Student-posed quecture questions can engage first-in-family students with meaningful learning.

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Abstract:

Students in their first semester at university were asked to pose their own questions, known as quecture questions, for each learning topic as part of their weekly preparation for flipped lectures on two parallel compulsory biology courses. Quecture questions are intended to engage students, particularly those with educational disadvantages who may be unfamiliar with effective learning strategies, in meaningful concept-based learning. The mechanism of posting the questions differed between the two courses in that a forced sequence tool on the virtual learning environment required students to post something on the online board on one course while students could opt not to post on the online board on the other course. Small focus groups and qualitative analysis showed that the students realised both cognitive and metacognitive learning benefits from the quecture strategy. Students that were first-in-family to higher education were prioritised as focus group attendees and, although adjustment to the quecture strategy was judged to be more difficult within this group, positive learning benefits were discerned for all these students. The pressure to engage within one course was, on balance, considered to be useful for nudging students towards more effortful engagement with their learning. In this way cognitive and metacognitive benefits were recognised for first-in-family students.

Background:

Although I frequently hear students complaining that non-didactic learning means that they are teaching themselves, it may be true that, with appropriate guidance and support, this is the only way to achieve meaningful learning. Both Piaget's theory of constructivism and David Ausubel's assimilation theory of meaningful learning assert that we need to integrate new knowledge with relevant existing knowledge. Meaningful learning can be described as developing an understanding of core concepts and their relationship to other concepts within a discipline as opposed to memorising key facts (Ausubel, 1963). Achieving an understanding of interrelated concepts depends strongly on which concepts the learner has already understood and is therefore different for every learner. It follows, therefore that meaningful learning has to be personalised and that the successful learner must be engaged with the process. Ausubel concludes that the primary responsibility for learning belongs to the learner, and that this responsibility cannot be shared.

On arrival at university many students, particularly those with educational disadvantages such as being the first generation in their family to attend higher education, are not equipped with the skills required to take responsibility for their own learning. It is incumbent on university instructors to support students without experience of engaged learning to learn these skills (Canning et al., 2024). Active learning can address this deficit by modelling good learning strategies and by demanding engagement, particularly during lectures. Unsurprisingly active learning is unequivocally proven to improve student learning in science (Armbruster et al., 2009; Freeman et al., 2007; Freeman et al., 2014). Moreover, it addresses the issue of educational disadvantage, providing disproportionate benefit for traditionally low-scoring educationally disadvantaged students across science subjects (Cottone and Yoon, 2020; Eddy and Hogan, 2014; Gavassa et al., 2019; Haak et al., 2011; Theobald et al., 2020).

A myriad of active learning strategies have been described that are suitable for use during biology university lectures (Allen and Tanner

2005; Coryell et al., 2024). However, most active learning interventions involve engagement with a topic or learning point that is chosen by the instructor, which is unlikely to be the specific area of learning content that each individual learner needs to focus on for their own personal learning progress. The term 'personalised learning' has recently emerged as an active area of research and a goal in student-centred learning (reviewed in Cevikbas and Kaiser, 2022). One method of personalisation is for students to pose their own questions about the learning material. Student-posed questions can serve different functions for different individuals with the best questions allowing students to identify and fill gaps in their knowledge, identify and correct misconceptions, or to extend their knowledge, all of which lead to deep or meaningful learning (Chin et al., 2002). In studies of high school, college or university students' comprehension and retention of lecture material, generation of student-posed questions was found to be superior to individual re-study of the material (Ebersbach et al., 2020; King, 1991), to group discussion of the material (King, 1991) and to summarising the material (King, 1992). While investigating one's own question leads to improved understanding, the process of posing the question also provides feedback about the state of one's own learning giving student-posed questions both cognitive and metacognitive benefits (Ebersbach, 2020; Rosenshine et al., 1996; Chin et al., 2002; Song, 2016). Asking questions may be a uniquely favourable learning method due to the compelling emotions attached to seeking of information, seeking being a core positive emotion that is associated with motivation and feel-good neurochemistry (Panksepp, 2011). Chin asserts that '*to know how to question is to know how to learn well'* yet also points out that student-posed questions are sadly underused in science teaching (Chin et al., 2002).

Student-posed questions have been used as an active learning device to personalise student learning during biology lectures (so called 'quectures') since 2016 at this university (McQueen and McMillan, 2020). Second-year biology students recognised an increased responsibility for their own learning during quectures (McQueen and McMillan, 2020) and engagement with these student-posed quecture

questions was found to provide the most learning benefit for students who previously had the lowest course scores (McQueen and Colegrave, 2022). An investigation of average course scores within various demographic groups found that students who were first-in-family were amongst the lowest scoring. Although these scores were raised above the class average for students within this group who engaged with quecture questions, the proportion of students that did not engage was highest for first-in-family students (Table 1; McQueen and Colegrave, 2022). Suggestions to improve engagement and widen the benefits of the quecture strategy, particularly for educationally disadvantaged students, included to provide more time for students to generate their own questions and better support for how to do so, as well as to establish this way of learning earlier in the university experience by embedding it from the start of first year.

Here I describe the introduction of quecture questions across two new compulsory first year biology courses wherein question generation was formally taught, and where students generated the questions, without time restrictions, during private preparation for lectures. In one of the two courses question-posing was seen as almost obligatory due to the use of a 'forced sequence' rule available on the virtual learning environment while question-posing on the second, parallel, course took place on an online notice-board and was more easily skipped. Focus group discussions were held with students (including first-in family students) taking the courses throughout their first university term. Qualitative analyses of focus group transcripts, as well as study of submitted quecture questions, were used to answer the following research questions:

1) How was the quecture strategy experienced by first year students, particularly those that were first-in-family to attend university?
2) How did the forced sequence presentation of the quecture strategy affect students?

Table 1: Average course scores and engagement with the quecture strategy for demographic student groups

Demographic (n)	Course score (%) for students that did not engage with quectu re	Course score (%) for students that did engage with quectu re	Proportion of students that engaged with quecture (%)
Whole class (265)	62.1	66.5	47.9
Female (168)	62.8	66.3	51.8
Male (84)	61.7	66.3	40.5
Gender other (13)	56.5	69.3	46.2
Scottish (81)	58.3	61.5	37
RUK (63)	63.6	67.6	42.9
European (49)	65.9	69.9	67.3
International (61)	64.9	66.5	54.1
Parents at University (181)	64.2	66.6	53.6
First to University (72)	59.4	66.3	34.7
State school (151)	60.9	66.3	46.4
Private school (71)	65.3	66.8	49.3
School other (39)	59.1	66.4	53.8

Data extracted from McQueen and Colegrave, 2022

Methods:

Context and ethics of study: The courses studied (Biology 1A: Variation and Biology 1B: Life) were first-year, first-semester mandatory biology courses taken in September- December 2023 at a Russel Group university where undergraduate programmes run for four years. All 241 students studying Life were also studying Variation as a co-requisite while a further 93 non-biology students also took Variation. Just under 2/3 of our student population normally identify as female, just under 1/3 as male and around 1/20 as gender other. The 2023 class also self-reported as 24% first-in-family and 76% from educationally experienced families; 40% attending fee-paying school and 60% attending state schools. The study received ethical approval (reference hmcqueen-0001) from the School ethics committee which adopts the UK research integrity office code of practice for research. All students taking part were advised about the method and purpose of the study before voluntarily signing consent forms and knew that they were free to withdraw from the study at any point. All data were anonymised after collation and stored digitally on a password-protected computer in accordance

with the EU General Data Protection Regulation (GDPR), and the UK Data Protection Act.

Tuition on question-asking: During their first week at university all biology students took part in a two-hour timetabled workshop with activities to help students to: appreciate the value of a questioning approach to learning, reflect on their own question-asking mindset, practice question-asking and discussion, categorise questions and to appreciate the method and purpose of student-posed questions on these courses.

Student-posed questions: Students were asked to pose their own questions for each topic (2 per week per course) as part of their preparation for flipped interactive lectures. Students prepared using materials that were available one week in advance and that were designed to take one hour per topic, and were asked to pose their own question that would further their understanding or interest in the learning objectives. On Variation the student questions were posted on a padlet (anonymous virtual posting board) embedded into the virtual learning environment (VLE) immediately below the preparation materials, while on Life questions were posted on a VLE discussion board which was also embedded with the learning material but did not have the facility for anonymity. On Life the preparation materials and discussion boards for two topics each week were presented in a 'forced sequence' which meant that it was necessary to post on the first topic discussion board to access the materials for the second topic, although typing even a blank space would permit the student to advance. There was a dedicated padlet or discussion board for each topic under study. Towards the end of each interactive lecture the instructor would dedicate 5 minutes for student peer-to-peer discussion of questions using the same 'penultimate slide' as a visual prompt each time. To avoid students leaving when this slide was presented, instructors were advised to retain something of interest for presentation after this discussion.

Data collection:

Qualitative data were collected by student discussion in small focus groups (Nagle and Williams, 2013). 18 student subjects were selected from a pool of volunteers who were

taking both courses. Subjects were invited to one or more in-person meetings in groups of 5 or less with priority given to those who were first in family. These students were grouped together and not with non-first-in-family (Table 2). Each meeting lasted just under one hour and explored three topics (the transition to university, sense of belonging and deep learning) sequentially with prompts provided by the course organiser for Life, who facilitated each meeting and always brought home-made cake. Prompts specific to question-asking were amended slightly as the course unfolded and are shown in Table 2. All discussions were recorded as Teams meetings (running in the background) and automatic transcripts were corrected by two independent researchers.

The end-of-course survey was shared via an emailed link, by a QR code during a lecture, and was also mounted on the VLE. This survey contained the question 'How well do you think that the strategy of posing your own questions on a discussion board during Biology 1B: Life lecture preparation helped to make you think?'

Data Analysis: Transcript data were first summarised using a data map **(**Nagle and Williams, 2013) and transcripts were reduced by identifying discussion relevant to question-asking. The reduced transcripts were read through multiple times before codes were generated and refined extensively using interpretative phenomenological analysis (Adu, 2019). The focus group analysis was carried out by the Biology 1B: Life course organiser who was herself first in family. Both of these facts will have influenced interpretation of the data. The final 16 codes were organised into four descriptive themes (the quecture process, asking, sharing and answering questions). Themes and codes were then organised into thematic concept maps to best describe student attitudes and behaviours discussed (Braun and Clarke, 2006). The number of students contributing to each code as well as the number of relevant comments made were categorised with respect to whether the person speaking was first-in-family (FIF1-5) or a student whose family was more educationally experienced.

Student-posed questions collected from padlets and discussion boards were checked for authenticity and anything that did not

represent a genuine question was discounted (many students posted nothing or non-relevant words on the discussion boards to move to the next section on the VLE). To correct for class sizes the number of questions posted on each course each week was expressed as a percentage of class size, but students often posted more than once each week such that this does not accurately describe the proportion of the class engaging.

Table 2: Focus group schedule and prompts relevant to quectures

Week	n	First-in-family	Question prompts relevant to quectures
2	3	+ (FIF1-3)	1) How comfortable or awkward/ difficult do you think it would be to do these things when studying? -Asking yourself questions. 2) What do you think of the quecture strategy?
3	3	-	
4	3	-	1) from above 3) What are your thoughts on posing questions as a method of study? 4) Which of padlets/ discussion boards works best for you? 5) Do you ever continue to think about or research your question?
5	5	-	3), 4) and 5) from above
6	2	-	
8	3*	+ (FIF1-3)	
10	2	+ (FIF4-5)	3), 4) and 5) from above
10	1*	+ (FIF3)	6) The interactive lectures with student-posed questions during preparation (quectures) were designed to support self-paced learning, a questioning approach to learning and collaborative learning by peer discussion in lectures. In which ways, if any, did this help?

n = number of students.
*= same students as in week 2.
FIF1-5= First-in-family students 1-5.

Results:

1) ***This form of quecture presentation encouraged effective learning, particularly for students with educational disadvantages***

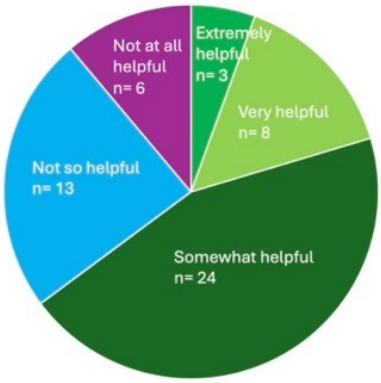
When students were surveyed at the end of the semester 65% agreed that posing questions had helped to make them think (Figure 1). Qualitative analysis of student attitudes during the courses provided a rich description of student attitudes and behaviours around the quecture strategy and process (Figure 2). Students' experiences confirmed that the strategy did encourage personalised learning with students recognising the resultant learning benefits and explaining that they used the questions to find gaps in their learning and to explore their personal curiosity. Four of the five first-in-family subjects explicitly articulated learning benefits and all five described use of the technique for gap-filling, curiosity or personalised learning (Figure 3). One first-in-family (FIF) student said;

FIF1: *You have to fully think about what you've just learned and then you have to think about what you don't understand and then try and figure out how to ask it. …. It is useful because it makes you think about what you don't know, but it's definitely easier said than done!*

While another student identified the value of personalised learning within the strategy;

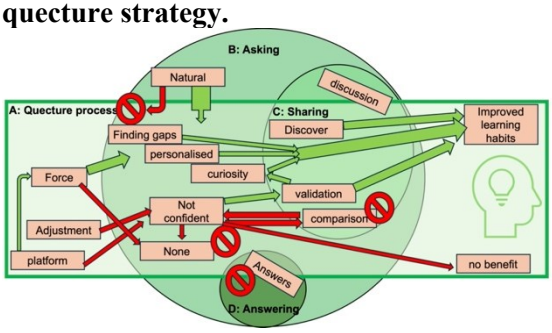
FIF2*: I think your own question for studying is quite good because …It's worded in a way that, you know, when it's answered your brain can understand it. Sometimes other people's questions can, like, it might mean the same thing, but worded different so you don't understand because everyone thinks differently.*

Figure 1: Course survey responses on helpfulness of quecture questions.



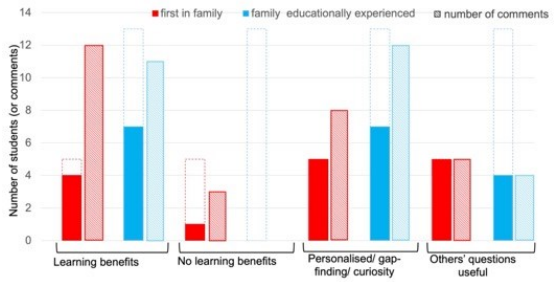
Responses to the question 'How well do you think that the strategy of posing your own questions on a discussion board during Biology 1B: Life lecture preparation helped to make you think?' are shown. The text of each of the multiple choice options, together with the number of students choosing that option are shown. n= 54

Figure 2: Student experiences of the quecture strategy.



Conceptualised relationship of the 16 codes (pink boxes) resulting from qualitative analysis, organised with respect to four themes (A: quecture process, B: asking questions, C: sharing questions and D: answering questions). While the majority of the data relates to questioning activity within the quecture process themes B-D are also shown to lie partly outwith theme A to acknowledge them as activities occurring outside of the quecture process. In this study we were only interested in sharing and answering of student-posed questions such that those themes (C and D) are presented within theme B: question asking. Green arrows indicate a positive influence from one code on another code or theme, while a red arrow indicates a negative influence. Thin arrows indicate one or a few comments supporting this influence and thicker arrows represent higher support. Red circular stop signs indicate a block to progress or learning.

Figure 3: Quecture learning benefits for educationally experienced or inexperienced students.



The number of students providing comment, and the number of their comments, on each of 7 codes are shown for students who were first-in-family (red) and separately for educationally experienced students (blue). 'Personalised', 'finding gaps' and 'curiosity' question generated 2, 8 and 10 comments from 2, 6 and 9 students respectively, all of which are combined here. Where a student commented on more than one of these three areas they have only been counted once. The codes 'discover' (8 comments from 8 students) and 'validation' (2 comments from 2 students) pertaining to others' questions are also combined here and are described as 'others' questions useful'. Where a student or comment was found in both codes it has been counted only once.

Although some students were not keen on the strategy, most acknowledged that they could see the value. One first-in-family student was the only subject to state directly that she believed the strategy not to benefit her learning, stating;

FIF3: *I don't think it's benefiting me just because that's not how that, like, my mindset is at the moment.*

And later in the study explaining;

FIF3: *But I probably don't use it in the best way because I don't, like, often go away and research my question. Umm, I'll say it, but then I will just forget to look at it.*

Interestingly the same student expressed a lack of appreciation of the value of her own curiosity;

FIF3: *I've always been, like, what? How does it know to do that? Like, who's telling it to do this? But they're, like, stupid questions.*

It was rewarding to observe how much students valued seeing other people's questions (Figure 3). Students reported discovering new things from reading others' questions as well as feeling validated by

comparing with their own understanding, particularly when they were not confident about their own learning (Figure 2). Each of the five first-in-family students commented on the value of seeing others' questions (Figure 3).

FIF4: *I'm interested to see what someone else has written….some people it is just their wider interests. They're not always directly related to like the course, which is fine, but they could be interesting sometimes.*

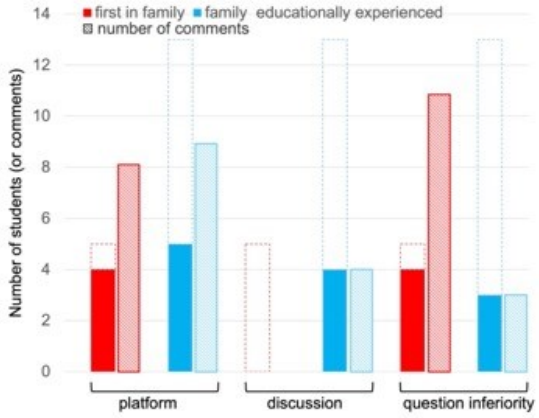
FIF5: *I read them and it's, like, sometimes I'm like, ohh I can actually answer this question!*

Due to technical limitations it was not possible for students to post their questions anonymously on the 'forced' discussion board as would have been preferred. When students discussed the two platforms this lack of anonymity was the most common complaint, raising anxiety particularly for less confident students who tended to compare themselves unfavourably to other students (Figure 2, Figure 4). This position was particularly prevalent in the first-in-family subjects some of whom also found that reading other people's questions revealed different personal learning positions which confused or alarmed them.

FIF1: *I'm sure there's someone else with the same question as me but it's just the odd few that are asking, like, a question that sounds like they've already done a masters degree!*

FIF3: *It's scary cause some people ask really good questions. And I'm like, where have you found this information?*

Figure 4: Quecture issues for educationally experienced or inexperienced students.



The number of students providing comment, and the number of their comments, on each of 3 codes are shown for students who were first-in-family and separately for educationally experienced students. The code 'comparison' in Figure 2 is more expansively described as question inferiority here.

There were only four comments about discussion of questions across all focus groups. All four comments were from educationally experienced students and concerned the lack of discussion (Figure 4). One International Baccalaureate student commented:

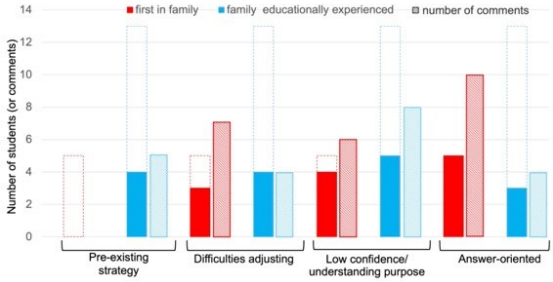
Sometimes I really want to interact and answer people's questions or discuss with them but I don't want to seem a bit, like, I don't know, annoying

2) *Prior learning experiences blocked engagement with some aspects of the quecture strategy*

Approximately one third of students did not consider the quecture strategy helpful (Figure 1). The qualitative analysis revealed that un-enthusiastic attitudes to the quecture strategy could often be attributed to pre-formed ideas of learning which were blocking the path to adopting this new strategy. Some students described well-developed existing questioning strategies (encompassed in the code 'natural' in Figure 2) and felt that they were not in need of this intervention. These were all educationally experienced students (Figure 5). Some students, including the first-in-family students, described difficulties adjusting to or understanding this new way of learning, often misunderstanding the strategy (Figure 5). Commonly students did not or could not adjust to the intention that the question was for personal advancement and were more concerned with how their question would be judged by others. Students from both background categories revealed that they were thinking of the lecturer's opinion, or that of other students, when constructing their questions, with the issue of lack of anonymity (discussed above) understandably influencing this thought-process.

FIF1: *I feel like I don't ask very good questions...my question is, like, something simple that I didn't understand, so I don't want everyone to know that I didn't understand.*

Figure 5: Prior learning effects on quectures for educationally experienced or inexperienced students.



The number of students providing comment, and the number of their comments, on each of 4 codes are shown for students who were first-in-family and separately for educationally experienced students. Data listed as pre-existing strategy equates to the code 'natural' whereby students already felt it natural to study by asking themselves questions. The codes 'adjustment', 'not confident' and 'answers' from Figure 2 are lengthened here and are more expansively described in the text.

Another common misconception about the process was the idea that the questions were posed for the purpose of getting answers from other people. This expectation arose in both background categories but was expressed by all the first-in-family students (Figure 5) who described dominant learning methods of rote

learning and memory recall in their educational backgrounds.

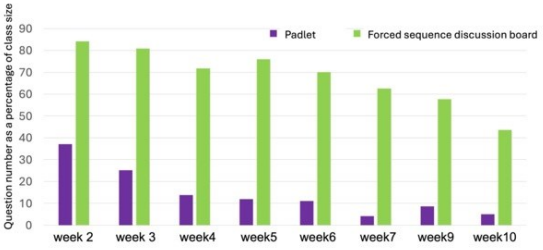
FIF4: *At the beginning I didn't realise that they were supposed to be more general questions. Uh, so mine were really like, impossible to answer questions (students laugh).*

Anecdotally, and judging by student comments about questions being answered, the idea of the questions themselves serving as a springboard for student learning is often also missed by staff.

3) The forced sequence presentation of quecture questions encouraged engagement

Students posed more genuine questions on non-anonymous 'forced' sequence discussion boards than on anonymous padlets (Figure 6).

Figure 6: Relative number of quecture questions posed with or without forced sequence.



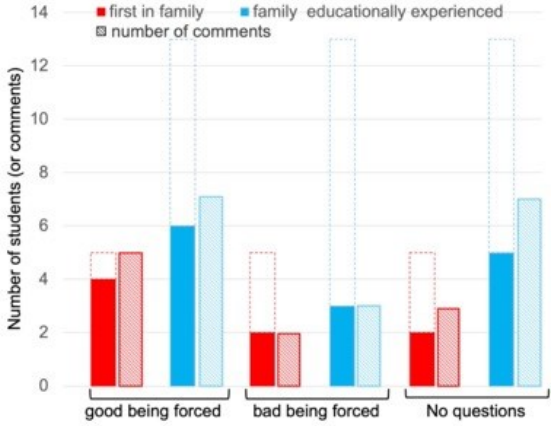
The number of quecture questions posed each week is shown for two courses that did, or did not, use a forced sequence discussion board. Anything not representing a topic-related question has been removed and the total count has been expressed as a percentage of class size. There are no week 8 data due to a teaching break.

After correcting for class size there were at least twice as many questions posed on the Biology 1B: Life discussion boards each week than on the Biology 1A: Variation padlets, and, for four of the eight weeks examined, the ratio was greater than six-fold higher (Figure 6).

The relationship between the platform for question-posing, student confidence or feeling forced and the learning outcomes is summarised in Figure 2. The lack of anonymity for the discussion board platform reduced confidence leading to unhelpful comparison as mentioned above. However, the forced sequence had both positive and negative consequences. Unsurprisingly feeling 'forced' to contribute was not universally popular and some students felt that this led to inauthentic behaviours such as copying others' questions or writing questions that the author was not invested in. The lack of anonymity exacerbated this issue, particularly for less confident learners. Some students also articulated a problem thinking of a question specifically because they were being 'forced' to do so in an unnatural way. One A-level student admitted;

Sometimes I don't think of a question right away, but I want to get on to the second lecture prep because I want to do it just now, so I just rush out a question and it's not a very well formulated or thought out one.

Figure 7: Attitudes to forced sequence quectures for educationally experienced or inexperienced students



The number of students providing comment, and the number of their comments, on each of 2 codes are shown for students who were first-in-family and separately for educationally experienced students. The code 'forced' has been separated into positive 'good being forced' and negative 'bad being forced'.

On the other hand more students acknowledged the benefits of being 'forced' to write a question before moving on (Figure 7). Notably students reflected that they would not otherwise have taken stock of the state of their learning during the course. Some also mentioned that the reflective break was itself a benefit.

I just want to get the lectures done and move on. But I think being forced to stop and think and do it can be quite useful as a little mental break. Just stopping and thinking, reflecting what you've just seen.

Four of the five first-in-family students offered comments that demonstrated that they could see the benefits of being 'forced' to pause and consider their own questions (Figure 7). When asked whether they would do this if not forced, one student replied;

FIF2*: Honestly? Probably not. If I didn't have to make the questions, I probably wouldn't think of them at the time. It would come to the end of the course and then when the task comes I'd be like oh, I actually don't know that. So I guess it probably does help me.*

Another explained:

FIF5: *I like the discussion board because it does force you to post a question.... it definitely makes you think… 'what have I actually understood from what I've just learned and what have I not understood or what do I want to know more about?' ... I think it's good because it really highlights what I don't know.*

Discussion:

The practice of posing own questions as a regular activity during lecture preparation has provided both cognitive and metacognitive benefits for first year university students. The benefits have been available to first-in-family students who acknowledge that the pressure of feeling that they were 'forced' to participate did support them to engage with the strategy when they may not have otherwise done so. Students clearly articulated using the quecture strategy to identify gaps in their learning and to encourage their own curiosity about topics as the course unfolded. For some students with previous learning habits of memorising facts, mostly in the revision period, this was a new way to learn. Engaging with the material in this way whereby concepts are understood and built upon as an ongoing process would represent an important transition to meaningful learning.

We used the virtual learning environment's forced sequence tool to encourage students to submit their own questions each week. Although it was necessary for students to post something on the discussion board to release the next section of learning material, students could avoid posing a question without penalty by typing even a blank space. The feeling of being forced had positive consequences and more students commented on the benefit of feeling forced than those objecting to it. This use of light touch force to influence self-benefiting but effortful behaviours is reminiscent of nudge theory which is often used to influence less likely decisions related to health or consumer behaviours (Thaler and Sunstein, 2008). An important aspect of nudge theory is that choice is preserved while the environment is arranged to nudge the person towards choosing a certain action. In this instance students may have felt more forced than nudged by the VLE and by personal habits of following rules. Future iterations of the quecture strategy might avoid negative attitudes if choosing not to write a question were explicitly stated as an option, although this might also reduce the benefit for those who appreciated feeling the pressure of having to identify their own question at the point of learning.

The focus group analysis also revealed the benefits that students gained from reading

each other's questions. This collection of thoughts from the diverse student population represented a valuable learning resource allowing students to consider different or wider aspects of the learning material than they might have considered themselves. Ludvigsen et al., (2019) describe the use of online collaborative boards to share students' questions during lectures, concluding that the resultant reflection and discussion opens, widen and deepens learning during lectures. Our asynchronous presentation of questions on the VLE during the week prior to each lecture gave the students, particularly those that struggled with the material, more time to view others' questions than when submission was during the lecture. However, some students revealed that public posting dissuaded them from posing the question that was right for them if their question was the same as, or they considered it inferior to, that of another student, such that private posting of questions might be better for some students.

The focus groups showed that student's questions were not being discussed as was intended within these courses. Interestingly this was only mentioned by educationally experienced students perhaps indicating that first-in-family students were not aware of the importance of discussing their questions. The lack of anonymity on the discussion board almost certainly thwarted follow-up posting, but students reported that discussion did not happen regularly on the padlets nor in the lecture theatre despite time being allocated for this practice during lectures each week. Discussion of questions is undoubtedly good for learning whereby one person's questions will often stimulate another person to expand their understanding (Chin et al., 2002). Although reading other's questions did partially achieve this end, the factors blocking discussion during lectures does require investigation. The difference between students reflecting on and discussing their own question versus a standard question and answer session is subtle but immensely important due to the personalised and metacognitive benefits of the former. If we are to genuinely support learning and cultivate curiosity in all students we must normalise the practice of student engagement with student-posed questions (Watson, 2018; Watson, 2021).

The qualitative nature and small scale of the current study, together with the inherent and unavoidable researcher bias during interpretative analysis, mean that the findings cannot be extrapolated widely. However, student attitudes and learning benefits alluded to here agree with prior larger analyses demonstrating benefits of the quecture strategy (McQueen and McMillan, 2020; McQueen and Colegrave, 2022). Importantly, we have now confirmed, at least for the participants in this study, that gentle pressure, guidance and support to pose a personally relevant question as part of the weekly study routine provides cognitive and metacognitive benefits for first-in-family students.

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