Exploring student response systems for large group teaching: a tale of engagement at scale

Sandra Barker
UniSA Business, University of South Australia, Adelaide, Australia, and
Lynn C. Gribble
School of Management & Governance, UNSW, Sydney, Australia

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Abstract

Purpose – This paper is a case study of student response systems used in large-class teaching. It considers the benefits, including the engagement of students and academic gains such as reduced administration. The constraints and impacts in classroom teaching are noted, drawing upon the experience of two teachers with their learning captured as a means of dissemination of practice to support other teachers who may be considering adopting and later adapting such practices (Gribble and Beckmann, 2023).

Design/methodology/approach – An autoethnographical account was undertaken using an action-learning approach as a sense-making exercise. These accounts enabled a depth of insight beyond the anecdotal evidence experienced by an individual teacher alone.

Findings – The findings show that while student response systems have constraints, these can be addressed by putting pedagogical concerns in front of any technology deployment, reaping benefits for students and teachers. Once engaged in using the system, students become more willing to enter further discussions. However, the limitations of both systems indicate that there may be a need for multiple systems to be available based on the pedagogical needs of the class.

Practical implications – The exploration of student response systems and outcomes of positive engagement by students in classroom settings provides insight to those wishing to explore such systems for use in large-class teaching settings.

Originality/value – This work extends discussions surrounding interactivity using student response systems. Additionally, practical insights from the users into their experiences with their students in using such systems provide alternatives for engagement in delivering large-class learning at scale.

Keywords Student response systems, Interactivity, Student engagement, Active learning

Paper type Case study

Introduction

The rise in the use and availability of student response systems has meant that many students arrive at university familiar with these as a form of engagement (Heaslip *et al.*, 2013). These systems provide a means to engage students, capture data and create a fun and gamified learning experience that rewards student interactivity (Sun and Hsieh, 2018). This case study explores two different student response systems used to teach large classes (>50 students), understanding the benefits and limitations in practice. It offers practical insight as the discussions note that while teachers are aware of such systems' existence, they may lack time or technical efficacy to explore them, often relying upon their own user experience (often as participants or recipients of such systems) to choose a system for implementation rather

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than pedagogically exploring needs. This case specifically shares insights in an applied manner in a large group teaching context. Rather than focusing on what the system can do, this autoethnographic account provides the opportunity to learn from the experience gained by the teachers in the process of using such systems as shared practice (Gribble and Beckmann, 2023). Previous studies (see Karpin and Mahmudatussa'adah, 2020) focused on learning processes for the students rather than understanding the teaching experience.

The considerable growth in student numbers for business schools (Australian Business Deans Council, 2022) means that class sizes have increased and can be expected to continue to do so. The recent literature varies and suggests that a "large" class is > 50 (Wang and Calvano, 2022; Mulryan-Kyne, 2010; Fortes and Tchantchane, 2010). As a result, the traditional means of student engagement may no longer be suitable, which has meant that teachers are seeking ways to measure engagement, knowledge acquisition and provide a voice to every student during synchronous learning interactions. Thus, deploying technology appears to provide some assistance.

This paper employs autoethnographic accounts of action learning processes in deploying two different student response systems. Similar pedagogical needs are noted by both authors, including measurement of knowledge attainment and student engagement. This guided the exploration of such systems. At a surface level, both systems explored offer similar pedagogical outcomes, with a key difference being the instant visualisation of data with Mentimenter (Menti) at the expense of identified individualised student's responses with Socrative's pseudo ability to take attendance.

As a result, the need for student response systems to be deployed in light of pedagogical needs is identified, but the limitations within systems require teachers to be comfortable shifting between various systems based upon pedagogical needs.

Background

In the early 2000s, business education experienced a significant paradigm shift. Whetten (2007) noted a transition from a teaching-focused approach to a learning-focused approach. The value of experiential learning, which identified active engagement and direct experience as the foundation for knowledge acquisition, was identified.

Active engagement in class activities has been shown to develop a deeper approach to learning (Laurillard, 2002). Yet, researchers have also identified the lack of participation and concentration by students attending face-to-face classes (e.g. Frick *et al.*, 2020; Akbay *et al.*, 2023). Whilst students have identified teacher presence as a motivating factor to keeping their studies on track, they have also noted that in large cohorts, students resist interactions and asking questions due to feeling uncomfortable (Holbrey, 2020). Additionally, broadened participation (Kitchener *et al.*, 2022) has meant the classroom of 2023 has more diverse learning needs, and as a result, teaching staff need to broaden their "toolkits" to find easy yet scalable methods to ensure every student is heard and seen. This underscores the need to consider how we might create a "safe method" for students to both ask and answer questions?

The rise of student response systems

More broadly, technology is now used and expected in every classroom to some extent. Student response systems are not a new phenomenon and were available prior to the ubiquitous use of and access to mobile phones. Systems such as "clickers" were distributed to students and linked to teacher-controlled software (Laxman, 2011). Student response systems often required the provision of both software and hardware for the deployment of an electronic means of well–known classroom techniques such as a "show of hands". The visual cues and clues, the fidgets and twitches, and in the 2020s, the lack of "doom scrolling" may

also signal some level of engagement (Wood and Shirazi, 2020). However, when considering means of gaining student engagement, other issues, such as the rise of large group teaching where classes may exceed 400 at a time, must be explored.

Each student response system offers similar yet different opportunities. As noted, teachers often learn about such systems through attending a session where they have been employed and deployed (Lock *et al.*, 2016); however, using any technology or student response system in the classroom requires some level of experimentation and a tolerance for risk. The initial cumbersome introduction of systems, originally requiring specialised hardware and software and, therefore, significant planning, appears to have left some reluctant to explore such use. Further, these early student response systems with limitations in terms of true/false or multi-choice answers may also have contributed to the reticence of staff to include them in their teaching. With mobile phones now ubiquitous and with many students bringing a laptop or tablet to class, along with broad internet access, the options have increased. A quick internet search will indicate that most student response systems offer some form of limited, free access. However, determining what system to use needs to be about more than cost. Student response systems must be considered in light of the student cohort, fit for purpose in terms of the pedagogical design and enable ease of access. As a result of the increasing availability of such systems, exploring *in situ* the use in an Australian business teaching context is warranted.

The challenges to teaching staff

The implementation of any technology must consider the user. Learning through observation is noted to be useful, and it appears that teachers adopt and adapt each other's practices either through experience or the influence of another teacher (O'Leary, 2020). The ongoing pressures on teachers have meant they may lack time to explore various solutions to enhance their practices (Abdulrahaman *et al.*, 2020). Further, those who are interested in doing so may lack the technical expertise or knowledge to explore what is available to best suit their classroom needs, both as a teacher and for their student cohort. Further, some may lack the efficacy to deploy it in the classroom, citing the stress of things going wrong as just one other pressure they could forgo (Abdulrahaman *et al.*, 2020).

Learning at scale

The rationale for exploring student response systems stems from the pedagogical concerns of learning and teaching at scale. This, therefore, is the starting point for our literature review. Issues such as how to ensure every student is seen and heard, when student interaction is needed and what data might improve learning and connection during synchronous learning situations are all considered.

As noted, business classes continue to grow (Australian Business Deans Council, 2022) and as a result, teachers are faced with increased class sizes. It is these numbers that inform the literature on learning at scale, which explores more generally the technology and pedagogy associated with teaching and learning, noting that large student numbers often involve multiple teachers (Joyner, 2022).

Care pedagogy requires a way to connect the requisite giving and receiving of care (Noddings, 1995). Knowing the student, their thoughts, concerns and interests draws them into the context of learning and teaching. Students want to be seen and heard (Hanna, 2022) and they want to feel safe and supported in their studies. The question is how to do so when opportunities to interact on a personal level are reduced in large teaching environments. As the ability to provide care is impacted by the ability to interact (Gray and Di Loreto, 2016), this loss of interaction must also be considered.

Learning and teaching at scale may lead to the loss of personalisation. Unlike small classes where the teacher is likely to know each student and even the quieter students can find a comfortable space even if it is with only one other peer (Walton-Fisette, 2010), Lloyd-Strovas (2015) notes that where there may be 400+ students, personal interaction is reduced. Connections and opportunities for the student to engage at a personal level are often reduced to making an appointment or "grabbing" an opportune moment, such as while walking into or out of class or as a result of being observed in a smaller group discussion.

Personalisation is linked to making student connections (Oller *et al.*, 2021). Rather than feeling like a "number", students feel connected and have a sense of belonging, enabling them to thrive (Oller *et al.*, 2021). Large-group teaching means there are many voices and limited time. As a result, students may feel lost and, even more likely, become "lurkers" in our classrooms.

The loss of interaction was also highlighted during the COVID-19 pandemic when students found themselves distracted from their studies due to the rapid move to emergency remote learning along with the disruption to other normal daily functions (Castro and George, 2021). The rise of life stressors affected their motivation to study, and as such, academic staff needed to work harder than ever to provide environments in which the students felt safe, interacted and motivated to learn. Castro and George (2021) note that student satisfaction with both student-teacher and student-student interaction was reduced.

Given the concerns of student interaction with personalisation and satisfaction as well as the provision of a pedagogy of care, the use of student response systems would appear, at face value, to address these concerns. The data would enable personalisation and an opportunity for interaction, which may also increase satisfaction.

Student interaction and engagement

Student engagement is complex to understand and multifaceted, yet it is acknowledged as a critical factor in supporting student learning and development (Kahu, 2013). Therefore, issues such as social learning, active learning, and teaching methods cannot be ignored when exploring student interaction.

Student engagement with the teacher is often used as a proxy for student engagement with the course materials (Carlton *et al.*, 2021). This may be linked to the notion that we learn in social environments (such as suggested by Bandura, 1977) or to learning styles linked to personality and behaviours (Griffin *et al.*, 2024) whereby extroverted learners engage quickly and freely in discussions, creating interactive and dialogic learning. However, it can be difficult to get student interactivity with diverse groups, particularly where cultural backgrounds or learning preferences leave the student as a consumer of information rather than a co-creator.

Bandura's (1977) work on social learning considers how students learn by observation of desired behaviours as cues and clues. Hence, students sitting in classrooms behind screens or worse, scrolling nonrelated material can signal this is an acceptable behaviour. During the shift to online learning during 2020–2022, teachers lamented not being in classrooms and blank screens as leading to feelings of isolation and a lack of enjoyment in their teaching (Apostolidis *et al.*, 2022).

Research into active learning has received significant interest (Mitchell *et al.*, 2017). However, "active learning is a wide concept, most often referring to student-centered and activating instructional methods and teacher-led activities" (Hartikainen *et al.*, 2019). It is this shift to teacher-led activities that supports the notion of student response software as a method to move from content-laden lecturing to dialogical approaches to engagement.

The move for lecturers from "sage on a stage" to "guide on the side" has long been accepted as needed and necessary (Morrison, 2014). Students are no longer just passive

consumers of content, and with the rise in content creation and social media "likes", actions such as voting up and voting down a comment have become part of their DNA (Wilding *et al.*, 2018). Many of the students in the classroom were born into a digital age rather than learning their computer skills later in life, as may be the case with teachers in the university system, particularly those who have moved on from their early careers (Bruggeman *et al.*, 2022). Therefore, a mismatch between teacher use of any technology as a form of engagement and student expectations for digital interactions may occur. Fang *et al.* (2023, p. 9) identify the need for "careful adoption of new ways of learning . . . as well as the integration of innovative educational technologies . . . to enhance the students' learning experience in a post-pandemic world".

Student response systems

Given the concerns of teaching at scale and student interaction and engagement firmly positioned, the deployment of student response systems needs exploration. These systems offer a means to encourage a dialogical approach to learning (Mayhew *et al.*, 2020). They have been used to encourage student participation in class through the asking and answering of questions as well as the testing of their knowledge through both formative and summative assessments (Akbay *et al.*, 2023).

To explore the opportunity of harnessing different student response systems to teach large classes and support student learning experiences (Tang *et al.*, 2022), our view is that any technology system choice is best implemented as a response to pedagogical needs (after Sankey, 2020). Therefore, the literature reviewed by the authors must consider the pedagogical concerns addressed by seeking interactivity in a class situation. As interactivity may be seen as a proxy for student engagement that literature cannot be ignored.

The integration of student response systems into the teaching tools has been identified as a key element to support synchronous teaching (Mayhew *et al.*, 2020). Student response systems have "been used in a variety of ways to enhance teaching/learning in a fun and interactive way for engaging students and make learning more enjoyable and memorable" (Nadeem *et al.*, 2023, p. 4). Some systems contain gamified elements, which studies have found to have a positive effect on student learning and engagement; however, the use of the leader board characteristics has been noted to have both positive and negative effects on engagement. Mayhew *et al.* (2020) cite studies identifying the use of student response systems as impacting improvement in the depth of student learning, increased engagement, inclusivity and peer-to-peer interactions, improved problem-solving skills and creating dynamic discussion focused pedagogy. Additionally, these systems have also been found to "give a voice" to students who would not normally participate in class discussions due to cultural background, disability or, more simply, the fear of being wrong (Mayhew *et al.*, 2020; Wood and Shirazi, 2020).

Context and methodology

In order to best provide insight through our experiences, we explored the work *in situ,* as it provides the opportunity to take the components of action learning that are widely used in management as a method to reflect in a systematic manner (Skipton *et al.*, 2010) and learn in the process of implementation. It is both iterative and allows for adjustments to be made in "real time", not requiring the completion of a cycle. While the components do follow each other in a system-like manner, recognising that each phase of the cycle enables both learning and change as one theorises, plans, takes action and reflects, the process can be commenced at any point of the cycle (Garratt, 2011). As such, a form of experimentation can be undertaken quickly by adopting a type of "in the wild" experience and using the innovator's mantra of "quick to fail and adjust".

Autoethnography is a methodology that places the researcher at the centre of the research process. Using writing as the primary focus of the research process, it places the researcher's experience, point of view and interpretation at the forefront of the research. As "an observational data-driven phenomenological method of narrative research and writing that aims to offer tales of human social and cultural life that are compelling, striking and evocative" (Poulos, 2021, p. 5), it provides access to an insider perspective and is therefore an appropriate method in education research. Being able to leverage the memories, emotions and knowledge of the researcher provides a lens for the data that is not possible when researching from an outsider's point of view (Tarisayi, 2023). The "candid first-person storytelling, autoethnographies provide windows . . . in more authentic, transparent ways than permitted by traditional research approaches" (Tarisayi, 2023, p. 59).

There are, of course, limitations to this methodology, as noted by Luitel and Dahal (2021, p. 5), in that autoethnography may promote "self-admiration of the researcher as a lone hero" (narcissism), may not "establish a clear theoretical standpoint . . . lack convincing arguments and scholarly rigor" (solipsism) and may emphasise the "artistic values of autoethnographies rather that the research agenda" (aestheticism).

This research follows the institutional ethical procedures for such work and is deemed exempt from full ethics approval. It reports an early study into the effective use of student response systems in business education at two Australian universities. This exploration was commenced as a result of the numerous corridor conversations (Gribble and Beckmann, 2023) that identified many of their colleagues incorporating these systems into their teaching without carefully considering the benefits or limitations.

Reflective narratives as a type of autoethnographic account

To capture the data for autoethnographies, personal narratives were used. Reflection through narratives enables sense-making while considering what was done and exploring evidence of impact (Andersen *et al.*, 2020). Using two reflective narratives enabled us to consider how we explored and used student response systems as a means to create active learning environments, providing a "voice" to even the most reserved students in the room in large management teaching environments. Such narratives provide the opportunity for development as teachers (e.g. Beckmann, 2016; Bornais and Buchholz, 2018; Kuiper and Stein, 2019). The observations, taken across multiple teaching sessions, indicated benefits and limitations in context. As part of their pedagogical approach, they considered the outcomes in the process of teaching and for the students. These reflections resemble autoethnographic accounts as they are shaped out of the writer's experience, considering the culture and context to make meaning while recognising the variances that occur (Branch, 2022).

In order to explore two different types of student response systems in two different settings, descriptions of both are provided as a background to create a mutual understanding of the vignettes. This information was drawn from Mentimeter's (Menti) and Socrative's own descriptive comparative education web forums.

Mentimeter (Menti)

Menti enables a teacher to "engage with students using live polls, word clouds, quizzes, multiple-choice questions and more. Track learning and understanding by asking questions and downloading results. Communicate and interact with your students". (mentimeter.com, 2023). When considering such software, the benefits of Menti are seen as a "huge range of options: generate questions, assign polls, get image feedback, create matrices, and more" (Commonsense.org, 2023a); however, the limitations, such as the inability to "import content",

impact presentations. Yet, overall, according to the reviewers, "this tool's dynamic presentations strike a nice balance between information and interaction".

Socrative

Socrative has a unique function to import class lists and provide detailed and identified data after the class. "Socrative is an online tool for teachers to give quizzes and on-the-fly assessments to students" (Socrative.com, 2023). The benefits of Socrative with quizzes are noted as having "... useful features like adding links and explanations". Yet they are more "serious in tone than some gamified competitors" (commonsense.org, 2023b). Nonetheless, "it is easy-to-use as a feedback and assessment tool that can support responsive teaching". It should be noted that it is unable to draw or graph an answer in real time, but a teacher can download the spreadsheet and create graphs and graphics separately. Also, the software is capable of enroling up to 300 students and having 30 rooms in operation simultaneously, making it easily scalable (Socrative.com, 2023).

Vignette 1: Menti in action

Two compulsory core undergraduate courses were used as sandpits. With enrolments of 60–100 students per session over the past four years, these business courses see students come from varied backgrounds, including international (primarily from Asia), domestic school leavers, including ~10% from low socioeconomic environments as well as domestic mature-age students looking to improve their current and future work prospects. For over 20 years, I observed that in-class discussions with students on theory-related topics were difficult to draw out of students who lacked educational capital (after Bourdieu, 1977). Beyond the one or two students who had prepared and were eager to voice their opinions, it was the larger component of the class who were either unprepared or unwilling to speak up that was of concern. Investigations revealed that they are fearful of providing an incorrect answer or looking "stupid" in front of their peers. Therefore, a student response system may provide a solution.

During 2017, as the coordinator of these two courses, I investigated the use of Menti as an in-class student response system to encourage participation. As a pilot, I trialled it during a conference presentation with peers and the positive feedback and success led to the adoption of the free version in 2018 as a type of "study in the wild" (Crabtree *et al.*, 2013). During the weekly face-to-face workshops, it provided students the opportunity to anonymously answer questions. Using question types such as multiple choice, true/false (yes/no), rank your preference, short answer and medium answer, I quickly saw everyone involved and I was able to gauge surface learning but, more importantly, hear their "voice". The system responses were displayed in various forms (text, word clouds and column charts). More than 80% engaged, reporting it as "interesting", providing a clear indicator to continue. My efficacy improved, and I designed Menti interactions in all classes, including virtual classrooms for external students.

After successful use (2018–19), a large license for Menti was purchased and, from 2020, incorporated across all my classes. The COVID-19 necessitated a move to completely online learning (2020–22), which demonstrated Menti integrated well for Zoom classes as well as for its synchronous engagement opportunities. The seamless presentation with embedded student activities enabled continual interaction with the embedded activities. The return to the classroom at the end of 2022 saw this practice continue.

It is observed that over each study period, students become more comfortable giving their opinions and answers to the activities audibly rather than through the system alone. An increase in confidence is seen with students voicing opinions on the topic of discussion as well

as engaging with them through Menti. The formal evaluation process attests to the "active engagement of students using Menti and drawing on their own personal experiences in communication" as helpful. As a result, it appears that Menti encourages engagement in synchronous teaching sessions.

Vignette 2: Socrative in action

With a large (~1,000 student) compulsory core course for masters students, of which ~90% are international, often learning in a second (third or fourth) language interaction can be difficult. Individual classes may have up to 250 students attending at a time. Of note is that these students have prior learning experience, where they may be more familiar with rote learning and they are observed to often be reticent to answer the teacher or engage in conversation. The pedagogical approach of the course is focused on transformative learning (after Mezirow, 1991, 1995, 1996), where dialogical and Socratic styles are employed.

My pedagogical requirements were based upon class sizes and the need to engage students in answering longer-form questions (as a form of mini assessment) while capturing attendance. At the same time, I wanted to enable opportunities for students to ask questions of an administrative nature without that taking over the teaching time. I also wanted to capture class sentiment, i.e. how were they feeling? Exploration of student response systems led me to Socrative with its ability to enrol up to 300 students with distinct login details and separate interactions by class enrolments (up to 30 separate classrooms). I had a proxy for attendance taking, and it appeared easy to deploy with its unique class codes and predetermined questions ready for use and reuse, as well as the ability to create ad hoc questions as needed.

The 2019 "trial" worked well. Beyond capturing class sentiment, the responses in real time, the deployment of short-answer free-form questions and gathering "any questions" prior to the course commencing were all possible. As Socrative provided downloadable data, following up with tailored information saw students respond positively to noting how it was "specific and tailored" (T1, 2019). The real-time data while teaching as well as the ability to follow up and inform further interactions provided a means of pedagogy of care at scale. As >93% of the class used the software deployed as an optional activity, I was comfortable using it for the graded mini quizzes.

With the move to online learning in 2020, interactivity was a major concern for this cohort. The system transferred well into fully online environments and was used throughout the teaching restrictions due to COVID-19 lockdowns in Australia through to the end of 2022.

Upon reflection, it is the increase in student voice and interaction that are compelling reasons to continue using a student response system. Teaching at scale needs every student to be heard and have the opportunity to safely ask any question at any time. It is the identifiable data available through Socrative that makes a difference for my classes. Socrative has ensured no student is lost, as it enables me to find the student and personalise responses where necessary. Beyond this, it is Socrative's ability to reduce administration and increase integrity that will keep it in my classroom, as these two items are necessary yet time-consuming in my teaching practice.

Discussion and implications

The vignettes provided offer insights in using response systems as a means to draw students into class activities, indicating that they do encourage students to respond to and "talk with each other" as well as share ideas and concerns. Student response systems create class interaction at scale, which is valuable as a means of engagement. Furthermore, these systems mean that teaching large classes does not have to be a passive form of information consumption and can remain interactive.

Clearly, activity and interactivity can be instigated and maintained through student response systems. While these systems have been available for many years to use in the classroom, their deployed as a means of creating engagement, particularly in larger classes, should not be ignored. Newer systems appear easier to deploy and cost-efficient (being either free or low in-cost) and other pedagogical uses can extend their application.

In comparing both vignettes, both systems reviewed largely provide similar features; however, it is Menti's ability to provide instant visuals that makes it appealing for student interactivity and teacher interactions. While Socrative's ability to take class attendance, reduce administration and drive personalisation at scale remains appealing.

Choosing a student response system must consider pedagogical concerns as well as access and ease of use. Benefits and constraints must be accepted within any deployment of the system, but commencing from the perspective of the student context, including neuro diversity, is key (Hamilton, 2022). Additionally, any technology must deliver on its promise of reducing rather than expanding the work required (Dukach, 2022). Systems such as Menti and Socrative provide teachers with opportunities to create and add activities in an "ad hoc" manner as well as pre-planned interactions. Additionally, systems that capture student data for later use are advantageous as they enable "checks and balances" to be put in place as well as the opportunity to explore levels of understanding and attendance.

Using student response systems alone is not an instructional method; any technology is, at best, a tool to be deployed as part of the teacher's methods (Alenezi, 2023). When teaching large classes where as many as 300 students may attend at once, there is a distinct need to move from "sage on a stage" and seek involvement and feedback from students.

Deploying such systems may also require a different or extended skill set than that held by traditional teachers. It is noted that any technology use requires a level of digital curiosity to explore what is available and the efficacy of implementing it (Alenezi, 2023). Users (both teachers and students) require a level of tolerance for ambiguity, as using any technology relinquishes a level of control in the classroom (Johnson *et al.*, 2016). In doing so, issues such as providing solid "rules of engagement" must be clear to students to avoid any potential mishaps, such as posting an inappropriate comment or image for all to see.

Both the literature and the experiences of the authors demonstrate that student engagement is increased in synchronous classes where student response systems have been implemented. Students were more readily engaged in providing responses to questions through the systems but also tended to extend conversations once the student responses were fed back to the class, making student voices seen and heard through various means.

Conclusion

Student response systems have a place in large-class teaching. In order to deploy such systems, it is important to consider ease of use for both the student and the teacher. Systems that enable instant visualisation and data use afterwards are of benefit to support teaching practices beyond the classroom as well. Pedagogy can be enhanced with technology, but pedagogy must drive the implementation (after Sankey, 2020). Importantly, any technology used should not add to the cognitive load of the student nor be a distraction from the course content. There are many types of student response systems on the market that may encourage students to be more interactive. Those that provide an opportunity for every student to feel seen and heard while considering issues such as neurodiversity and access are best deployed to support pedagogical approaches and create opportunities for every voice in the class, big or small.

While Menti notes anonymity as its core function to encourage responses, it removes the ability to use it for an in-class assessment written task. Socrative's reports support academic

administration as well as direct and specific personalisation. As a result, choosing a student response system for deployment is not an "either or" but an "either and" solution. General technological expertise can overcome limitations; however, recognising that teachers may lack the technical efficacy or interest to be digitally curious means that the full benefits of such systems may not be exploited beyond the possibilities presented at face value. It is also important that teachers become proficient in using different types of student response systems to ensure that the deployment best matches the pedagogical and administrative needs of the teacher while supporting students to learn at scale.

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Corresponding author
Lynn C. Gribble can be contacted at: l.gribble@unsw.edu.au