused Group Meetings (Pre- and Post-Intervention)

Template Analysis of the task-focused group meetings identified an increase in group members' screen gaze attentiveness and their motivation to switch the cameras on in online group work meetings after CSCC training intervention.

##### Pre-Intervention Task-Focused Group Work Meetings (PreTGMs)

As the first step in data coding using NVivo (Pro 12) software, 59 references were identified under two free codes (avoidant/breaking screen gaze and long silences) in the transcriptions of PreTGMs. This is how the data overall was seen to be offering 'non-verbal communication' as a main, overarching theme for both groups. For a visual representation of this please see Table 5 below.

##### Post-Intervention Task-Focused Group Work Meetings (PostTGMs)

The same procedure as above was applied to the PostTGMs transcripts. As the first step in data coding using NVivo (Pro 12) software, 119 references were identified under three free codes (nodding, reduction of breaking screen gaze and silences) in the PostTGMs. Thus, 'non-verbal communication' emerged as an overarching theme for both Groups as shown next in Table 5.

Next, the above screen gaze results were further explored using Micro-ethnographic analysis of task-focused group work meetings (which consisted of the students' journal article presentations and follow-up group discussions) and Template Analysis of the focus groups' transcriptions respectively for data triangulation.

**Table 5.** Emergent Themes from the Analyses of Pre Vs Post-Intervention Group Meetings Transcription.

Theme	Focussed Codes	Free Codes	Groups 1 and 2			
			Pre		Post	
			Frequencies (59)	%	Frequencies (119)	%
Non-verbal Communication	Disruptors	Breaking screen gaze	49	83.05	18	15.13
		Long silences	10	16.95	4	3.36
	Facilitators	Nodding	–	–	97	81.51

### 3.3.2. Micro-Ethnographic Analysis

The results of the micro-ethnographic analysis indicated behavioural changes amongst the group members after the CSCC training as they tended to be more attentive and interactive. Switching their cameras on and focusing on sustaining their screen gaze during their post-intervention presentations and follow-up discussions were both factors here.

#### Students' Journal Article Presentations

Below is an example from Group 1 of the pre-intervention screen gaze behaviours of S4 (the presenter) and the rest of the group (listeners) during S4's journal article presentation to his fellow members. The behaviour was characteristic of all the presenters in both groups as well as the rest of the group (listeners) during the pre-intervention discussions. Box 1 shows the behaviours of all group members during S4's pre-intervention journal article presentation.

A pattern that has emerged from the micro-ethnographic analysis for both groups is that breaking engagement through avoidant screen gaze by a presenter appeared to encourage the breaking of screen gaze attention amongst other members. They appeared to be more easily distracted by their individual physical environments. For example, student 4 (Group 1) had the whole group's screen gaze attention until he broke the screen gaze himself by looking downward at his notes during nearly his whole presentation. This may have facilitated S2's verbal communication with his brother who came into the room during S4's presentation. When this happened, S1 repeatedly broke his screen gaze as well.

Overall, when a presenter broke screen gaze, the following two phenomena were apparent.

Without screen gaze, the presenter could not notice other group members' non-verbal signals, if any, of their understanding or lack of understanding of what the presenter was saying. The presenter could not witness any possible cues of encouragement, agreement or disagreement within the group in real-time. Second, it might be equally important that the other group members could see that the presenter was not paying attention to them, therefore, any non-verbal responses from them to what the presenter was saying were not observed.

Compared to the pre-intervention presentations, all group members in both groups exhibited more positive and attentive behavioural changes during the post-intervention. As a representative example for all speakers in both groups, Box 2 records all group members' behaviours during S4's post-intervention presentation.

This micro-ethnographic analysis demonstrated a reduction in breaking screen gaze by all group members after the CSCC training intervention. For example, during the pre-intervention presentation, when S4, the speaker, read from his notes with his eyes down, S2 repeatedly turned away from the screen to converse with his brother who was on a sofa behind him. Therefore, his screen gaze was mostly erratic. However, the tendency of the group members to respond to external stimuli was reduced after the CSCC training intervention as can be seen in Box 2 above (S2's behaviour in the post-intervention).

**Box 1.** Micro-Ethnographic Field notes during S4's Journal Article Presentation (Pre-Intervention).**Group 1/Pre-Intervention Screen Gaze and Related Behaviours during S4's Presentation**

1. S4 presents his journal article to the group for a total of five minutes and 25 seconds.
2. The presenter appears to be mainly reading, eyes down, at the expense of maintaining optimal gaze. He looks at his notes and presents without sustaining eye gaze with other group members throughout most of his presentation. His eye gaze connection to others is infrequent and fleeting.
3. At the start of the presentation, S2's brother enters the room [00:17:07] and sits on a sofa behind S2 but then talks to S2 from behind. S2 moves his outstretched right hand [00:12:16] behind him as expecting to be given something by his brother behind him. Then he turns his body in his chair to communicate [for seven seconds 00:12:17–00:12:25] with his brother.
4. Within the group, S1 appears to notice this event and is suddenly smiling then covers his mouth with his left hand as if to hide his smile. S4 may not be aware of this as he seldom looks at the screen.
5. After this, S1 also looks down and bites the little finger of his left hand [00:12:25–00:12:40] and then communicates with another person in the room, breaks his screen gaze and seldom looks at the screen.
6. S1 looks to his left and it seems, non-verbally communicating (nodding and smiling) with another person outside their group [00:13:26–00:13:34]. S1 communicates with someone else in the room four more times, looking at the left continually till 00:13:56. Afterwards he fixes his gaze downward [00:13:59–00:14:17].
7. S2 is speaking, nodding and smiling at his brother who is in the room with him, and repeats these actions two more times [00:14:00–00:14:12, 00:15:21– 00:15:29] during S4's five minute and 25 second presentation.
8. S1 fixes his gaze downward for 17 seconds [00:14:19–00:14:36]. Afterwards, he looks away from the screen moving his head down and then to the left, breaking screen gaze [00:14:57–00:15:08].
9. There is a long pause (11 seconds) when S4 finishes presenting his journal article. [00:16:00–00:16:11].
10. S1 breaks screen gaze for a combined total of two minutes and 40 seconds.
11. S2 breaks screen gaze for a combined total of 55 seconds.
12. S3 breaks her screen gaze for a combined total of two minutes and 15 seconds.

**Box 2.** Micro-Ethnographic Field notes during S4's Presentation (Post-Intervention).**Group 1/Post-Intervention Screen Gaze and Related Behaviours during S4's Presentation**

1. S4 presents his journal article for six minutes and 20 seconds during which he sustains screen gaze for five minutes and 12 seconds. He breaks screen gaze for one minute and eight seconds.
2. S1 looks at the screen during most of S4's presentation, sustaining screen gaze for four minutes and 45 seconds and breaking screen gaze for 35 seconds. No external communications occurred.
3. S2 sustains his screen gaze for five minutes and 11 seconds during S4's presentation but breaks screen gaze for nine seconds. When his brother tries repeatedly to communicate with him, S2 doesn't break screen gaze with his group and does not respond to his brother.
4. S3 sustains screen gaze for five minutes and three seconds during S4's presentation. He breaks screen gaze for one minute and 17 seconds.

**Student Task-Focused Group Discussions**

The micro-ethnographic analysis of the follow-up group discussions indicated similar results to what was observed during the presentations: a reduction of erratic screen gaze with an increase in screen gaze attentiveness in the post-intervention group discussion. (See Boxes 3 and 4).

**Box 3.** Micro-Ethnographic Field notes during S4's Discussion (Pre-Intervention).**Group 1/Pre-Intervention Screen Gaze and Related Behaviours during Discussion on the Article Presented by S4**

1. During the discussion of the journal article presented by S4 for three minutes and 20 seconds, S4 speaks continuously [00:16:37 - 00:19:38] without sustaining his screen gaze with other group members – there was an extended period of downward gaze. S4 breaks screen gaze for a combined total of three minutes and two seconds.
2. S1 breaks his screen gaze (looks downward) for a combined total of one minute and 16 seconds.
3. S2 breaks his screen gaze (communicates with his brother in his room and looks downward) for a combined total of 18 seconds.
4. S3 breaks her screen gaze (touches her hair and looks downward) for a combined total of one minute and 37 seconds during the discussion.

Notably, the results of group members' screen gaze attentiveness during pre-intervention discussions were found to be similarly erratic and unpredictable across all participants in both groups, despite the thorough search through the videos for disconfirming evidence by any group member.

**Box 4.** Micro-Ethnographic Field notes during S4's Discussion (Post-Intervention).

**Group 1/Post-Intervention Screen Gaze and Related Behaviours  
during Discussion on the Article Presented by S4**

1. After S4 presents his journal article, the discussion of it takes five minutes and 37 seconds during which S4 breaks screen gaze for a combined total of 21 seconds.
2. S1 breaks screen gaze for a combined total of 42 seconds.
3. S2 sustains screen gaze throughout the discussion of S2's journal article and looks down for only one second.
4. S3 breaks screen gaze for a combined total of 27 seconds.

Overall, the micro ethnographic evidence here helps explain how screen gaze was better sustained across both groups after the CSCC training than before. The above field note findings were found to be representative of both groups. These data inform and appear to corroborate what was found in the quantitative data above in Section 3.1.

### 3.3.3. Template Analysis of Focus Groups Transcriptions

During the focus groups, the group members reflected on their meetings before and after the CSCC training and the transcriptions were analysed using NVivo (Pro 12) following the Template Analysis framework. The results show that sustained screen gaze attentiveness emerged as a major theme in the post-intervention group meetings. Furthermore, the use of the CSCC was identified by the respondents as a major reason for this increase of screen gaze attentiveness. Interestingly, the students reported their practical applications of the compassionate strategies as having motivated them to switch on their cameras during the post-intervention group meetings. Below, extracts of examples of these accounts are presented using pseudonyms and it should be noted that English was not the first language of any of the participants.

**Listening:**

*S4 : When I listen [ed] to Jenuru [S1]'s (presentation) actually he was not smiling—always. So, . . . I don't know whether it's the topic is boring . . . to him.. so, I was . . . asking [a] question to make it more attractive . . . and the other people also got interacted with that . . . and him as well to express what he wanted to say. I did that [on] purpose actually.*

(Group 1, Transcription of Post-intervention Focus Group, pp.2 & 3, lines 63–71).

**Presenting:**

*S8 : For me, it was the body language. You know, that little nod of like clarification [that] they were listening, was a lot more about telling that [they were] . . . there... When I was talking, like, all you guys are nodding heads, so it gives you more confidence like you guys actually paying attention.*

( Group 2, Transcription of Post-intervention Focus Group, p.2, lines 42–46).

**Presenting and Discussing:**

**S2:** *Yeah, so I think I it went all good like I can see when I was discussing, when I was presenting my article like people are curious and because of their facial expressions, that drives me keep on going to complete my article [presentation]. So, I think it's a good discussion even ... during the questioning time because of their feedback.*

(Group 1, Transcription of Post-intervention, Focus Group, p.2, lines 42–46).

**S8:** *Now it's more like more comfortably ... joking around. It is much more confidence with each other to actually talk. Now it seems like everything is different ... we feel much more comfortable in how we interact.*

(Group 2, Transcription of Post-Intervention, Focus Group, p.11, lines 347–350).

**S4:** *... in my case I have confidence to talk in front of you all now without any fear. That's I'm saying, again, that's what we gain through the [CSCC] techniques.*

(Group 1, Transcription of Post-Intervention Focus Group p.7, lines 234–236).

**S6:** *I would also say about having the webcam turned on, the other day, I didn't want to, but now (after the CSCC training) I think by having it turned on, ... it makes us feel more like friendly. So, I think having camera turned on help all of us.*

(Group 2, Transcription of Post-intervention Focus Group, p.16, lines 510–515).

The examples above illustrate the changes that group members experienced individually and the groups/teams after undergoing the CSCC training. This evidence confirmed that post-intervention group members felt more comfortable, interactive and inclusive. This helped them to be more attentive to one another's presentations and in the follow-up group discussions. Finally, group members articulated their increased readiness and willingness to switch their cameras on during post-intervention online group/teamwork meetings in contrast to their pre-intervention group meetings.

**4. Discussion**

According to the findings of this study, a lack of screen gaze attentiveness was evidenced during the pre-intervention group meetings by group members when fulfilling their roles as speakers as well as listeners. This contrasts with the first component of compassion which is to 'notice the distress or disadvantaging of self and others'. This cannot be accomplished without full attention to one another in a group meeting. The current findings are in line with Vertegaal et al.'s [69–71] research. Their eye-tracking study explored the role of eye gaze in group work via video conferencing where the spread of eye gaze around the group equalised the participation of the group members and enhanced the quality of problem solving and decision making [69–71]. Of particular interest here was that although the mediating effect of inclusive eye contact around the group when it met in class [13,14] was not possible online, an increase in camera use, and with that, sustained screen gaze attention throughout the group's post-intervention meetings appeared to compensate for this. Therefore, an important point to notice is that the switching on of the cameras during such discussion meetings does appear to significantly enhance screen gaze attentiveness and facilitate the equal participation of each group member.

Furthermore, the findings were relevant to both (a) Learning and (b) Social experiences across the group.

**(a) Learning experience across the group**

If not looking at the screen, a speaker might fail to observe the non-verbal behaviours of students who may be signalling, even unconsciously, that they do not understand parts of the presentation, whether that is conceptual, or because of spoken English language errors or accent, or difficulties of English comprehension such as from speed of others' speech. Even a small frown or moving/turning of the head may signal to the speaker that they should repeat or/and rephrase a point. Observing these signals is useful in particular if listeners do not wish to verbally interrupt the presentation. Furthermore, if listeners do

not understand and cannot signal potential difficulties non-verbally to a presenter who is not looking at them, a follow-up discussion might prove difficult. Not attending to non-verbal cues will therefore not only affect the listeners trying to communicate their difficulties in following what is said, but the whole group's learning experience in terms of the quality of criticality of the discussion that follows because some members may lack the comprehension they needed to participate. Both groups experienced such a problem during the pre-intervention group meetings.

(b) Social experience across the group:

- (i) If the presenter does not sustain screen gaze with the listeners, this may cause the listening group members to dissociate from their compassionate role of supporting the current speaker; this is true for the screen gaze of all students in the group, but particularly for the speaker. This may lead to there being no perceived necessity for listeners to sustain their own screen gaze because evidence of their attention to a speaker is not noticed by that speaker; listeners may feel that their supportive behaviours are pointless. Furthermore, in the online group format, in particular, the listeners may then become more susceptible to distractions in their physical environment.
- (ii) The speaker who does not sustain screen gaze with the listeners is most likely to also miss other highly communicative non-verbal signals of engagement from the listeners. Nodding and smiling are useful signals of understanding and/or encouragement to the speaker to continue. Turning/moving heads from side to side, frowning or expressions of puzzlement, or blank looks may be useful signals to the speaker that he/she is not communicating successfully at this moment, and should repeat, and/or rephrase, and/or slow down or simply stop and check understanding around the group.
- (iii) An inability to notice their own behaviours does not allow group members to observe their behaviours in terms of group tasks achievement.

In summary, it is important to enact the first component of compassion for the group work/teamwork context, ('noticing'), in order to fulfil the second component, ('taking wise actions to reduce or prevent the distress or disadvantaging of self and others'). Understanding this phenomenon and application of the CSCC practically during the post-intervention task-focused group work meetings assisted students' recognition of the advantages of switching their cameras on during their group/team meetings online. This was especially enhanced by their realisation that they could offer a wide range of support to their peers by implementing what they had learned about CSCC. Hence, this approach appears to help address the multi-factored issue of delayed or abandoned development of social relationships that could be remedied through even non-verbal exchanges in online group meetings [22,72,73]. Further, the current findings are important for addressing negative emotions including feelings of isolation and/or helplessness by students having had to shift into the online platforms [74].

This study on compassion as an intention (not an emotion) [30] suggests new avenues to enhance the productivity and inclusivity of online group work/teamwork meetings. For example, in a group of four members with cameras on, each group member can read the expressions, all on one screen, of all three other members of the group, at the same time. Compared to when a group sits around the table, this is a change of spatial dimensions for 'reading' faces and their non-verbal cues and signals (e.g., confusion, approval, disagreement, encouragement) during the meeting. This alone may be worthy of further research in terms of how the observing social brain adapts under compassionate conditions, where oxytocin may help sync the group [24]. This is important because of research such as that of Greenfield's [13,75] on identifying how the current, widespread requirement for daily digital multi-focusing is changing the architecture of children's brains in digital societies. She asserts, 'if you only focused on the behaviour of one player (in a game of football, for example) you couldn't extrapolate the nature and context of the

game'. Similarly, in their group meetings, if students focus on the speaker only (which often happens in offline meetings), they may not also pay close attention to the immediate facial responses of the rest of the group members. However, this advantage of reading faces (in online group meetings) is only possible when attendees have their cameras switched on.

During the post-intervention presentations, the follow-up discussions of the articles and again in the focus groups, it was evident that, the CSCC training increased the confidence of students when they spoke as presenters or/and as discussant participants because of the non-verbal support they could consciously observe from their group/team. First, this CSCC support confidence building of the student speaking as they experience the support from their group/team. Second, students appeared to more easily assess responses and overall reactions of the whole group to presentations or discussions more easily as they were looking at three other faces at once. The verbal evidence for enhanced inter-students' support of each other similarly aligned with the principles of the non-verbal compassionate communications, above.

Overall, the findings suggest that training the students in CSCC motivated them to use practical compassionate communications to manage their group/teamwork interactions irrespective of their ethnic, religious or mother tongue differences. This may be the result of compassion being a valued concept cross-culturally [76–80]. Thus, the study's findings are relevant for addressing the current tendency towards ethnic and religious polarization of student communities [81–86].

Moreover, the current study answers the constructivists' concerns that students' learning should be demonstrated in tangible products. By teaching students, the current empirical evidenced based understanding of compassion as it pertains to interactional dynamics in group/teams, students demonstrated their learning not only through their recorded completed presentations and discussions as outcomes but also by the content of these in relation to shared criticality and enhanced group cohesion.

Finally, the study's findings demonstrated the successful adaptation of the CSCC (through partnership with the students) to the online group meeting context. The findings also support the notion of the Self Organized Learning Environments (SOLE) introduced by Mitra [53,87]. In the context of this study, 'self-organized' is inferred from the choice by students of their journal articles to present and discuss without a tutor taking part. The whole point of the discussion was to develop critical perspectives taking through the social interaction (in this case based on an empirical understanding of compassion) considered by the constructivists as necessary for student learning.

#### *Limitations of the Study*

Technological barriers in the form of unstable internet connections prevented one student from keeping the camera continually switched on in Group 2 despite repeated attempts by her to do so.

It may be that the single facilitator (teacher/trainer) for this study was a positive variable in the findings. This is a variable that cannot easily be removed from many teaching and learning situations unless carried out through human learning machine instruction interactions, but it is important to consider. However, in the current approach, this argument becomes much weaker as, once the exercise began, there was no supervision or mediation by the teacher during either the group presentations or discussions.

The backgrounds of each student in their respective online environments may well have been more distracting across the group than might be expected in a shared physical space. Additionally, as planned, it will be necessary to investigate whether, and if so, in what ways, students have taken forward and not discarded what they learned from this study. This is to a planned and necessary extension of this study to be carried out several months from now.

## 5. Conclusions

The study identified that screen gaze was key to the kinds of non-verbal signals of social connection most likely to mediate learning outcomes for the whole online group/teamwork meetings. This aligns with the findings in previous studies [13,16,66] that inclusive eye contact (around the group) was a key feature of the pedagogy of compassionate communication in offline classroom group work.

The CSCC was found to license participants to exercise, their purposeful use of compassionate verbal and non-verbal communications throughout their group/teamwork meetings.

Post-intervention, all participants reported being motivated to switch their cameras on in contrast to the preference of some not to do so not only in the pre-intervention meetings in this study but also as they reported in relation to their previous experiences of online group work on their degree programmes. This change, attributed by all participants to a new understanding of compassion specific to group work/teamwork suggests an accelerated development of a shared, interdependent identity in each group. Moreover, the findings are relevant to the current emphasis in higher education on the need for authentic assessment in HE and as preparation for groups/teams in the workplace. The findings inform group work/teamwork practice for students, teachers and syllabus designers. Specific to this study though, further research will investigate the benefits of teaching the cognitive skills of compassionate communications, as above, to Tamil, Sinhalese and Muslim students, drawn together as strangers from a new sample of Sri Lankan, not UK, universities.

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**Institutional Review Board Statement:** The study has been reviewed by the Ethics Committee of the University of Hertfordshire (protocol code cHUM/PGT/UH/04345 and 3 October 2019).

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study. No research participant can be identified in this research article as all study data have been anonymized.

**Data Availability Statement:** Data supporting reported results can be found in the secure One Drive at the University of Hertfordshire, accessed through the authors.

**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A

### *Questionnaire on Group Work Behaviours*

This short, anonymous survey asks questions about group work. Could you kindly spend approximately 5 min sharing your opinions, please? The results from the survey (pre and post) will help us identify the impact, if any, of the evidenced based compassionate pedagogy to support students' communicative ease with others in groupwork. The work is approved by the University of Hertfordshire Social Sciences, Arts and Humanities Ethics Committee with Delegated Authority, UH protocol No. cHUM/PGT/UH/04345.

You are free to withdraw at any stage, just stop answering the questionnaire or leave this page.

What will happen to the data collected within this study?

- The data collected will be stored electronically, in a password-protected environment, for four years, after which time it will be destroyed under secure conditions.
  - The data will be analysed and the results will be used in publications and presentations. The analysis will contribute to the primary researcher's PhD project.
1. In the box below, please enter the code given to you by the researcher.

2. Demographic Information

2.0 Which age group do you belong to?

- 18–25
- 26–35
- 36–45
- 46–55
- 56 and above
- Prefer not to say

2.1 What is your gender?

- Male
- Female
- Other
- Prefer not to say

3. In your view, which of the following best describes your level of English?

- Expert user—accurate, appropriate, fluent with full understanding
- Very good user—rare errors, use complex language well
- Good user—only occasional errors, use complex language quite well in most situations
- Competent user—some errors, use some complex language in familiar situations
- Modest user—frequent errors, have difficulties with complex language

4. Please tick any of the following behaviours that you have demonstrated (your own behaviour) in your group discussions.

Negative Group Behaviours		Always (1)	Quiet Often (2)	Sometimes (3)	Not Very Often (4)	Never (5)
4.1	Talking a lot so that others do not get many chances to speak.					
4.2	Talking in silences when other group members are talking.					
4.3	Not looking at all the other people in the group.					
4.4	Using difficult language terms or expressions without explaining so that other people in the group may not understand.					
4.5	Not listening carefully to other peoples' ideas.					
4.6	Not helping other people when they are getting into difficulty while they are speaking.					
4.7	Talking over others.					
4.8	Not inviting others to speak.					
4.9	Not thanking others for their contribution.					
4.10	Speaking very little or not at all in the group.					
4.11	Not even reading a little bit in order to bring something to the discussion.					
4.12	Letting other people talk and talk without interrupting them.					
4.13	Allowing others to speak too fast for everyone to understand them.					
4.14	Not asking for more explanations when understanding becomes too difficult.					
4.15	Other:					

4a. If you selected the item 15 'Other', please include your observations here.

5. Please tick any of the following behaviours that others have demonstrated (you have observed in others) in your group discussions.

Negative Group Behaviours		Always (1)	Quiet Often (2)	Sometimes (3)	Not Very Often (4)	Never (5)
5.1	Talking a lot so that others do not get many chances to speak.					
5.2	Talking in silences when other group members are talking.					
5.3	Not looking at all the people in the group.					
5.4	Using difficult language terms or expressions without explaining so that other people in the group may not understand.					
5.5	Not listening carefully to other peoples' ideas.					
5.6	Not helping other people when they are getting into difficulty while they are speaking.					
5.7	Talking over others.					
5.8	Not inviting others to speak.					
5.9	Not thanking others for their contribution.					
5.10	Speaking very little or not at all in the group.					
5.11	Not even reading a little bit in order to bring something to the discussion.					
5.12	Letting other people talk and talk without interrupting them.					
5.13	Allowing others to speak too fast for everyone to understand them.					
5.14	Not asking for more explanations when understanding becomes too difficult.					
5.15	Other:					

5a. If you selected the item 15 'Other', please include your observations here.

6. These questions are about your confidence in considering your and others' behaviours during group work. Please tick your answer for each question.

Confidence of Working in Groups		Not Confident at All (1)	Not That Confident (2)	Reasonably Confident (3)	Extremely Confident (4)
6.1	How confident are you to engage in group discussion?				
6.2	How confident are you to draw others into group discussion?				
6.3	How confident are you to address the behaviour of someone who is dominating the discussion during group work?				
6.4	How confident are you in moderating your own behaviour to benefit group discussion?				

7. To what extent do you think group behaviours can influence your learning? Please tick your answer for each question.

		Strongly Disagree (1)	Somewhat Disagree (2)	Neither Agree nor Disagreed (3)	Somewhat Agree (4)	Strongly Agree (5)
7.1	Group discussion with other students usually leads to a better understanding about a topic					
7.2	The quality of the discussion is determined by the way the group members interact					
7.3	The quality of the discussion is determined by knowledge of the group members					

8. Please add any additional thoughts about group work.

Thank you very much for your participation.



4. I am emotionally moved by my distressed feelings or situations.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

5. I tolerate the various feelings that are part of my distress.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

6. I reflect on and make sense of my feelings of distress.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

7. I do not tolerate being distressed.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

8. I am accepting, non-critical and non-judgemental of my feelings of distress.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

Section 2—These questions relate to how you actively cope in compassionate ways with emotions, thoughts and situations that distress you. So:

When I'm distressed or upset by things ...

9. I direct my attention to what is likely to be helpful to me.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

10. I think about and come up with helpful ways to cope with my distress.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

11. I don't know how to help myself.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

12. I take the actions and do the things that will be helpful to me.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

13. I create inner feelings of support, helpfulness and encouragement.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

### *Compassion to Others*

When things go wrong for us and we become distressed by setbacks, failures, disappointments or losses, we may cope with these in different ways. We are interested in the degree to which people can be compassionate with themselves. We define compassion as "a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it".

This means there are two aspects to compassion. The first is the ability to be motivated to engage with things/feelings that are difficult as opposed to trying to avoid or suppress them. The second aspect of compassion is the ability to focus on what is helpful to us. Just like doctors with their patients. In other words, the first aspect of compassion is to be





32. Others reflect on and make sense of my feelings of distress.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

33. Others do not tolerate my distress.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

34. Others are accepting, non-critical and non-judgemental of my feelings of distress.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

Section 2—These questions relate to how others actively cope in compassionate ways with emotions and situations that distress you. So:

When I'm distressed or upset by things ...

35. Others direct their attention to what is likely to be helpful to me.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

36. Others think about and come up with helpful ways for me to cope with my distress.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

37. Others don't know how to help me when I am distressed.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

38. Others take the actions and do the things that will be helpful to me.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

39. Others treat me with feelings of support, helpfulness and encouragement.

	1	2	3	4	5	6	7	8	9	10	
Never											Always

Thank you very much for your participation and time spent on this survey.

## Appendix C

**Table A1.** Wilcoxon Signed-Rank Test Statistics—Questionnaire on Group Work Behaviours.

	Z	Asymp. Sig. (2-Tailed)
AEngLevel – BEngLevel	−1.000 <sup>b</sup>	0.317
AQ4.1 – BQ4.1	−0.577 <sup>c</sup>	0.564
AQ4.2 – BQ4.2	−0.137 <sup>c</sup>	0.891
AQ4.3 – BQ4.3	−1.667 <sup>b</sup>	0.096
AQ4.4 – BQ4.4	−1.134 <sup>b</sup>	0.257
AQ4.5 – BQ4.5	−0.108 <sup>b</sup>	0.914
AQ4.6 – BQ4.6	−0.707 <sup>b</sup>	0.480
AQ4.7 – BQ4.7	−0.816 <sup>c</sup>	0.414
AQ4.8 – BQ4.8	−0.378 <sup>b</sup>	0.705
AQ4.9 – BQ4.9	−1.000 <sup>c</sup>	0.317
AQ4.10 – BQ4.10	−1.633 <sup>b</sup>	0.102
AQ4.11 – BQ4.11	−0.000 <sup>d</sup>	1.000

Table A1. Cont.

	Z	Asymp. Sig. (2-Tailed)
AQ4.12 – BQ4.12	– 0.879 <sup>c</sup>	0.380
AQ4.13 – BQ4.13	–1.732 <sup>b</sup>	<b>0.083</b>
AQ4.14 – BQ4.14	–0.447 <sup>b</sup>	0.655
AQ5.1 – BQ5.1	–0.412 <sup>c</sup>	0.680
AQ5.2 – BQ5.2	–0.276 <sup>b</sup>	0.783
AQ5.3 – BQ5.3	–0.000 <sup>d</sup>	1.000
AQ5.4 – BQ5.4	–0.184 <sup>b</sup>	0.854
AQ5.5 – BQ5.5	–0.604 <sup>b</sup>	0.546
AQ5.6 – BQ5.6	–0.378 <sup>b</sup>	0.705
AQ5.7 – BQ5.7	–0.378 <sup>c</sup>	0.705
AQ5.8 – BQ5.8	–0.087 <sup>b</sup>	0.931
AQ5.9 – BQ5.9	–0.879 <sup>b</sup>	0.380
AQ5.10 – BQ5.10	–0.577 <sup>b</sup>	0.564
AQ5.11 – BQ5.11	–0.213 <sup>b</sup>	0.832
AQ5.12 – BQ5.12	–0.425 <sup>b</sup>	0.671
AQ5.13 – BQ5.13	–1.633 <sup>b</sup>	0.102
AQ5.14 – BQ5.14	–1.732 <sup>b</sup>	<b>0.083</b>
AQ6.1 – BQ6.1	–1.732 <sup>c</sup>	<b>0.083</b>
AQ6.2 – BQ6.2	–0.577 <sup>c</sup>	0.564
AQ6.3 – BQ6.3	–1.633 <sup>c</sup>	0.102
AQ7.1 – BQ7.1	–1.414 <sup>c</sup>	0.157
AQ7.2 – BQ7.2	–1.732 <sup>c</sup>	<b>0.083</b>
AQ7.3 – BQ7.3	–0.000 <sup>d</sup>	1.000
AQ7.4 – BQ7.4	–1.414 <sup>b</sup>	0.157

a. Wilcoxon Signed-Rank Test, b. Based on positive ranks, c. Based on negative ranks, d. The sum of negative ranks equals the sum of positive ranks.

## Appendix D

Table A2. Wilcoxon Signed-Rank Test Statistics—Questionnaire on CEAS.

	Z	Asymp. Sig. (2-Tailed)
AQ1 – BQ1	–0.962 <sup>b</sup>	0.336
AQ2 – BQ2	–0.282 <sup>c</sup>	0.778
AQ3 – BQ3	–0.184 <sup>b</sup>	0.854
AQ4 – BQ4	–1.973 <sup>c</sup>	<b>0.049</b>
AQ5 – BQ4.5	–0.954 <sup>c</sup>	0.340
AQ6 – BQ4.6	–1.980 <sup>c</sup>	<b>0.048</b>
AQ7 – BQ4.7	–0.144 <sup>c</sup>	0.886
AQ8 – BQ4.8	–0.340 <sup>c</sup>	0.734
AQ9 – BQ4.9	–1.725 <sup>c</sup>	0.084
AQ10 – BQ10	–0.000 <sup>d</sup>	1.000
AQ11 – BQ11	–1.382 <sup>c</sup>	0.167
AQ12 – BQ12	– 0.425 <sup>c</sup>	0.671
AQ13 – BQ13	–1.732 <sup>b</sup>	0.083
AQ14 – BQ14	–0.447 <sup>c</sup>	0.655
AQ15 – BQ.15	–0.970 <sup>b</sup>	0.332
AQ16 – BQ16	–1.065 <sup>c</sup>	0.287
AQ17 – BQ17	–0.412 <sup>c</sup>	0.680
AQ18 – BQ18	–1.414 <sup>b</sup>	0.157
AQ19 – BQ19	–0.756 <sup>b</sup>	0.450
AQ20 – BQ20	–1.276 <sup>c</sup>	0.202
AQ21 – BQ21	–0.272 <sup>c</sup>	0.785
AQ22 – BQ22	–0.000 <sup>d</sup>	1.000
AQ23 – BQ23	–0.000 <sup>d</sup>	1.000
AQ24 – BQ24	–0.000 <sup>d</sup>	1.000

Table A2. Cont.

	Z	Asymp. Sig. (2-Tailed)
AQ25 – BQ25	−0.406 <sup>b</sup>	0.684
AQ26 – BQ26	−1.725 <sup>b</sup>	0.084
AQ27 – BQ27	−0.921 <sup>b</sup>	0.357
AQ28 – BQ28	−0.755 <sup>c</sup>	0.450
AQ29 – BQ29	−1.289 <sup>c</sup>	0.197
AQ30 – BQ30	−0.351 <sup>c</sup>	0.725
AQ31 – BQ31	−0.422 <sup>b</sup>	0.673
AQ32 – BQ32	−1.378 <sup>c</sup>	0.168
AQ33 – BQ33	−0.000 <sup>d</sup>	1.000
AQ34 – BQ34	−1.289 <sup>c</sup>	0.197
AQ35 – BQ35	−1.063 <sup>c</sup>	0.288
AQ36 – BQ36	−1.633 <sup>c</sup>	0.102
AQ37 – BQ37	−0.962 <sup>c</sup>	0.336
AQ38 – BQ38	−2.233 <sup>c</sup>	0.020
AQ39 – BQ39	−2.121 <sup>c</sup>	0.034

a. Wilcoxon Signed-Ranks Test, b. Based on positive ranks, c. Based on negative ranks, d. The sum of negative ranks equals the sum of positive ranks.

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