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Achieving online dialogic learning using breakout rooms

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The use of breakout rooms is an increasingly used tool in online teaching. This study uses Laurillard's (2013) Conversational Framework to evaluate the effectiveness of breakout rooms in achieving learning through peer-to-peer dialogue in large-scale teaching. Data were collected through online surveys, comprising Likert ratings and open questions, to undergraduate students ($n = 115$) and tutors ($n = 9$) at Aberdeen Business School (Robert Gordon University) reflecting on Year 1 studies in the 2020–2021 academic year. Key findings indicate that breakout rooms can be successful in achieving effective learning through peer-to-peer dialogue. However, this is highly dependent on the participation by students, which was variable. In order to facilitate effective breakout rooms, tutors need to ensure they set a clear task, with evidence suggesting a perception gap between tutors and students on how effectively this was done, and regularly visit breakout rooms to encourage participation and provide support.

Keywords: breakout rooms; dialogic learning; conversational framework; online; learning

Introduction

Dialogue has long been identified as an important component of learning (Jung and Brady 2020; Littleton and Howe 2010; Simpson 2016). This dialogue can take many forms, but 'talk' within a conversation is a common way in which this is achieved within educational settings, with a number of empirical studies identifying pedagogical benefit (Alexander 2018; Howe *et al.* 2019; Jones and Hammond 2016).

In the traditional classroom, tutors regularly make use of small group discussions to effectively scaffold conversations between learners. To maintain this peer-to-peer dialogue, following the large-scale movement to online teaching during the coronavirus 2019 (COVID-19) pandemic, tutors turned to the technology that could enable this and the use of breakout rooms drastically increased (Sharmin and Zhang 2022). In practice, particularly when used for large scale teaching, the success of breakout rooms has been variable. While post-pandemic studies of this are limited, McGrath and Wolstencroft (2021) wrote an opinion piece indicating '*students dislike or at worst dread it'* (p. 1) with problems cited including anxiety, awkwardness, little interaction, and cameras firmly turned off.

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This research aims to investigate the effectiveness of breakout rooms to achieve peer-to-peer dialogic learning. In doing this, the following objectives are identified:

1. To evaluate, from the perspective of students and tutors, the effectiveness of breakout rooms in achieving learning through peer-to-peer dialogue.
2. To disseminate the knowledge gained on factors which can facilitate effective use of breakout rooms for learning.

This will add to the existing literature in two ways. Firstly, by evaluating, with the use of a theoretical framework, the use of breakout rooms as a pedagogical tool for achieving dialogue. While this novel use of the framework will be demonstrated in the context of breakout rooms, it may be transferrable to other vehicles of peer-to-peer learning. And secondly, in the identification and evaluation of factors, which facilitate breakout rooms in large-scale teaching.

Theoretical framing

The importance of dialogue in education is not a new concept. While differing in epistemological stances, and without evidence of engagement, similarities can be drawn in early work in this area by Freire (1921–1997) and Bakhtin (1895–1975) in the importance of dialogue in education (Rule 2011; Skidmore and Murakami 2016). Vygotsky (in Vygotsky and Cole 1978), another well cited scholar, introduced the concept of learning as a social process with the importance of speech, which transforms into inner speech, and in turn sets out the thinking that results in learning. This has led to the now widely accepted view that speech goes beyond expressing thought to enabling and shaping it. Vygotsky's (Vygotsky and Cole 1978) work has been classed as dialectic rather than dialogic (Wegerif 2008), with learning being directional from tutor to student with differences in knowledge being something to overcome, as opposed to a dialogic approach where meaning arises in the context of differences. However, the thinking of Vygotsky (Vygotsky and Cole 1978) that speech goes beyond expressing thought to enabling and shaping it is continuing to contribute the understanding of learning in this area.

The role of conversation was formalised by Pask (1976) in his 'Conversation Theory' and the benefit of conversation in learning has become widely accepted with many studies identifying the positive impact of conversation in learning (Bjuland and Helgevold 2018; Chappell and Craft 2011). In the learning environment, this conversation can occur between the student and tutor or between students. In line with the first objective of evaluating the effectiveness of breakout rooms in achieving peer-to-peer dialogue, this study will initially focus on evaluating the effectiveness of conversation between students. However, the study will also go beyond this to recognise for this to be effective it must be carefully planned and supported by the tutor, which may also include dialogue between the tutor and students.
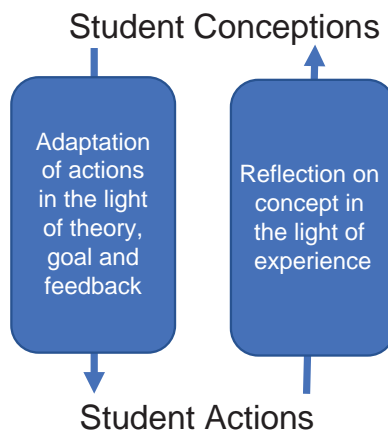
For conversation between students to result in successful learning, Laurillard (2012) summarises the results of several studies to identify the steps that need to take place. Firstly, the student takes a position and then defends this position through discussion with other students where they respond to critique of this position and consider alternatives offered. Following this, the student reflects on their initial position and adapts or changes position. To be effective, Laurillard (2012) identifies that this is 'highly dependent' (p. 143) on the type of dialogue between learners, with success

requiring learners to challenge, critique and offer alternatives to ideas generated and explained by the learner.

The peer-to-peer learning cycle element of the Conversational Framework is replicated in Figure 1. This element of the Conversational Framework will be used as the framework for analysing the effectiveness of breakout rooms in achieving peer-to-peer learning. This framework was chosen as it is specifically designed for technologically enhanced learning, and is widely cited in educational technology research (Domakin 2017; Holmberg 2016; Tomczak and Bel 2021; Von Der Heyden 2019, inter alia). In addition, it specifically separates out the elements within a conversation that must take place in order for learning to occur and therefore provided an analysis tool, which could be applied to evaluate the success of breakout rooms in achieving this in line with the study objectives. A criticism of an earlier version of the framework but still applicable to the latest version was identified by Brewster (2009) in the failure of the framework to include '*disruptions*', at a technical, conceptual or contextual level, or '*unintended consequences*'. However, Brewster (2009) notes this is a particular problem when using the framework for planning purposes, rather than the evaluative focus of this study.

Breakout rooms as a conversation vehicle: Effective facilitation

While not framed using the peer-to-peer learning cycle, many studies support the use of breakout rooms as a mechanism for enabling conversation between students. Tonsmann (2014, p. 59) identified breakout rooms as an '*invaluable technique for student understanding and assimilation of concepts*' and Saltz and Heckman (2020) identified that breakout rooms increase motivation, productivity and help students to connect with other students. Cadieux *et al.* (2020) also noticed that 'rich' discussion occurred during breakout rooms. In addition, benefits beyond the peer-to-peer learning cycle may also be found with breakout rooms being identified as giving students the confidence to ask tutors questions and therefore also contributing to student to tutor conversation (Chandler 2016).

Student Conceptions

Adaptation of actions in the light of theory, goal and feedback

Reflection on concept in the light of experience

Student Actions

(Laurillarrd, 2013, p.87)

Figure 1. Peer-to-peer learning cycle, the Conversational Framework.

However, much of these studies are situated in classes or groups with small numbers and while providing excellent examples of effective use of breakout rooms, such as exposing medical students to telemedical encounters (Rucker *et al.* 2020) or undertaking a structured pair activity for computer programming (Saltz and Heckman 2020), it cannot be assumed that these findings are transferrable to large-scale teaching. Indeed, few studies have been undertaken, with Sharmin and Zhang (2022, p. 329) identifying literature in this area is '*severely limited*'. Two very recent studies have aimed to start closing this gap. Sharmin and Zhang (2022) looked at weekly and end of term feedback from a class of 330 students and found a more mixed response from students, with many expressing positive feelings towards breakout room usage, but an average of 47% of students each week expressing negative feelings. In Tsihouridis *et al.*'s (2021) study of 327 students, a more positive overall response was identified particularly in giving the opportunity to communicate and discuss. However, it also identified those in their first year of study (freshmen) were more content with the use of breakout rooms due to the social benefits they brought than those in later years of study. Both of these studies also identified a participation challenge, with the identification of student frustration with non-participative group members (Sharmin and Zhang 2022; Tsihouridis *et al.* 2021).

MacDonald and Campbell (2012) identified that for online synchronous teaching to be effective, tutors need to learn how to effectively facilitate online sessions and how to design effective learning activities. While many previous studies are based in small-scale teaching environments, it is still useful to reflect on previous studies breakout room facilitation findings and evaluate the relevance to large-scale teaching. In terms of facilitation, Saltz and Heckman (2020) identified a particular challenge for breakout rooms in that all students cannot be monitored at the same time compared with a high-level scan of group discussions in a traditional classroom. While technology is emerging that allows tutors to view output, such as a written chat or a whiteboard simultaneously, there still remains a challenge in how to prioritise support, such as in encouraging participation by all participants. For some, this has been overcome by having a tutor in each room (Rucker *et al.* 2020). Practically, this may not be possible for large-scale teaching when staff-student ratios may be much higher. Pedagogically, this may be more suitable when the focus is on tutor to student learning rather than student to student learning, with research from classroom-based group discussions indicating constant tutor presence may hinder discussion (Powell 1974). A compromise to this may be found in an approach of the tutor '*visiting*' each breakout room, whether randomly or when called on for help, as used by Sharmin and Zhang (2022).

A further complication for large-scale teaching in visiting breakout rooms is setting the desired small number of participants in each group. Both Tsihouridis *et al.* (2021) and Sharmin and Zhang (2022) identified 4–5 students as the optimal group size. However, smaller group sizes come with a trade-off in number of groups a tutor has to visit and the time they can spend with each, particularly in the light of findings by Venton and Pompano (2021) who estimate an additional 10%–50% of time is required to visit individual breakout rooms. The composition of breakout room groups also results in challenges. Sharmin and Zhang (2022) found 52% of students preferred working in the same group, however 16% observed that they like the chance to meet and work with other people.

In terms of designing effective learning activities for online breakout rooms, many studies where success has been achieved are grounded in examples of very specific use or for a very specific task (Cadieux *et al.* 2020; Rucker *et al.* 2020; Saltz and Heckman 2020). While the specific task may not be transferrable across disciplines, these do promote the success of breakout rooms when being used for a clearly defined and structured activity. However, designing effective tasks does require an investment of time with MacDonald and Campbell (2012) identifying these can be labour intensive to create and requires knowledge beyond the technology functionality in effective online facilitation and design of online activities.

Finally, for breakout rooms to be successful both tutors and students need to be confident in the use of technology. As experience grows, this appears to be a decreasing barrier, with many recent studies not commenting on any issues with this. Chandler (2016) specifically comments that technology did not cause frequent problems during breakout rooms, although tutors occasionally perceive they may be a problem in advance of teaching, which needs to be overcome.

Methodology

Participants

Data were collected via a survey to all continuing Year 2 undergraduate students at Aberdeen Business School (Robert Gordon University) (*n* = 208). The survey was completed during academic year 2021/22 with Year 2 students reflecting on their Year 1 experience during the prior 2020/21 academic year, which due to the COVID-19 pandemic, had been completed primarily online. A further survey was distributed to all module co-coordinators who taught these students in Year 1 (*n* = 9).

A survey was selected to reach the large number of potential participants to ensure as many views were taken into consideration as possible. It was felt that students reluctant to speak in breakout room discussions in class may also be reluctant to participate in alternatives, such as interviews or focus groups, and the ease and anonymity of an online survey may encourage participation from all. In addition, this was a consistent approach with previous large-scale studies in this area (Sharmin and Zhang 2022; Tsihouridis *et al.* 2021).

The student sample comprised students on five courses: Accounting and Finance, Management, Management with Human Resource Management, Management with Marketing, and International Business Management. During the year, each student studied seven specified modules, determined by course being undertaken. Four of these modules were undertaken by all Year 1 students and other 3 being bespoke to either the Accounting and Finance Students or those on the other management degrees, giving a total delivery of 10 modules. For each module studied, students received a pre-recorded lecture and a live tutorial most weeks (occasionally in person in Semester 1 only). Each module co-ordinator designed the content and approach of the live tutorials and were free to use, or not use, breakout rooms during these. No breakout room discussions were assessed or graded. All of the tutors, except one, used Zoom as the platform for running the online breakout rooms with the other tutor using Blackboard Collaborate.

Of the 10 modules delivered, these were run by 9 module coordinators due to one module coordinator running two of these modules. While the module coordinator

may have been assisted by further tutors in delivery, they were responsible for setting activities, supporting the tutors in delivery and discussing any delivery issues. As such they have overview of the full modules and were determined as the best person to complete the survey. The tutors involved have not received formal training on the use of breakout rooms. However, informal training, such as discussions with colleagues, and reflecting on previous experience helped to shape their approach.

Data collection and analysis

Online Surveys was used to administrate the survey. This is General Data Protection Regulations (GDPR) compliant and certified to ISO27001 standard. Questions were generated by using the steps identified by Laurillard (2012) for effective peer-to-peer learning and which feed into the peer-to-peer learning cycle (see Table 1). Further questions were generated through an extensive literature review to identify factors which have previously contributed to the success of breakout rooms. Questions comprised 5-point Likert scale questions to show levels of agreement or occurrence of given statements and open narrative questions to allow student and tutors to expand and give further information.

Once complete, the survey data were entered into SPSS for statistical analysis. Various descriptive analyses were undertaken to understand the data gathered. In addition, Spearman's rho (r_s) was applied to identify any significant relationships between identified elements of Laurillard's peer-to-peer learning cycle. This non-parametric statistic treats the Likert rating as ordinal data and is consistent

Table 1. Student rating of peer-to-peer learning elements.

Survey Question	Always (%)	Often (%)	Sometimes (%)	Seldom (%)	Never (%)
Students take a position (conception) and defend this through discussion (action) with other students					
I shared my ideas and explanations in breakout room discussions.	20	47	26	4	2
Students receive feedback from peers					
I received useful feedback from other students on my ideas or explanations during breakout rooms.	4	27	30	25	12
My ideas or explanations were challenged by other students in breakout rooms.	0	26	37	24	12
I responded to or challenged other students' ideas or explanations in breakout rooms.	5	24	36	21	12
Students reflect (action) in the light of discussion and adapt or change (action) position (conceptions) in the light of discussion					
I adapted or changed my understanding as a result of breakout room discussions.	7	37	41	11	3
I got confirmation that my ideas or explanations were correct as a result of breakout room discussions.	12	37	36	12	1
Even when I wasn't speaking, listening to other students' discussion in breakout rooms helped me construct and validate knowledge.	16	43	27	9	4

with previous education studies looking at the relationship between Likert ratings (Lim and Richardson 2016; Mullen and Tallent-Runnels 2006).

Ethical considerations

Ethical approval was received through the Robert Gordon University ethical approval process in advance of data collection. In addition, it was explained to participants that participation was voluntary with the option to withdraw at any time through leaving the questionnaire. Assurance was also given that responses would be anonymous and could not be traced back to individuals. Each participant gave consent to participate in the research through selecting an option to this effect before commencing the survey.

Results

A total of 115 students completed the student survey giving a completion rate of 55%. Of these, 42% were from the Accounting and Finance Programme and 58% were from the Management Programme. This shows a slightly higher completion by Accounting and Finance students with the full population split between Management and Accounting and Finance. Descriptive statistics identified an almost equal split between male and female respondents with 46% of respondents identified as female and 51% as male (with three respondents choosing not to disclose this). All of the tutors completed the tutor survey giving a 100% response rate.

Breakout room effectiveness: Tutor and student perspective

The tutor survey responses identified that breakout rooms were a popular pedagogical tool with tutors. All but one of the tutors used breakout rooms with one tutor using them in every tutorial, three tutors using in most tutorials and four using occasionally. In order to understand why these were used, tutors were asked this as an open question and responses given resonated, directly or indirectly, with encouraging dialogue between students. Enabling group work was the most common reason given ($n = 4$) with one tutor specifically identifying breakout rooms were used so that students '*can learn from each other*' and another '*to encourage them to speak to each other*'. Two module coordinators identified breakout rooms were used to respond to the challenge of encouraging '*talk*' when online, with one tutor noting '*this may be easier when in a small group*'. A variety of other reason were given: to foster a community, to encourage active participation, to get a feel for understanding or difficulties, to give individual feedback and to give variety in approach. In rating the effectiveness of breakout rooms in achieving dialogue between students and collaborative learning, the majority of tutors identified these as somewhat effective, with detail shown in Chart 1 and Chart 2.

The 'somewhat effective' ratings were backed up with narrative responses from tutors. When asked of their assessment of the learning that was being undertaken, a key theme emerged in responses that when students participated there was evidence of learning, but student participation did not always happen, which limited learning. This adds evidence of emerging themes from the previous literature in the use of breakout rooms in large-scale teaching (Sharmin and Zhang 2022; Tsihouridis *et al.* 2021).
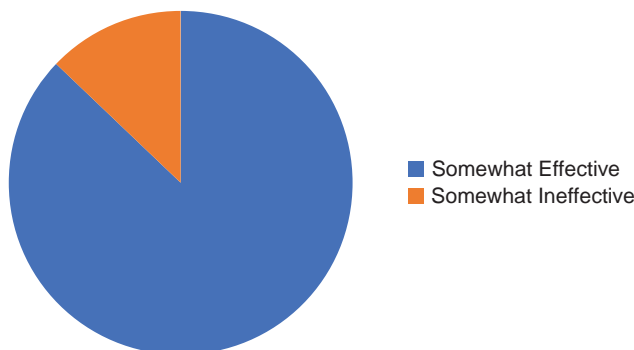
Chart 1: How Effective, based on your experience, are breakout rooms in achieiving Collaborative Learning
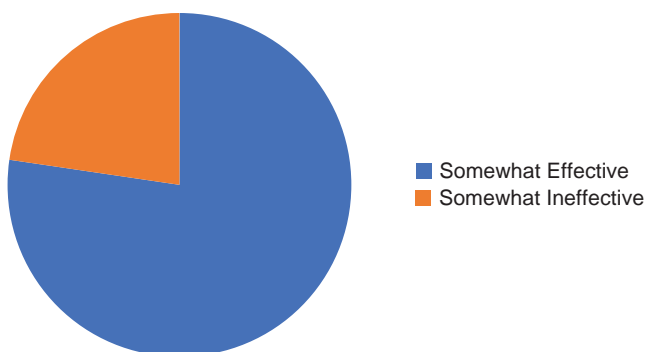

Chart 2: How Effective, based on your experience, are breakout rooms in achieiving Dialogue Between Students

However, as tutors were not present in breakout rooms for most of the time, it is also useful to triangulate this data by also looking at the students' perspective of learning. An original approach was taken to this where the elements required for peer-to-peer learning were identified from Laurillard's (2012, 2013) peer-to-peer learning cycle and students were asked to rate their agreement on a 5-point Likert scale of how well the identified elements were achieved. This is summarised in Table 1.

These initial descriptive statistics give an indication of the frequency of participation in the different identified elements of Laurillard's peer-to-peer learning cycle. To further understand if student participation in the elements of the peer-to-peer learning cycle impacted the cycle's desired output, identified as an adapted or changed conception or confirmation that initial conception was correct, Spearman's rho (r_s) test statistics were undertaken with the results shown in Table 2. These initial results indicate the potential for breakout rooms to achieve peer-to-peer learning, with individual elements of the peer-to-peer learning cycle highly correlated to overall identification of learning being achieved. However, the key word here is 'potential' as this success is significantly linked to student participation – for those who shared their ideas and explanations and were then able to receive feedback, the

Table 2. Bivariate correlation coefficient [Spearman's rho (r_s)].

Evidence of learning / Evidence of participation in peer-to-peer learning cycle	I adapted or changed my understanding as a result of breakout room discussions.	I got confirmation that my ideas or explanations were correct as a result of breakout room discussions.
I shared my ideas and explanations in breakout room discussions.	0.462**	0.496**
I received useful feedback from other students on my ideas or explanations during breakout rooms.	0.508**	0.528**
My ideas or explanations were challenged by other students in breakout rooms.	0.483**	0.479**
I responded to or challenged other students' ideas or explanations in breakout rooms.	0.555**	0.461**

**Correlation significant at the 0.01 level (2-tailed).

results indicate a significant relationship to learning. However, for those who were not willing to participate and even share ideas or explanations, the peer-to-peer learning cycle cannot really begin. This was reflected in the overall question to students where 47% agreed or strongly agreed that breakout rooms helped to improve understanding of a topic, while 25% neither agreed or disagreed, 19% disagreed and 9% strongly disagreed with this.

In addition, while this study focused on peer-to-peer learning, evidence from both tutors and students indicated a contribution to learning beyond the peer-to-peer learning cycle but still within the Conversational Framework. This was in breakout rooms aiding discussion between students and tutors and thus contributing to the tutor-to-peer learning cycle (Laurillard 2013). This benefit was identified in a small-scale project by Chandler (2016) and the findings from this study provide evidence that this is also true for large-scale teaching, with 59% of students either agreeing (44%) or strongly agreeing (15%) that discussions in breakout rooms gave them confidence to raise concerns or ask the tutor for further guidance once they knew other students had the same concerns or questions. In addition, all but one tutors who used breakout rooms agreed that breakout rooms were very effective (n = 3) or somewhat effective (n = 5) in giving students confidence to ask the tutor questions once they had discussed it with their peers.

Facilitating effective breakout rooms

While this analysis indicated the potential for peer-to-peer learning, there were still several students whose responses indicated that they did not experience all or some of the components required to achieve peer-to-peer learning. This was explored further. MacDonald and Campbell (2012) identified that for online synchronous teaching to be effective, tutors need to learn how to effectively facilitate online sessions and how to design effective learning activities. So, an open question on what tutors could do to aid successful breakout rooms, along with Likert ratings, developed on findings from

previous literature and which aimed to identify what tutors can do to improve facilitation, were asked to students.

The most popular response (*n* = 34/86) to this open question on what tutors can do, was the setting of a clear task. This importance of a clear task was also evidenced by a Spearman's rho (r_s) showing a significant correlation (0.320; $p \leq 0.001$) between ratings on how 'breakout rooms helped my understanding of a topic' and 'I was always clear on what we were meant to be doing in breakout rooms'. Regarding setting the task, a number of students referred to the need for '*clear instructions*', a '*clear explanatio*n' or a '*clear aim*'. Indeed, 21 students specifically used the word 'clear'. Linked to this, further students identified a preference for a specific task rather than general discussion as summarised by the following student: '*A good idea would be to give a specific task to be done instead of splitting the class into rooms just for them to discuss something*'. This was also corroborated with the Likert rating where there was strong agreement with the students that breakout rooms worked better when there was a specific output to produce (61% strongly agreeing, 24% agreeing). Tutors agreed with this approach as indicated by 75% strongly agreeing and 25% agreeing that students had to produce a clear output from each breakout room. However, an interesting discrepancy was identified between tutors and students in terms of perception of how this was enacted. All tutors who used breakout rooms strongly agreed (*n* = 7) or agreed (*n* = 1) that students were given clear instructions on what they were expected to do. However, when students were asked if they were clear on what they were meant to be doing in breakout rooms, the responses were much more mixed as highlighted in Chart 3.

The second most common answer by students on what a tutor can do to aid successful breakout rooms regarded tutor visits. Of those who elaborated on why this aided an effective breakout room, the most common explanation (*n* = 13) was to help get the discussion going and encourage participation. Examples included, '*Go around and make sure the conversation is flowing*' and:

'*Go through the breakout rooms and ask for cameras to be turned on/ensure conversation is happening. A lot of teachers did go through the groups, but they just ask if any help is needed etc then only one student replies to say yes or no. They could do*
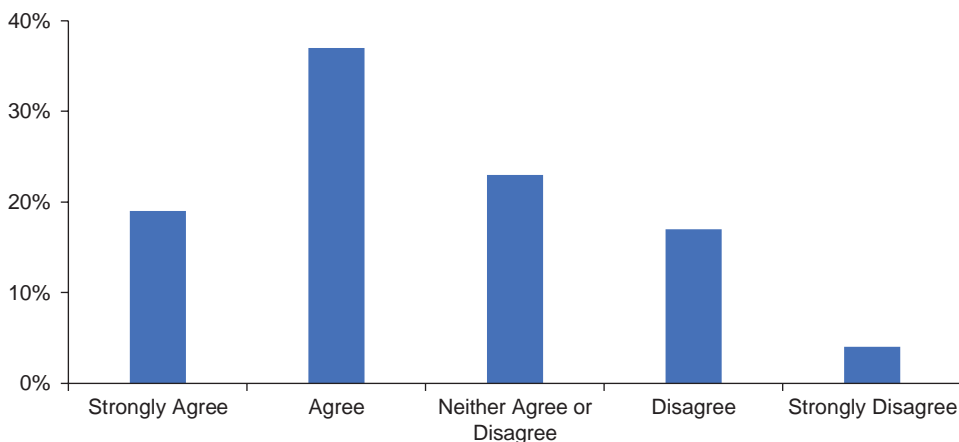

Chart 3: I was always clear on what we were meant to be doing in breakout rooms.

with listening in on the group for a couple minutes to ensure all students are speaking to each other and if not maybe contact those students who haven't been putting in any input to the breakout rooms'.

A lack of participation has previous been identified as an issue, particularly for large-scale teaching (Sharmin and Zhang 2022; Tsihouridis *et al.* 2021) and was also an issue for these students. Student ratings of their own participation and others' participation are summarised in Chart 4. This student perception can also be corroborated by the tutors' perspective. When tutors were asked if they encountered any problems when using breakout rooms, five tutors mentioned problems with student participation. This included one tutor identifying rooms where students '*refused to engage'* and another noting '*the entire rooms remains silent until the tutor drops in'*.

To further understand what specifically could be done to improve participation, cross tabulation, between those who rated their own participation as 'sometime' ($n = 29$) or 'seldom' ($n = 2$) and their narrative response to what tutors could do to aid effective breakout rooms, was undertaken. Five students simply identified that they did not want tutors to use them but gave no further explanation. Outside of this, two recurring themes were identified that resonated with previous analysis: setting a clear task and regular tutor visits to encourage participation.

Alongside setting a clear task, this highlights from the students' perspective the value of tutor visits. This view was also shared by the tutors who were able to identify that some rooms '*remains quiet until the tutor drops in'*. All tutors visited breakout rooms, though the approach to this varied from '*tried to visit once'* to multiple visits. However, almost all tutors directly mentioned or alluded to time pressures. For example, one tutor noticed that '*time was a real issue – difficult without some finishing tasks and wanting to move on'* and another noting '*it took some time to get round all the groups'*. This challenge is exacerbated by 84% of students also rating the time given for breakout rooms to be too long ('Always', 'Often' or 'Sometimes'). In the absence of additional teaching resource, this results in a challenge for tutors in terms of visiting teaching rooms at the right time.

A further contentious area was if students should be encouraged to put on cameras. While fully acknowledging the varying views (Castelli and Sarvary 2021;
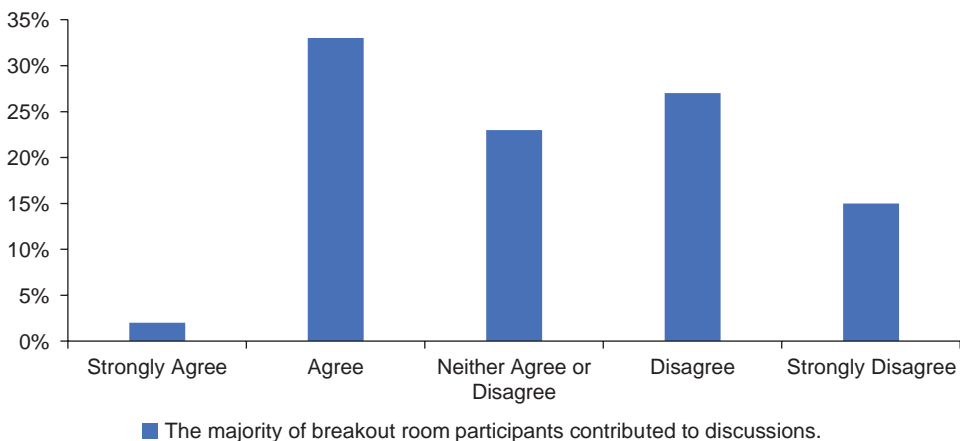

Chart 4: The majority of breakout room participants contributed to discussions.

Jayasundara *et al.* 2022; Pavlov, Smirnova, and Nuzhnia 2021) and how this may not be appropriate for all students, it is important to reflect on the views of students on this. While discussing how to encourage students to participate, some referred to tutors encouraging students to switch on microphones and speak, while others specifically mentioned switching on cameras. Charts 5 and 6 summarise students' opinion on cameras being used and the impact this has had on discussion.

To understand further, students were asked 'if you didn't feel comfortable putting your camera on, can you explain why?' Forty-nine students gave an explanation for this. Interestingly, by far the most common explanation could be summarised as because nobody else was, as one responder describes as '*no one else did it so didn't want to be the weirdo with my camera on*'. This is in keeping with earlier responses that identified many students actually wanted tutors to encourage them to put cameras on. A smaller number of students had other more personal reasons for not putting on their cameras. Possibly fixable with some advance planning, six students commented that tutorials were often early and they were not camera ready, while a further three commented they were either in bed or their pyjamas. Promoting the use of virtual backgrounds could respond to the five further students' concerns over sharing their home environment. However, five students gave personal reasons for not wanting to
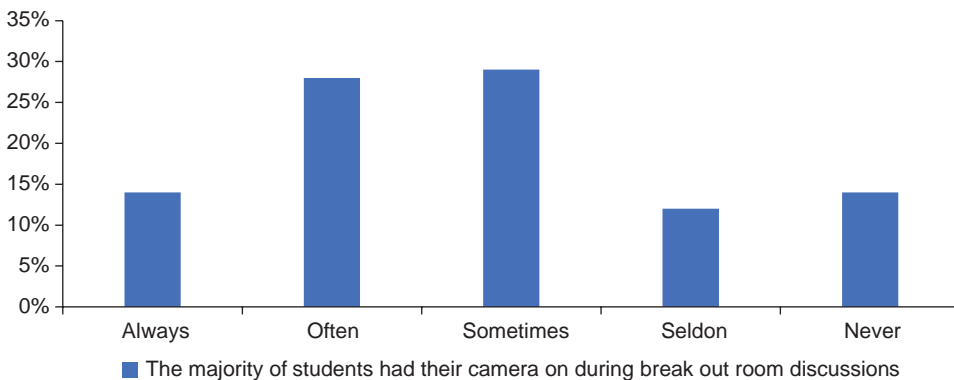

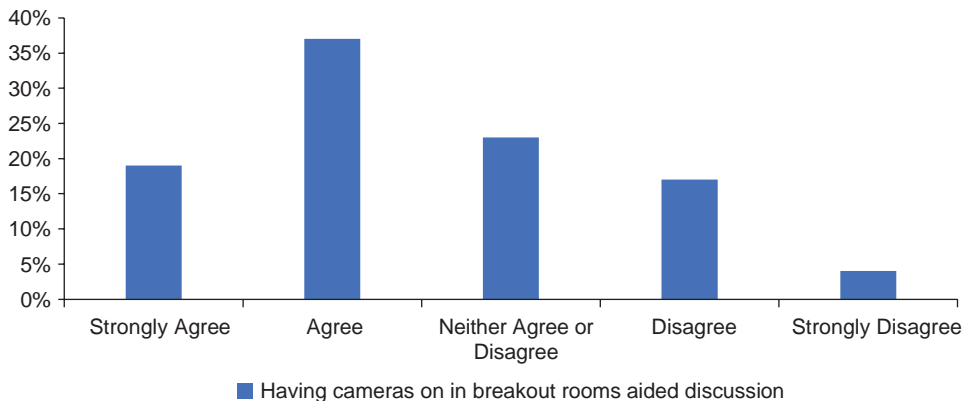Chart 5: The majority of students had their camera on during breakout room discussions.

Chart 6: Having cameras on in breakout rooms aided discussion

switch these on, such as 'I am not comfortable showing my face in public' or 'Feel weird with people looking at me' and it is important these minority opinions are also considered. Tutors may consider encouragement rather than requirement or if this is a requirement, ensure that support is available for these students.

Limitations and further research

Limitations for this research are identified as follows. Firstly, the sample represents a unique group of students and while from a range of courses these were all in business/accounting areas at the same level of study. The findings may not be directly transferrable to other levels and areas of study. In addition, the study is limited to the technology available at the time of the study, namely Zoom and Blackboard Collaborate, and as new technology emerges this may change the way in which breakout rooms are facilitated. For example, features in Adobe Connect can allow tutors to view chat or whiteboards of multiple groups simultaneously and further research could establish if this could improve facilitation of breakout rooms through responding to challenges identified in this research. Finally, further research could also extend the knowledge in this area by identifying other more specific factors that impact the success of breakout rooms, such as the specific subject being taught and the nature of the subject (e.g. difference between more factual/numeric topics and more discursive topics), as well as analysing the relationship between breakout room activity and assessment performance.

Conclusion

This research aimed to investigate the effectiveness of breakout rooms to achieve peer-to-peer dialogic learning. A unique application of Laurillard's peer-to-peer learning cycle, extracted from the Conversational Framework (2013), was used as a framework to evaluate if, from the students' perspective, effective learning was achieved. The key finding from this analysis was that for students who participated, and as measured by 'actions' in Laurillard's (2013) peer-to-peer learning cycle, evidence of effective learning was identified. This finding was corroborated by tutor perception that breakout rooms had the potential to achieve effective peer-to-peer learning, but this is strongly influenced by participation.

Participation was therefore identified as a key element in success but achieving this was identified as challenging with several students not participating in discussion and therefore limiting both their own and other students learning. Strategies to improve participation were therefore explored further and two key themes emerged: setting a clear task with a tangible output and making effective tutor visits.

While setting a clear task seems perhaps obvious, the results revealed an interesting discrepancy between tutors and students regarding whether a clear task was being set. Tutors should regularly reflect on this – good evidence of success, or otherwise, can be gained from visiting rooms and identifying if the task was clear and if not, it is important to reflect on what was unclear and to use this knowledge going forward. In addition, tutors should also ensure that a mechanism is in place if students are in a breakout room and the task is unclear. This could include training students in the 'call for help' or 'message the tutor' type tools available in most breakout rooms, which can direct tutor attention quickly to the room most in need. Having the task

written down and either sharing this or encouraging the students to take a photo or screenshot if written on screen can also help. Finally, students preferred to have a specific identified output rather than a general 'discuss…' This can take many forms such as completing a collaborative document, making a PowerPoint slide or producing a short text answer which can then be shared after with as a whole group via a chat message.

As well as clarifying the task, tutor visits can also play an important role in encouraging participation. However, this can be inhibited by time, particularly with students indicating a preference for shorter breakout rooms. A potential solution may come in the form of collaborative tools where group responses are updated on a separate or integrated platform. This would allow the tutor to order visits in a more productive manner – targeting those not getting started for initial help, followed by identification of misunderstanding as discussions progress and visiting those 'finished' with feedback or ways to extend the discussion. In addition, this could include an 'are you clear with the task' as the first required response to ensure the task is clear.

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