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ARTICLE

Are You Still with Us? Managing Mobile Phone Use and Group Interaction in PBL

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Abstract

As mobile phone technology becomes more advanced, so too does its presence in everyday life. Research has shown, for instance, that students are using their mobile phones in classroom settings, a practice that holds both potential advantages and disadvantages. In group work, these interactions may have consequences for group dynamics in that orienting to a mobile phone can display a shift in an individual's attention to the group. The current essay details a research project conducted on problem-based learning (PBL) tutorials in the United Kingdom in which student groups were video-recorded as they worked. A discursive psychological analysis focused on instances of interaction in which a group member picked up his or her mobile phone in the middle of a working session and how the accountability for the phone use was managed by either the phone user or a fellow group member. In understanding more about the microprocesses that take place in such environments, we are better positioned to support students' learning and socialization as they progress through college.

Keywords: PBL, student group interaction, discursive psychology, group dynamics, mobile technologies

One of the challenges of implementing problem-based learning (PBL) is ensuring that group members work effectively together (Dolmans, De Grave, Wolfhagen, & Van Der Vleuten, 2005). As technology develops, it is particularly important that group members can function appropriately while using mobile technologies, such as mobile¹ phones, tablets, and laptops, in classroom settings. Mobile phones, in particular, have the ambiguous status of being a tool both for work and leisure purposes, given that their primary function is communication and in most cases they also provide access to the Internet. They are also personal and discreet; others in the group may not be able to see the screen activity in the

same way that a laptop or tablet is visible, and as such, using mobile phones in an educational context presents a problem of interpretation for group members in terms of whether the phones are being used for work or leisure purposes and thus whether a group member is still engaged with the group. In this essay, we utilize discursive psychology to examine the use of mobile phones in PBL student tutorial interaction at the exact moment in which a phone is picked up, analyzing what impact such an action can have on a group. Such an approach contrasts mainstream psychology's treatment of interaction by focusing on talk as performing a social action; such as how a phone user and other group members attend to the

¹ In this essay, we have used the term "mobile phone" to refer to cell phones, smartphones, wireless phones, etc.

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accountability of using the phone in the tutorial. In doing such in-depth analyses, we can shed further light on the intricate interactions that take place within PBL settings and how group dynamics are managed by the individuals involved.

Mobile Technologies in the (PBL) Classroom

The development of mobile wireless technologies has generated great interest within higher education due to its potential for shifting the academic environment from traditional to mobile learning settings (Kim, Mims, & Holmes, 2006) as part of what has sometimes been referred to as the move from mobile learning (m-learning) to “ubiquitous computing” (Laru, Naykki, & Jarvela, 2015; Weiser, 1991). Having the function of Internet access is particularly useful in teaching settings where there may be limited computer availability, and social media services such as blogging, Twitter, and Instagram have opened up new possibilities to encourage and facilitate student learning (Adelman & O’Brien-Weiss, 2014). Research has also suggested that mobile phone use in education can increase interaction and group cohesion (Davies, 2014) and enhance social connectedness (Wei & Lo, 2006) but is counterbalanced by the concern that such technology is at best a distraction (Organista-Sandoval, Serrano-Santoyo, McAnally-Salas, & Lavigne, 2013; Tindell & Bohlander, 2012) and at worst a tool for plagiarism (Braguglia, 2008; Campbell, 2006; for a summary of this discussion, see Barry, Murphy, & Drew, [2015]).

Research in this field has predominantly focused on evaluating the use of mobile technology in the classroom in terms of effectiveness (e.g., Ahmed & Parsons, 2013; Wu et al., 2012) or surveys measuring the frequency of reported use of mobile technologies by students (e.g., Barry, Murphy, & Drew, 2015). By comparison, very little research examines how students actually use mobile technology in classroom settings, and this tends to focus on accounts of students’ experiences of mobile use (Gikas & Grant, 2013) rather than observations or recordings of student behavior and interaction. As a result, while we are gaining a growing picture of patterns of mobile phone use in educational settings, we still know very little about how this use plays out in practice.

Within PBL settings specifically, there has also been interest in the use of online technologies as an additional form of support for student learning and increasing access to resources (Hmelo-Silver & Bromme, 2007), alongside the possibility of mobile phone use having a direct effect on group dynamics (Hmelo-Silver, 2013; Jin, Bridges, Botelho, & Chan, 2015). Chan and colleagues (2015), for instance, have reported facilitators’ concerns that the use of mobile phones would disrupt

tutorial discussion or reduce interaction between students, even though they noted that students typically self-regulated their mobile phone use for academic purposes rather than social media, phone calls, or texting (Chan et al., 2015).

Mobile phones present a particular dilemma in classroom settings, acting as they do as a bridge between formal (i.e., classroom-based) and informal (i.e., unstructured and unanticipated) learning, even when these are used within a classroom setting (Gikas & Grant, 2013). Since they have an ambiguous status as both a personal and a work object, they also bridge the divide between what might be understood as intentional or unintentional learning. That is, even if a student is using a mobile phone to go off topic, he or she may still be learning through information found. The mere act of orienting to a mobile phone, however, can be perceived as demonstrating an individual’s disengagement from group interaction and thus change the group dynamics. In interacting with a mobile phone, an individual’s attention is drawn to the device instead of the group, suggesting that the individual is not fully immersed in the group environment and as such is violating norms through “social loafing,” exerting less contribution due to being engrossed in his or her phone (Dolmans, Wolfhagen, van der Vleuten, & Wijnen, 2001).

Mobile Devices in Interactional Research

In order to better understand the role of mobile phone use in PBL tutorials, literature on human-computer interaction as well as ethnomethodological and conversation analysis studies in the use of objects in interaction provides fruitful insights (e.g., Haddington, Keisanen, Mondada, & Nevile, 2014; Nevile, Haddington, Heinemann, & Rauniomaa, 2014). For example, in their analyses of mobile phone interaction, DiDomenico and Boase (2013) likened the act of orienting to a mobile phone’s “chime” (receiving a text message) to the notion of responding to a summons (Schegloff & Sacks, 1973), whereby the mobile phone user may be summoned by a ringing phone so that he or she may engage in conversation (orally or textually) with the caller. Crucially, however, the authors demonstrated how, unlike a voice call summons, a text message summons allows the mobile phone user to respond without suspending the copresent interaction; an important point for negotiating the availability of turns at talk (DiDomenico & Boase, 2013).

If we treat PBL tutorials as being as much about social interaction as about learning and cognition, then we need to address not only how often or for what purpose mobile phones might be used in PBL tutorials but also the way in which these objects are oriented alongside conversation. While the use of technology in educational settings has a

long and established history (e.g., Cuban, 1986), research that examines the discursive and embodied practices (sometimes referred to as “multimodality”) around mobile devices within social interaction has only developed since mobile technology itself became more readily available (Lundin et al., 2010). For instance, Brown, McGregor, and colleagues (Brown, McGregor, & Laurier, 2013; Brown, McGregor, & McMillan, 2015) note how the mobile phone is an “occasioned” object in interaction; that is, it arises in interaction through being occasioned, or made relevant, by the surrounding talk and interaction. Their research examined mobile devices in mobile interaction (e.g., when people are walking around museums or finding their way around a city), but there is relevance here in that such devices can, in theory, be used at any point in an interaction (see also Weilenmann, Normark, & Laurier, 2013). One of the key findings from this area of research is that mobile phone use is closely interwoven with social interaction. In other words, people do not use their phones randomly or with little regard for conversation; instead, the phone is *part of* the complex interplay between talk, interaction, and objects in the social space.

In this essay we therefore develop existing research into the use of mobile phones in PBL tutorials and combine this with a discursive approach to interaction, drawing on insights from ethnomethodology. This also contributes to a growing body of work that examines discursive practices in PBL tutorials (Imafuku et al., 2014; Jin et al., 2015; Koschmann, Glenn, & Conlee, 1997; Visscher-Pleijers et al., 2006) and as such sheds further light on the “black box” of PBL settings (Hak & Maguire, 2000), since we are focusing on the routine, naturalistic interactions that are often overlooked in PBL research but can impact immensely on group dynamics. Specifically, we investigate what happens to group interaction at the point at which a group member picks up and begins to use his or her mobile phone during PBL tutorials *by focusing on how the phone user and other group members attend to the accountability of using a phone in a tutorial*. We examine the turn-by-turn management of the mobile phone in the group interaction in order to provide an insight into how technologies are used *in practice* in PBL settings and their location within the group dynamics and communication processes.

Methodology

Participants

The data used for this essay is taken from a corpus of naturalistic video-recorded problem-based learning student groups from two UK universities. Data was collected between

October 2012 and December 2013 from 23 psychology (University A) and 8 interdisciplinary science (University B) students, totalling eighty-five hours of interaction (for details regarding specifically the groups featured in this paper, see Table 1 below). Recruitment consisted of identifying possible PBL classes and/or components in which potential participants could be approached. Four PBL modules were identified across the two universities, and an announcement was made in person at the start of each module to recruit individuals or groups voluntarily to the project. The PBL models used at both universities were broadly based on the Aalborg model of PBL (Kolmos, Fink, & Krogh, 2006), whereby groups followed the seven steps of PBL, beginning with starting to unpack the problem and ending with reflecting and applying newly gained knowledge to the problem.

For the psychology students at University A, PBL was a relatively new approach to learning; although they had experienced one block of PBL (five hours) in the previous year of their degree, this was the only class in the psychology curriculum that was fully taught in this way. These classes were timetabled, and as such recordings lasted for the length of the PBL block, whether this was a whole semester (i.e., groups in Extracts 1, 4, and 5) or over only a couple of sessions (i.e., the group in Extract 2). Groups were overseen by a floating facilitator who visited each group numerous times during each session but didn't stay for the entire time. The interdisciplinary science students (University B, Extract 3), conversely, had been using PBL since the start of their degree, and as such it was an established teaching method in their department. These groups did their PBL sessions at times arranged by themselves—for however long they wanted—outside of the timetabled teaching sessions, and as such there is a large variance in terms of hours of recorded data not only across these interdisciplinary science groups but also between them and the psychology groups. Unlike at University A, the groups from University B were not facilitated by a staff member; instead, a staff member could attend “drop in” on sessions if the group encountered any problems while undertaking the task. No facilitators are present in any of the extracts detailed in Table 1 (next two pages).

Informed, written consent was gained from all participants, including consent to use static images and video recordings in research publications and presentations, due to the nature of the data and the necessity to analyze close-up peer interactions. No demographic data was obtained from any participants such as their ages or gender, but in consenting to take part in the study, participants revealed that they were at least 18 years old. The study received full ethical approval at university level. The video data was transcribed to words-only detail in the first instance before a data corpus

Table 1. Group information.

Extract	Class/ University	Overview of Whole PBL Component	Specific Task Featured in Extract	Number of Hours Recorded	ECTS Credits for Class
1	Final year “Qualitative Methodologies in Practice” University A	Reading qualitative psychology journal articles to become familiar with different methodologies, arguing strengths and weaknesses of each, analyzing qualitative data, collecting and analyzing own qualitative data.	Analyzing raw transcript data pertaining to the theme of friendship.	21 hours: 7 weeks @ 3 hours per week	20
2	Final year “Conceptual and Historical Issues in Psychology” University A	Devising a research proposal containing no ethical constraints	Brainstorming ideas for a psychology research project that does not have to adhere to ethical constraints.	2 hours: 2 weeks @ 1 hour per week	20
3	Final year “Interdisciplinary Science” University B	Devising a podcast for an evolution exhibit at the local natural history museum.	Discussing ways in which to record the podcast.	7.3 hours	20
4	Final year “Interdisciplinary Science” University B	Reading qualitative psychology journal articles to become familiar with different methodologies, arguing strengths and weaknesses of each, analyzing qualitative data, collecting and analyzing own qualitative data.	Reporting back to fellow group members about self-study that has been undertaken.	21 hours: 7 weeks @ 3 hours per week	20

Table 1., cont'd: Group information.

Extract	Class/ University	Overview of Whole PBL Component	Specific Task Featured in Extract	Number of Hours Recorded	ECTS Credits for Class
5	Final year "Qualitative Methodologies in Practice" University A	Reading qualitative psychology journal articles to become familiar with different methodologies, arguing strengths and weaknesses of each, analyzing qualitative data, collecting and analyzing own qualitative data.	Reporting back to fellow group members about self-study that has been undertaken.	21 hours: 7 weeks @ 3 hours per week	20

was compiled, and those extracts chosen for further analysis were subjected to Jeffersonian transcription notation (Jefferson, 2004, Appendix 1).

Analytic Procedure

In order to analyze the data, the data corpus was first searched for instances of interaction in which a group member picked up his or her mobile phone, of which there were discernibly 326 (see Table 2, Appendix 2). The distinction between actually picking up a mobile phone and otherwise orienting to it (e.g., pressing or touching the phone) is important, as picking up marks a distinct shift in attention as opposed to touching or glancing at a phone, which might be similar to, for instance, looking at one's watch or a clock on the wall. Such picking-up instances were broadly categorized as happening during opening, middle, or closing stages of a PBL tutorial. This distinction is important, because the impact of interacting with a mobile phone in the middle of a session is potentially more problematic than at the start or end, when groups are settling down and finishing up, as the middle is intuitively when the focus should be on the work (e.g., Hmelo-Silver, 2004).

Middle instances were the focus for the analysis and were identified as being the moment at which a break in group collaboration might occur; the starting point for any potential trouble in the functioning of the group. Different issues are at stake, for example, when a group member looks at, touches but does not pick up, or puts down a mobile phone.

A conversation analytic (CA) and discursive psychological (DP) approach was used to analyze the data, methodologies

that have previously been used to analyze tutorial talk (e.g., Attenborough & Stokoe, 2012; Gibson, Hall, & Callery, 2006; Koschmann et al., 1997). CA was developed by Sacks, Schegloff, and Jefferson (1974), demonstrating how conversation is interactively constructed by looking at its basic properties, such as turn-taking, speech acts, and repair. DP is a form of discourse analysis that focuses on the management of psychological issues in talk and text (Edwards & Potter, 1992). The approach does not align with conventional values of psychology in which individuals' speech is regarded as being indicative of internal consciousness; rather, it assumes that talk has an action orientation and is used to perform particular social functions, achieved through a variety of rhetorical strategies (Wiggins & Potter, 2007). Discursive devices were used to examine the construction of talk in interaction, focusing on how issues around accountability are managed through turn-by-turn conversation. The analytical focus was therefore on those instances in which group members first picked up their mobile phones and how they did—or did not—account for doing so in situ.

In the analysis we demonstrate the ways in which group members orient explicitly to the use of their mobile phone: by positioning its use as being beneficial, by demonstrating its priority over current group interaction, and as an invitation to follow a particular course of action. In this way, group members clearly mark their mobile phone use as being an accountable, and thus potentially problematic activity in PBL settings; the accounting process marks the phone use *as requiring* an account. The following extracts have been chosen for analysis, as they are commonly observed patterns across the data set, and to conclude we provide an example

of a deviant case: of the less common occurrence when group members did not account for or attend to their mobile phone use explicitly and were subsequently held to account by another group member or members.

Analysis

To begin the analyses, then, we detail how group members routinely account for their mobile phone use in some way by stating a reason for picking up their phones and how this is often done at the exact point at which the phone is picked up. In Extract 1 the group is on task working, despite member Jackie having just arrived late by around 30 minutes (one-quarter of the whole session). The focus of their discussion is on analyzing transcript data pertaining to friendship.

Extract 1

1 Nadia: cuz these are frien'ships that are (.)
 2 jus' due
 3 to the fact that they're forced to live
 4 together
 5 Regina: °mm hm°
 6 Nadia: ((gazing down)) that kin'a thing
 7 ((1.0: Jackie sits down))
 8 Nadia: ((looks down/ puts pen on table and
 9 reaches into jacket pocket)) °sorry°
 10 (.) >°gonna take ma° phone out so I can
 11 go on the interne'< and look at that=
 12 Jackie: =ah texted ya
 13 (0.5)
 14 Nadia: did you
 15 Jackie: Euh [huh
 16 Nadia: [sorry



Figure 1. Clockwise from left: Jackie, Jocelyn, Nadia, Ally (hidden), Regina. (Although group members explicitly consented to having their images included in publications, screen grabs have been modified slightly to encourage anonymity and better highlight embodied gestures.) Lines 8–9: Nadia reaches into the left pocket of her jacket (circled) to retrieve her phone.

This first example provides an illustration of how a group member explicitly orients to the use of his or her phone for work purposes. Here, we see Nadia account for her shift in attention by apologizing to her peers before explaining what she is doing. This course of action appears appropriate here: her last utterance (lines 1–4) was not overtly supported or challenged by any of her peers, and so it makes sense for Nadia to access her phone as a way of obtaining an additional resource to be used in the discussion—i.e., what can be accessed on the Internet to look at “that” (line 11).

Nadia’s utterance “sorry” at line 7 is of particular interest. It could be interpreted as verbal display of accountability for

interrupting the discussion not only by ceasing to talk but also through her actions: putting her pen down and searching in her pockets. Instead of saying she’s going to research on the Internet, Nadia states that she is “gonna take my phone out so I can go on the internet and look at that” (lines 10–11), detailing the three processes involved: first, producing her phone; second, accessing the Internet; and third, researching the topic. This step-by-step detail presumably serves to assure her peers that in producing her phone, she is not social loafing or removing herself from the group; rather, she is sticking to the rules and using her phone for a beneficial purpose. Jackie’s immediate comment (“ah texted ya,” line 12) consolidates the pertinence of the phone in that she makes relevant an appropriate action that Nadia might have made (to reply to the text message or refer to this when talking to Jackie). Alongside the lack of response by the other group members, this orientation

to the phone as being an appropriate object for discussion effectively smooths over the introduction of the phone and allows the group to proceed with their conversation.

This is a rather simple example but demonstrates clearly how group members mark their mobile phone use in the data set. The second example again demonstrates how group members orient to the use of their phones within the PBL setting, though here it is being explicitly used for nonacademic purposes. As we join them, the same group is again on task, and all the group members’ mobile phones are on their desks. They are discussing ideas for a task in which they must produce a psychological research proposal with no ethical constraints.

Extract 2

17 Ally: what we know [today
 18 Nadia: [mm hm
 19 Ally: [(inaudible) ((looks at Jocelyn's
 20 phone))
 21 Jocelyn: [(pressing phone to activate screen))
 22 [AH THINK WE pro'ly are meant to do
 23 somethin'
 24 Nadia: like- [(picks up phone, begins
 25 'Googling')]
 26 Jocelyn: [that's- ((picking up phone))
 27 °>hold on ma mum's phoning me<°
 28 ((2.0: places phone to ear))
 29 Jocelyn: that is unethical because em
 30 ((Jocelyn puts phone to ear))
 31 ((3.0: Ally gazes at Jackie, and begins
 32 to smile, then looks at Nadia))
 33 Jocelyn: because it is about chi-
 34 ((takes phone away from ear and looks
 35 at it))
 36 Jocelyn: °oh f'r God's sake mum hhh°
 37 (1.0)
 38 Jocelyn: she phone' me an' straight t'answer
 39 phone
 40 (1.0)
 41 Ally: [she's maybe tryin' to phone you back
 42 heh
 43 Jackie: [she's tryin' to phone you fback
 44 Ally: fheh
 45 Jackie: fahuh
 46 ((6.0: Ally twiddles her pen, Nadia
 47 scrolls on her phone, Jackie continues
 48 eating her lunch))
 49 ((Jocelyn puts the phone to her ear
 50 again, before an answer phone message
 51 can be heard faintly))



Figure 2. Clockwise from left: Jocelyn, Ally, Jackie, Nadia. Line 28: Jocelyn puts her phone to her ear while still attempting to hold the turn at talk. (The students in Extract 2 are the same as those in Extract 1 (minus one), as they are two different PBL classes, but wanted to work together again.)

The extract begins, as before, with the group on task. At lines 19–22 there is an episode of overlapping talk, and as such we see group member Jocelyn raise her voice while also activating her phone (pressing a button to unlock it and thus gain access to its functions), therefore indicating that although she is attempting to regain the turn at talk, further

phone interaction may soon occur, displaying a split in her attention to her peers. Jocelyn's actions from lines 21 to 35 are of interest because of the way in which she continues her turn in the discussion but is also visibly occupied by her phone, apparently due to the fact that her mother has called her. Jocelyn very quickly accounts for why her attention has been turned to her phone (line 27), but instead of solely focusing on returning the call (as she goes on to do), she thrice continues attempting to make her point in regard to the PBL task.

The way in which Jocelyn accounts for why her focus has veered to her phone is in stark contrast to the episode in the previous extract, where Nadia apologized before procedurally explaining that she was going to interact with her phone and why. Here, Jocelyn does almost the exact opposite by shifting the focus from herself to her peers, telling *them* to “hold on,” as “my mum’s phoning me.” This is a potentially serious group dynamic issue for PBL: Jocelyn is effectively prioritizing her personal call over the group discussion. In asserting that the group should do so, Jocelyn posits herself as still owning the turn at talk, but the phone call takes priority, and as we see, she regains this over a series of turns as she juggles the task of getting her point across while trying to contact her mother. In this way, she tries to manage the apparent transgression by continuing to contribute to the group discussion, albeit in a stunted and disjointed manner.

Although Jocelyn has accounted for why she is on her phone, it is interesting to observe the responses of her peers. At line 31, there is a three-second lapse in the interaction while she has the phone to her ear as she tries to return her mother’s call. At this point we see that Ally’s gaze goes from Jocelyn’s phone to Jocelyn herself and then to Jackie, and then Ally begins to smile. This entire interaction happens fairly quickly and subtly, almost like a nonverbal tracking of the disruption to the group interaction. Ally’s gaze toward Jackie here and the subsequent smile are reminiscent of Kidwell’s (2005) work into gaze as social control, where “problem conduct” behavior is acknowledged through gaze. Kidwell’s research demonstrated that even young children can differentiate between a passive gaze and a gaze with meaning, and although we can’t see Jackie’s reciprocal actions here, the fact that Ally begins to smile while holding her gaze is suggestive that their shared look carries meaning—possibly a sense of “this is inappropriate”—presumably because Jocelyn is making a phone call in the middle of a group work session. While it is possible to continue contributing to group interaction at the same time as, for instance, texting or accessing the Internet, conducting a phone call is different and more troublesome. It can, for instance, interrupt the talk of other speakers, whereas the aforementioned practices are done silently and thus are less likely to suspend the copresent interaction (DiDomenico & Boase, 2013). As we see at the end of the extract, the other

group members refrain from talking while Jocelyn is still interacting with her phone. Therefore, while Jocelyn may *account* for her mobile phone usage, this does not necessarily *excuse* it within the remit of group interaction.

These first two extracts have illustrated that while students may verbalize their orientation to their phones, it is done in a somewhat understated way. In both of these examples, the speakers lower their voice and speed up their speech, almost as an aside from the group conversation—a clear removal from the usual conversational tone suggesting that such orientations to mobile devices are, like the way in which they are delivered, unusual or irregular. In the next extract, however, we see a student who accounts for his mobile phone in the opposite manner; instead of diminishing the orientation to his phone, he involves it as being part of the task. As we join them, the group members are discussing possible ways in which to record a podcast for the PBL task.

Extract 3

```

52 Donald: >°w'll° have †either've you< [tried iPhone
53 speaking
54 [((picks up
55 phone, looks at Phillip))
56 (0.5)
57 Rachel: ((looks at Donald))
58 Phillip: ((looking at Donald, shakes head)) °no°
59 Rachel: we should try
60 Phillip: [could do
61 Donald: [I will try (.) right now
62 Rachel: (good)
63 Donald: I'VE GOT- I've e:ven got a recording app on
64 my phone
65 ((1.5: Phillip reaches into pocket))
66 Rachel: ((looks at Donald)) doesn't ev'ryone
67 ((1.0: Phillip retrieves phone from pocket))
68 Donald: fshut up Ra(h)chel [heh heh heh

```



Figure 3. Clockwise from left: Phillip, Donald, Rachel. Line 54: Donald picks up his phone as he highlights its relevance in potentially contributing to the group task.

In this third extract, we see group member Donald account for orienting to his mobile phone midtutorial but in a somewhat different way than in the first two examples. Instead of explicitly stating what he is doing (like going on the Internet to research or answer a call), Donald constructs his account as

a “news announcement,” directing the topic of conversation to the possibility of recording on an iPhone and thus justifying his orientation to it. This is very similar to the way in which Brown et al. (2015) note that the interaction occasions, or makes relevant, the mobile phone use. In this instance, the mobile phone is collectively treated as relevant (“we should try,” line 59; “could do,” line 60) by the others in the group, and so its use is made part of the ongoing interaction.

Schegloff and Sacks (1973) identified that talk tends to occur in pairs such as question and answer, offer and acceptance/refusal, and compliment and response, and as such, in asking whether his peers have “tried iPhone speaking,” he is inviting a response. As Donald picks up his phone—concurrent with his question asking—he looks directly at Phillip, which indicates that he expects an answer. This is of interest, because Donald holds Phillip accountable for answering the question. If Phillip had answered that he had, Donald’s action of picking up his phone may have not been accepted due to the fact that it was presumably not going to be beneficial for the group (since someone had already tried that course of action). In answering as he does, Phillip allows Donald’s actions to be accepted within the remit of the group, as he is potentially solving the issue of how to record the group podcast. As such, the accounting is subtle; although Donald does not say outright to his peers, for instance, “I’m going on my phone to try the record app,” his embodied action of lifting the phone up into sight of the group suggests that his question preempts—and accounts for—his course of action.

As Donald pursues his interaction with his phone, he goes on to tell his peers about the recording app his phone has (line 63), which further justifies his being on his phone within the tutorial. However, group member Rachel responds to this by minimizing the importance of it through suggesting that Donald’s recording app—which is currently justifying his interaction with his phone—is something that “everyone has” (line 66), and it is at this point that Phillip too takes his phone out of his pocket, an action noted in other study as being made normative through the actions of others (Jin et al., 2015). Although we do not know if Phillip has an iPhone (and therefore, presumably, the same app that “everyone” with an iPhone does), it is possible that he retrieves his phone in order to investigate whether he has the same function. There is no verbal orientation to or justification for producing his phone, possibly because the action takes place behind his laptop screen and as such is not visible to the whole group.

Next, we see another example of mobile phone interaction serving as an invitation to follow a particular course of action. Here, we join a group of students just at the moment when they have veered off from the PBL task and are talking about Katy’s daughter Carly.

Extract 4

69 Katy: Carly's writin' a feminist essay
 70 Helen: [is she
 71 Chloe: [(picks up phone)]
 72 ((33.0: the rest of the group chat as Chloe
 73 interacts with her phone underneath the
 74 table))
 75 Katy: Lucy's like tha' "she's never gonny ask you
 76 fur help again" °ah was like° (inaudible)
 77 (1.0)
 78 Hannah: put 'er off [ehm hm
 79 Chloe: [heh
 80 ((11.0: Katy picks up her notes, Deborah
 81 appears to be reading, unclear what Hannah
 82 is doing))
 83 Chloe: ((not looking up from phone)) will we've a
 84 break
 85 ((1.5: Deborah looks at Chloe's phone))
 86 ((Chloe looks to Deborah))
 87 Deborah: ((looking at Katy, smiling)) °yeah° ((nods))
 88 (3.0)
 89 ((Hannah stands up to leave room, Deborah
 90 produces her phone))



Figure 4. Clockwise from left: Katy, Hannah (hidden), Deborah, Chloe. Lines 80–82: Group appears to be refocusing on the task while Chloe is on her phone under the table.

Whereas in the previous extract Donald's accounting for his phone use was to propose that they use it for their task, here Chloe makes her actions relevant by initiating that the group take a break. As we join the group, Katy holds the turn at talk—discussing her daughter's exam revision—and Hannah and Deborah have been cofacilitating the conversation until there is a lull at line 80. At this point, we see Katy orient to her notes in front of her, pulling them toward her and apparently reading them, while Deborah does the same. Chloe, on the other hand, is still interacting with her phone, albeit covertly under the table.

Although a suggestion of a break may appear to come at an appropriate time—since the group has been off task anyway—her peers' actions within the period of silence do not indicate alignment with Chloe's subsequent proposal at line 83. In “doing academia” (i.e., shuffling papers, reading, picking up pens), Chloe's peers display behaviors that are “socially

accountable” (Buttny, 1993)—that is, that are relevant to the interaction. In reading and orienting to the papers in front of them, the rest of the group demonstrates the relevance of their actions; they are in a PBL tutorial and so are doing PBL-relevant activities. The silence that follows is therefore problematic, since some of the group members are demonstrating that they are back “on task,” while other group members demonstrate exactly the opposite. Any one of the group members could initiate the next turn at talk and as such direct the topic of conversation, and it is at this point that Chloe accounts for her interaction with her mobile phone by uttering “will we've a break” (as in “will we have a break”).

As was noted in the previous extract, the fact that Chloe turns her head to look at Deborah suggests that she was looking for a response; in doing so, she holds Deborah (or at least someone in her group) accountable to answer. Suggesting that the group has a break at that precise moment in time therefore demonstrates the relevance of her phone interaction—that it is acceptable to use a phone during a break, which is perpetuated by Deborah's immediate orientation to her own phone, once the break has been confirmed (line 87). However, it also highlights Chloe's acknowledgment that being on the phone when not officially on a break is inappropriate (supported by the fact that her phone interaction was under the table and thus not explicit), and so to rectify this transgression, as soon as the official break begins she is not accountable anymore for not contributing to the group.

Deborah's response here is reminiscent of Ally's in Extract 2, as she gazes at another member of the group and smiles, possibly acknowledging the irony that Chloe has suggested having a break, despite behaving in a way consistent with already being on a break for the past short while. Nonetheless, the group members move smoothly into their break without further discussion.

This extract was different from the previous ones because of the delay in accounting for mobile phone use. In the first three extracts, accounting coincided with orientation to the phone, whereas here there was a long period of interaction before this happened. Although the accounting did finally come, the next section details what can happen within a group if a mobile phone user does not account for his or her actions.

To conclude, we detail an example in which students do not account for their mobile phone use and as such are held accountable by another group member. Such activities are less common and more tricky to manage, as they raise issues regarding whose responsibility it is to address such transgressions. In this interaction, the group members are discussing whether a journal article should be included in a fictional conference, as per the PBL task. Group member Ava is openly interacting with her phone.

Extract 5

91 Kate: ((to Raymond)) right do you think your
 92 paper should be in the-
 93 Raymond: ((looking at Ella)) me::h yeah [with
 94 changes
 95 Ella: [(inaudible) yeah
 96 changes (.) >I jus'- I jus'< think
 97 there should be more data BUT I did
 98 like it
 99 [(Kate reaches for biscuit))
 100 Raymond: [yeah it was g- it was interestin'
 101 Annabel: °yeah°
 102 Raymond: jus' a larger sample size
 103 Kate: ((turns to Ava)) what's wro:ng
 104 Raymond: prob'ly
 105 ((all look at Ava))
 106 Ava: ((not looking up from phone)) eh am
 107 try'a like find a way of setting up
 108 Google mail
 109 Annabel: ah liked our paper like I liked it when
 110 I got into it



Figure 5. Clockwise from left: Ella, Annabel (hidden), Raymond, Kate, Ava. Line 105: Kate's turn initiates the others' gaze toward Ava.

This example demonstrates what happens when a group member does not account for his or her mobile phone use. As we join the group, the members are on task, reporting back to each other about the worthiness of certain journal articles they have read. The lack of discernible pauses or hesitations indicates a fluid conversation, positioning this group as competent and able; however, one group member is not contributing, and this needs to be addressed. As such, Kate orients to Ava's lack of input, formulating it as being problematic and needing to be addressed within the group environment. Kate could have questioned simply what she was doing or quietly spoken to her aside, but in asking "what's wrong" (line 103) in the midst of the group discussion, she highlights the immediacy of the situation; Ava has not voluntarily accounted for her shift in attention, so she is asked about it immediately, not when the conversation lulls.

Kate's formulation that something is "wrong" constructs Ava's actions as troublesome, as something out of place in

the regular group dynamics, and despite being peers, Kate demonstrates the appropriateness of holding her accountable for her actions. Ava responds but without looking up, indicating that her attention is so focused on her phone that she disregards the impact of this on her group. Although she answers, she does not change her actions, indicating that she orients to "setting up Google mail" (line 108) as more important than contributing to the discussion, which is returned to and continued by the other group members.

This extract demonstrates the ability the group has to function when faced with a problem without the input from, for instance, a facilitator. The self-monitoring here initiated by Kate shows that group members are held accountable for their actions and that despite the absence of the facilitator, groups don't automatically begin slacking off, which is of particular interest considering that such self-monitoring is beneficial for academic achievement in PBL (Loyens, Magda, & Rikers, 2008). However, the quick reorientation to the on-task discussion suggests that while the group members do not sanction Ava for her actions, it is treated as problematic, and they do not engage further about it, evidencing the more troublesome environment when mobile phone orientation is not accounted for by the user.

Discussion

The above extracts illustrate actual student interaction in PBL tutorials and the processes involved in accounting for mobile phone interaction while in an academic context. To begin, we saw how accounting for phone use by the phone user was done at the time of the interaction—a common occurrence, as it diminishes the likelihood that said user will be held responsible for disrupting the group dynamic by diverting the members' attention. If phone users detail immediately why they shift to their phone—for instance, to answer a call or to search for an article—they are preempting being asked. In the fourth extract, we saw an example of a student accounting for her mobile phone interaction through situating it as an invitation to take a break. This extract was different in that the accounting came after a delay, but when it did come, it served a function for the group, so the phone user escaped potential criticism. In the final extract, we saw that if a phone user did not account for her mobile phone use, she was made to do so by a peer. One of the conclusions of this essay, then, is that in our data set, mobile phone interaction did not go unchecked in PBL tutorials; either the person using his or her phone or one of the other group members attended verbally or through gaze to the relevance of the mobile phone *at just that moment in the interaction*. That mobile phones will be used in PBL settings is perhaps inevitable, providing as they do a source of information checking

and increased accessibility to resources, but we can examine how group members deal with this usage *as a group*, thus demonstrating the impact it can have on group dynamics.

As noted by Chan et al. (2015), for instance, facilitators may have concerns that mobile phones could disrupt discussion or reduce interaction between students and as such may be resistant to the use of mobile technology in PBL tutorials. Our analysis supports Chan et al.'s (2015) and Jin et al.'s (2015) finding that students self-regulate and normalize their phone use, providing additional evidence to show *how* this self-regulation is managed as part of the discussion. Like Brown et al. (2015), we also suggest that mobile phone use in interactions need not be considered detrimental to discussion and that the group members in the PBL tutorials remain oriented to and included in the group interaction, even when their immediate attention is turned elsewhere.

The analysis contributes to research into the use of ubiquitous computing in educational contexts by illustrating examples of how students might begin to self-regulate their learning and use of mobile devices while working with others (Laru, Naykki, & Jarvela, 2015). For facilitators, this essay hopefully provides reassurance that students may, in some situations, self-police their mobile phone use or sanction their group members if they fail to do so themselves. For students, the fact that fewer mobile phone interactions happened in the opening and closing stages of the tutorial compared to the middle stage suggests that mobile phone interaction perhaps takes a backseat to general chat and thus socialization between group members. The data shows that students spend more time conversing while settling down and packing up as opposed to being on their phones, indicating that the turn to mobile phone interaction happens for a reason—such as searching for a journal article or answering a telephone call—and not just for something to do.

Despite the knowledge gained about students' mobile phone interactions, it is of course crucial to highlight the limitations of this study. Despite the large data set of 58 PBL tutorials spanning 85 hours, this was limited to two UK university contexts, one in which PBL was not the main form of teaching approach used. As such, other universities and cultural contexts may reveal different normative behaviors around phone use, which would be worth investigating. In addition, this essay only examined the immediate interactional context after the pickup of the mobile phone, but it would also be of interest and importance to examine other aspects of student-phone interaction: what happens when the phone is put away, for example, or what happens when a facilitator enters the room? Conducting more research into these practices would allow further insight into the discreet interactions taking place in the PBL setting, which in turn would position us as educators to be able to support more effective learning.

Finally, the analysis developed in this essay opens up possibilities for further research on the use of technology in PBL settings, complementing the work of those already publishing in the area (e.g., Bridges, Green, Botelho, & Tsang, 2015). For instance, the analysis demonstrated how group members accounted for their mobile phone use at a specific moment in the interaction—that is, when the phone was picked up. Specifically, we suggest the following as areas that require further exploration:

- Use of mobile phones at different times during the PBL tutorial (i.e., at the start, during the middle, or in the closing phases of the tutorial) as well as different stages during the PBL process (e.g., while the problem is first explored, when group members are reporting back, or when new findings are applied to the problem; for discussion of the applications of mobile technology at each PBL stage, see Chan et al., 2015; Jin et al., 2015). Each of these moments holds different accountabilities for group members in terms of their involvement in the group, according to the task they are engaged in and the collective orientation of the group as a whole.
- What happens when mobile phones are put away or put down: the moment of disengagement from technology and back to the group.
- How the use of mobile phones or other mobile devices might differ according to group size. The groups in our study were between four and five members; with larger groups the flow of conversation may be fragmented into subgroups, and the use of mobile phones might not impact on the group engagement in the same way.
- How mobile phones are used in different PBL settings (i.e., different models of PBL, whether the facilitator is present or not, and in different disciplines). Are the patterns of accountability seen in this study culturally specific or pertinent to the particular models of PBL used in these classes?

Conclusion

This essay demonstrates what happens within group interactions at the point at which a group member picks up and begins to use his or her mobile phone during PBL tutorials. This act tends not to go unacknowledged: normative practices show that the mobile phone user will account for why he or she is producing the phone at that moment at in time—whether it is to benefit the group or invite a particular course of action—and if the phone user does not, another member

of the group will orient to it. This suggests that despite the rise in mobile phones in the classroom (e.g., Barry et al., 2015), interacting with a phone within the group setting is still not considered straightforwardly acceptable. The accountability of mobile phone use in PBL tutorials provides further evidence for the importance of social interaction in learning; what was important here was the group member's attention within the group rather than necessarily the specific activity on the phone. Through subtle verbal and nonverbal acknowledgments, therefore, group members were able to ensure that the phone user was still with the group to ensure continued focus on the tasks at hand.

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Appendices

Appendix 1: Jefferson Notation System

((action))	nonverbal action
(.)	Just noticeable pause
(1.0)	Timed pause
.hh	In-breath
wor-	Cut-off word
>word<	Faster speech
<word>	Slower speech
WORD	Louder speech
°word°	Quieter speech
<u>word</u>	Emphasised speech
£word	“smiley” speech
wo(h)rd	(h) denotes laughter bubbling within
word	
wo:rd	: denotes stretching the preceding sound
Speaker A: word=	= denotes no discernible pause between two
Speaker B: =word	speakers’ turns
Speaker A: word [word	Overlapping talk
Speaker B: [word	

*Adapted from the system developed by Jefferson, printed in J. M. Atkinson and J. Heritage (Eds.), *Structures of social action; studies in conversation analysis* (Cambridge: Cambridge University Press, 1984), ix–xvi.

Appendix 2: Mobile Phone Pick-up Instances

Table 1. Mobile phone pick-up instances from 58 PBL tutorials/85 hours’ of recordings. (This is as accurate as possible, dependent on camera angles, obscured views, and recording quality. In addition, some individuals remained interacting with their phones for long periods of time, which is not reflected in such instance-counting.)

Opening stages: Before facilitator has been to see group or a group member initiate focusing on work	Middle: Between facilitator checking in with group at start and last visit from facilitator at end	Closing stages: After facilitator has visited for final time and orients to finishing up
82 (25%)	82 (25%)	48 (15%)