



# I can be a “normal” student: the role of lecture capture in supporting disabled and neurodivergent students’ participation in higher education

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## Abstract

After the return to on-campus teaching post-Covid, reports of student disengagement and low attendance are common and anxieties over the relationship between lecture recordings and attendance have re-emerged, leading some educators to remove recordings. To understand the potential impact of such decisions, this study explored how neurodivergent and disabled students use recordings using a qualitative survey approach. Reflexive thematic analysis emphasised the need for learning flexibility and questioned traditional lectures. Neurodivergent and disabled students raised concerns over accessibility, highlighting the crucial nature of recordings beyond attendance. For example, features such as pausing or speed adjusted were described as vital for managing learning among disabled and neurodivergent participants. Our findings do not support an uncritical view of lecture recordings. Participants discussed the self-discipline required for effective use and responses reflected prior concerns discussed in the literature regarding recordings leading to focusing on lectures to the detriment of other sources of information. However, despite challenges, we found multiple examples of students using recordings to maintain engagement as a successful self-regulated learner. In line with Universal Design for Learning, our findings support the provision of lecture recordings as an inclusive and accessible technology for all students, not just those with declared disabilities. All data and analysis code is available at <https://osf.io/ue628/>.

**Keywords** Lecture recordings · Lecture capture · Disability · Neurodiversity · Inclusive education · Universal Design for Learning

There is growing recognition within the higher education (HE) sector that student populations are increasingly diverse and often have unique needs in order to fully engage with, and demonstrate, learning. According to a 2021 Parliamentary report, 14.3% of full-time HE home students and 19% of part-time students declared at least one disability in England (Office for Students, 2021) providing an overall estimate of 17.3% for all UG and

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PG students. In Scotland, the estimates are only based on data from first-degree entrants; however, these estimates are similar to England at around 13% (Higher Education Statistics Agency, 2019). It is important to note that these percentages are likely a lower bound estimate given that, for a variety of reasons, many students choose not to disclose a disability or diagnosis to their University or may not have access to diagnosis at the time this data is collected.

In both England and Scotland, the largest proportion of declared disabilities were specific learning difficulties like ADHD, dyslexia, dyscalculia, and dysgraphia (Bolton & Hubble, 2021). A drastic increase in the identification of neurodivergent students in UK schools between 2010 and 2019 (McConkey, 2020) has meant increasing numbers of neurodivergent students progressing to HE (Pino & Mortari, 2014). In England, 34% of students declaring a disability reported a specific learning difficulty/difference (Bolton & Hubble, 2021), and in Scotland, this estimate is just over 40% (Commissioner for Fair Access, 2019). In Scotland, statistics related to autism diagnosis in HE students are typically clustered with mental health diagnoses and thus difficult to clarify. However, due to the trebling in reporting of this specific diagnosis, further exploration has identified that 3% of first-degree entrants disclose an autism diagnosis (Commissioner for Fair Access, 2019). In England, reporting rates are similar at around 4% (Bolton & Hubble, 2021). As is the case with ADHD, this is likely to be an under-estimation given the known diagnostic challenges, large numbers of adults and families seeking diagnosis privately due to NHS waiting times, and some never seeking a formal diagnosis. Importantly, a recent review highlighted that fewer neurodivergent young people transition to HE and those that do have poorer outcomes and rarely graduate at the same time as neurotypical peers (Sedgwick, 2018). This highlights that not only does HE potentially “break” more students with SLDs than it “makes”, but many may not make it there at all.

## Lecture recordings and inclusive teaching practice

Proactive strategies to support and ameliorate teaching and learning challenges can eliminate discrepancies in experiences between students with diverse needs and facilitate their success (Matthews, 2009). Practices that emphasise universal design and include digitally accessible materials and flexible teaching approaches are known to be beneficial to all students but particularly those with additional needs (Sarrett, 2018). Indeed, increasing recognition of the need to mainstream disability is not isolated to education, with the United Nations launching a Disability and Development Report in 2018 (United Nations Department of Economic and Social Affairs, 2018). The report highlights the importance of mainstreaming disabilities not only in education but in areas such as social protection, employment, basic services, and energy to ensure that Sustainable Development Goals can be realised by and for people with disabilities. In an insightful narrative synthesis, Clouder et al. (2020) extract important themes from recent literature exploring inclusive teaching in support of neurodivergent students in HE, and within which the necessity and utility of reasonable adjustments are repeatedly highlighted. Once such adjustment is that of lecture capture and post-pandemic, it has surfaced within wider discussions of academic culture and climate.

Lecture capture, as conceptualised in this paper, refers to the recording of a live lecture, typically in which attendance at the live lecture is expected. Prior to the Covid-19 pandemic, there was a mix of research on the impact of lecture capture as an inclusive

technology. Nightingale (2019) discusses how dyslexic students used recordings to alleviate the cognitive load of note-taking during live lectures and reduce the risk of being unable to keep pace. Being able to revisit the recordings reduced anxiety, a sentiment echoed by Voelkel et al. (2023) in a non-disability-specific sample. From the perspective of widening participation, MacKay et al. (2021) conducted focus groups with students who were from lower socio-economic backgrounds as well as first-generation students and carers. Participants noted how recordings helped balance responsibilities like paid work and commuting. This is corroborated by O'Brien and Verma (2019), who found that women, older students, and those living further from campus relied more on recordings. During the pandemic, research highlighted the benefits of lecture recordings for neurodivergent students. For instance, Levenberg and Reesh (2023) conducted interviews with students with ADHD who reported that being able to engage flexibly with recordings helped them plan and manage their study time whilst the practical features of recordings such as being to adjust playback speed helped maintain engagement.

However, the provision of lecture recordings is not without controversy. Concerns about their impact on attendance are prevalent, although pre-pandemic literature (e.g., Edwards & Clinton, 2019, Nordmann et al., 2020) offers inconsistent findings, with reviews suggesting no systemic relationship (O'Callaghan et al., 2017). More nuanced concerns about the impact on broader study behaviours propose that recordings encourage students to focus solely on the lecture rather than reading more widely (MacKay, 2019; Voelkel et al., 2023). In addition, Nordmann et al. (2020) argue that educators should target generic study skills and support the effective use of lecture recordings through viewing their use through the theory of self-regulated learning, rather than a preoccupation with attendance. A systematic review by Broadbent and Poon (2015) found that time management, metacognition, effort regulation, and critical thinking were all predictors of achievement in online learning environments. Whilst purely online learning environments are different, there are clear parallels between these skills and the behaviours described by students regarding their uses of lecture recordings, for example, the ability to schedule when one will watch a recording requires time management whilst knowing when to move on from the lecture and engage with further reading requires metacognition and critical thinking.

Initial research from the pandemic pivot-to-online suggested that the widespread adoption of lecture recordings had led to more positive staff attitudes (Robson et al., 2022). Indeed, as higher education began to transition back to on-campus teaching, initial debates focused on whether the on-campus lecture was dead and the use of asynchronous recordings should predominate (Nordmann et al., 2022a). However, with many across the sector reporting student disengagement and low attendance (Williams, 2022), pre-Covid anxieties regarding the relationship between recordings and attendance have returned, with some institutions removing recordings as a result (Clarence-Smith, 2023) with consequential concerns of inclusivity and accessibility.

The current study undertook an exploratory qualitative survey approach to build on work that was conducted pre-Covid and during the pivot-to-online to better understand how and why students use lecture recordings within the post-Covid landscape where many institutions have transitioned back to on-campus lectures. Although understanding this question from the perspectives and experiences of all students is important, it was an explicit aim to study neurodivergent and/or disabled students, broadly defined, who are typically under-represented in this kind of research but for whom the provision of lecture recordings may have greatest impact.

RQ: How do students, particularly those who are neurodivergent and/or disabled, use lecture recordings of on-campus lectures?

## Method

### Methodological approach

Whilst interview and focus-group methodologies were considered, to create a safe space for potentially vulnerable populations sharing sensitive information (Wilson & Neville, 2008), in-direct data collection was deemed more appropriate. Despite limiting opportunities for interactivity, a qualitative survey design was chosen to protect anonymity and capture maximum heterogeneity and participant dispersion (Braun et al., 2021). This study was approached with an experiential epistemological stance. Experiential approaches are concerned with individuals' subjective experiences of events, and their meaning making with consideration to the wider forces and circumstances that surround them (Braun & Clarke, 2022). The current study looked to ground these interpretations in participants' lived experiences of such factors, rather than interrogate their meanings. As such, an experiential bottom-up, person-centred approach was favoured over a top-down critical approach.

Whilst the primary methodological approach and the analysis reported in this paper are qualitative, additional quantitative items were included in the survey. The full results of this quantitative analysis are available in the [online supplementary materials](#).

### Data collection and materials

The survey was created and hosted on Qualtrics (<https://www.qualtrics.com>). The questionnaire was novel and was constructed by engaging with the literature to identify potential uses and motivations for using lecture recordings for the quantitative items. A full copy of the questionnaire is available at <https://osf.io/ue628/>. Participants were first asked to provide demographic information: age, gender, age on starting their degree, current subject, level and country of study, language of instruction, and whether they identified as neurodivergent and/or disabled.

Participants were then asked quantitative items about how and why they used lecture recordings. First, participants were asked to rate three items about why they used recordings. As a follow-up question, participants were asked to select the reasons they typically missed lectures from a set list. Participants were then given an open question to describe *why* they used lecture recordings in their own words.

Participants were then asked how they used the technical features such as adjusting playback speed or pausing. Participants were then given an open question to describe *how* they used lecture recordings in their own words. Finally, two open questions asked them to describe the advantages and disadvantages that they perceived regarding providing and/or using lecture recordings.

### Participants

We explicitly sought undergraduate and postgraduate-taught students who were studying on campus and provided with recordings. We explicitly targeted neurodivergent and disabled students, and participants were recruited through a combination of purposeful, convenience, and snowball sampling. In total, 419 participants had data recorded in the survey, although only 310 participants provided data beyond demographic responses and were included in the analysis. Open-text gender responses were coded as woman, man, and non-binary (see Table 1). Given the targeted nature of our recruitment and the exploratory

**Table 1** Sample size and age by gender

Gender	Mean age	SD age	<i>N</i>	Percent
Woman	21.4	4.77	209	67
Man	21.7	3.95	59	19
Non-binary	20.8	3.46	24	8
Not stated	21.7	5.1	18	6

nature of our work, our sample was not intended to be representative of the demographic trends of general population and this is clearly the case. For example, in the most recent census in England and Wales, 0.26% of the population identified as non-binary compared to 8% of our sample, potentially driven by the finding that neurodivergent people are more likely to identify as gender diverse (Goetz & Adams, 2022). Additionally, whilst we targeted all student groups, the first and last authors who were responsible for advertising are based in psychology, a discipline that continues to have a significant gender imbalance with estimates that 78% of undergraduate psychology students identify as women (Gruber et al., 2021), and this likely contributed to the resultant make-up of our sample.

Participants' open-text responses to questions requesting disability and neurotype status were coded into four categories (see Table 2). It was crucial to recognise the unique experiences of students who identify as multiply disabled (Al-Beltagi, 2021) and to accept self-identification as well as formal diagnosis in recognition of systemic barriers to care and diagnosis. Responses were manually coded using HESA categories then collapsed into:

1. Neurotypical and non-disabled: identify as neurotypical and having no disability
2. Disabled: identify as neurotypical and report having one or more physical, mobility, chronic health disabilities, or mental health conditions such as depression, anxiety, and eating disorders
3. Neurodivergent: identify as ADHD, autistic, dyslexic, dysgraphic, dyspraxic, OCD, and/or living with schizophrenia
4. Neurodivergent and disabled (NDD): identify as both neurodivergent and disabled

A minority of participants indicated that they were mature students (9%), whilst a majority indicated they were currently enrolled in Levels 1–3 of their undergraduate degree (83%), were studying at a UK university (93%), and/or were being taught in their first language (85%).

The median time spent on the survey was 6 min and 18 s. Across all open questions, participants' median word count was 92, with a mean of 113 words, with responses ranging from 2 to 554 words in length. In total, participants provided 30,886 words of open-text responses.

**Table 2** Sample size by disability and neurotype

Disability	<i>N</i>	Percent
Neurodivergent	126	41
Disabled	84	27
Neurotypical & non-disabled	72	23
NDD	28	9

## Ethics

This study was approved by the University of Glasgow's College of Medical, Veterinary and Life Sciences Research Ethics Committee (Approval number: 200220138). All participants provided informed consent and had no direct contact with researchers. Regardless, responses went through thorough deidentification and pseudonymisation.

## Analysis

Open responses underwent the six phases of reflexive thematic analysis (TA) proposed by Braun and Clarke (2022). Reflexive thematic analysis was favoured for the purposes of this study, as it can flexibly accommodate an inductive and theoretically independent approach to data, and there was little existing research in this area. Accordingly, TA centres participants' experiences and their contexts in the analysis, consistent with the study's experiential epistemological approach. The entire data corpus was reviewed repeatedly by CH to ensure familiarity. Subsequently, codes that reflected the content of the data were created and reviewed, before these were organised into themes of repeated and inter-related perspectives. Throughout this process, CH consulted with EN, who also reviewed and offered perspectives on the qualitative data corpus. Codes and themes were then repeatedly reviewed, defined, and paired with illustrative quotes identified from the data corpus.

## Reflexivity

Researcher reflexivity and transparency with regards to their positionality to a topic, and how this may influence all stages of the investigative process, is critical to the appropriate application of TA (Braun & Clarke, 2022). EN and CH are academic teaching staff at the University of Glasgow, with acknowledged expertise in neurodiversity (CH) and lecture capture (EN). Both EN and CH have an interest in accessibility and inclusion, whilst CH has lived experience of neurodivergence and disability. To acknowledge that they are not immune to culturally imposed biases and that personal interest could disrupt the truthful interpretation of participants' responses, CH engaged in a process of regular reflective logs during the familiarisation and analysis process.

Three main themes were extracted from the data, the first two of which each include two subthemes (see Table 3). These themes should be considered reciprocally connected. The first theme describes lecture recordings as "*an inclusive tool of learning*" that supports the needs of all students to optimise their immediate learning opportunities through adaptive and flexible engagement. The second theme identifies recordings as "*a flexible safety net*" that provides support beyond the immediate learning environment to recognise the student

**Table 3** Thematic structure

Themes	An inclusive tool for learning	A flexible safety net	Questioning assumptions and prototypes
Subthemes	Consolidation and preparation Functional flexibility	Demand flexibility Care & safety	

as a whole person and other dynamic systems within which they operate. The final theme discusses the inherent preconceptions of “ideal learning” present within education settings by “*questioning the assumptions and prototypes*” upon which learning design is grounded.

## An inclusive tool for learning

Participants described how recordings provided maximum access, adaptability, and opportunity for learning. Although this was more frequently shared by neurodivergent and disabled students, it was also shared by a significant number of neurotypical and non-disabled students. Recordings allowed students to “*plug the gap that live teaching leaves*” (woman, 18, disabled) by providing accessible and multi-tiered support for learning (a) as a tool for consolidation and preparation, or (b) by permitting functional flexibility that could be employed in a manner that best served diverse individual needs.

## Consolidation and preparation

Just over 40% of participants reported using lecture recordings explicitly to compliment and consolidate learning rather than replace attendance. Many that cited a need for revision did this immediately after attending a lecture in order to clarify points of ambiguity, to supplement live note-taking, or to create notes and study tools after and instead choosing to actively listen and engage with the live lecture.

*As a means of filling knowledge gaps. I will find the relevant sections and rewatch the content, making notes along the way. (Man, 20, NT)*

Information loss due to the intensive and competing demands of traditional live lecture formats was frequently cited as the compelling reason why students needed recordings for consolidation. The impact of information loss was potentially more consequential for some disciplines:

*Lectures, at least in my subject, set out to cover a wide range of complex information but there is only a very short time in which to do so and it is often difficult to follow. It's so easy to miss the name of a crucial text to follow up on or a critic/academic that has been influential in the field, and it is also very easy to lose track of key dates and pieces of context that could be useful later on. (Woman, 18, ND)*

And some were more susceptible to information loss due to circumstances outwith their control:

*Even if I attend a lecture, a low blood sugar during a lecture or my ADHD can mean I cannot focus or retain information. Using lecture recordings can allow me to review the material again. (Man, 22, ND & Disabled)*

Aside from unpredictable medical circumstances, cognitive demands inherent to the traditional lecture format were commonly cited by participants of all neurotypes and not only those whose labels are hallmarked by these challenges. “Zoning out”, becoming distracted, and struggling to process fast-paced speech were featured frequently.

*I rely on lip-reading quite a bit in order to process auditory input so when I have to type during lectures and cannot watch the lecturer speaking this causes me to miss*

*some things. Additionally, even the information I do get down I do not fully process so watching the recording helps me consolidate the lecture. (Woman, 19, ND)*

Participants shared their, sometimes elaborate, strategies to mitigate the challenges of information loss experienced in in-person lectures.

*I have the recording on one computer screen, a browser and my previous notes open on my second screen, and the lecture slides on my iPad to take notes on. I usually start playing the recording at 1.25 speed and pause when I need to. This means a 2 hour lecture usually lasts 3 to 4 hours, so I usually split it over a few days. (Man, 40, ND & Disabled)*

However, post-lecture consolidation was not the sole motivation reported by participants, and frequently, recordings were cited as a key tool for revision and preparation for later assessments and exams because “*sometimes it helps just to hear the concept explain by a person rather on text*” (Woman, 19, NT).

As well as being a key tool in the consolidation and revision practices of participants, the diverse manner in which recordings were used and the differing needs they met were evident.

## Functional flexibility

Although some participants shared that they preferred to simulate the experience of in-person attendance when using lecture recordings, this experience was supplemented by the functional flexibility that recordings allowed.

*I will let them play and follow along with the slides, taking notes how I would in a lecture. I also often pause to take extra notes when needed. (Woman, 21, NT)*

The significance of adapting pace by pausing, slowing down, speeding up, and using captions in the recordings was mentioned by 48% of participants and demonstrates how recordings were functionally adaptable to the needs of individual participants.

*In the ideal world, I have gone through the slides beforehand to take some notes, then I watch the recording on 1.5x speed and keep my hands busy (eg hand sewing something) so that I focus on listening. I will pause/rewind as needed and then edit my notes for clarity as the recording may clear up some understanding issues or tell me that something is more important. I can then use these notes to make flashcards for revision. (Woman, 29, ND & Disabled)*

A consistent sentiment was the perceived improvement in participant’s learning experiences due to this flexibility, with frequent mentions of learning being “*much easier*” and resulting in (at least in the qualitative experience of some participants) “*better learning*”. The opportunity of recordings to adapt to individual needs was perhaps best illustrated by participants who were multiply challenged by barriers to learning that traditional in-person lectures present:

*Recordings allow me to pause and write detailed notes, including expounding upon them with my own thoughts, ideas, or way of articulating something, and I can focus myself on one topic for the day rather than shifting gears constantly. I can position/contort myself in a way that helps me focussed which is typically not a way you want to be seated in public. I can wear clothes I don’t have to think about, I can take*



*breaks for resting, a walk, a shower, food or the bathroom any time, look something up online at any time. I can sometimes use subtitles so my auditory processing doesn't mean I miss things. (Woman, 20, ND)*

This highlighted that beyond functional flexibility and immediate benefits to learning, lecture recordings had a wider impact on the individual, their well-being, and lifestyle as discussed in the following theme.

## **A flexible safety net**

Alongside the functional flexibility described above, participants identified that lecture recordings served a broader purpose beyond the immediate learning context by providing a “*safety net*” for the individual more holistically. Given that no learning is done in isolation, participants shared the multifaceted micro and macro level factors that impact their learning opportunities and described how recordings contributed to this context. Overwhelmingly, lecture recordings provided a degree of flexibility to accommodate competing demands, to adapt to unavoidable circumstances, and to prioritise the care and safety of themselves and others. This was concisely described by one participant below but was a sentiment echoed in some way by nearly 50% of respondents.

*I use the recordings to allow myself to be flexible with my time. If I feel unable to go to a lecture, either because I am ill, tired, busy or just too overwhelmed, I do not need to feel stressed about missed content. I also find it reassuring to know that if I am struggling to focus in a lecture, I can always revisit it if needed (this actually encourages me to attend lectures as I do not need to be as stressed about them). (NB, 19, ND and Disabled).*

## **Demand flexibility**

Nearly 49% of participants shared that on occasion, they could not attend in-person lectures out of necessity and consequently needed recordings to stay abreast. All neurotypes cited the incompatibility of obligatory attendance alongside personal demands that are often necessary and immovable. The financial and productivity loss due to lengthy commutes was also a significant factor in balancing the cost and benefit of attendance especially when subject to epiphenomena like public transport disruption, strikes, and inclement weather.

*I will also use them if I am not up to going in that day as my commute means I often have to sacrifice 4 hours or more of my day for a 1 hour lecture. (Woman, 25, ND)*

Some participants also described frequently competing academic demands and being placed in impossible positions by universities themselves who do not provide recordings yet create timetable clashes. Lecture recordings allowed participants to navigate around and through both predictable and unpredictable challenges with the assurance that their learning would not be compromised. This assurance resulted in an alleviation of anxiety that for many students then promoted a readiness to learn when circumstances and opportunity aligned.

*I know they are they for when I have a particularly bad day, I don't have to have the extra worry of having to miss class on top of a bad mental health day. When you're struggling, you need the net of support so you can catch up later. (Woman, 32, ND)*

However, participants did recognise that despite the benefit of this safety net and its ability to adapt to lifestyle demands, losing opportunities for dynamic and interactive academic discussions and social interaction were a necessary cost, although one that did not outweigh the benefits.

*I like the sense of academic community of being in a physical lecture, but that pales in comparison to all the ways online recordings help - I can process them at my own pace, I can pause if I need to attend to something (like my blood sugar), I don't have to stress about missing lectures due to health or any complications. (24, ND & Disabled)*

Aside from broader and more external lifestyle factors, for participants who were neurodivergent, disabled, chronically ill, or living with mental health challenges, lecture recordings provided a level of flexibility that accommodated more intimately unpredictable aspects of their lives as described below.

## Care and safety

Participants frequently described how access to lecture recordings does or could ameliorate neurocognitive challenges, and mental and physical health risks within and outwith learning settings.

*I think the main advantage is making me less fearful of being sick and having to skip a class for physical or mental health reasons. I know that if I catch the flu, I don't have to force myself to campus in order to not fall behind. Lecture recordings to me means that having a bad day physically or mentally is not a death sentence; they are a reassurance that even if I'm too sick to go or if I struggle focusing in the lecture, I still have the same opportunity to learn the material on a better day. (Woman, 22, ND)*

For some, in-person attendance was arduous beyond the norm, and for others, it was potentially hazardous due to medical needs, or the lecture environment or people in it being triggering for their physical or mental health.

*I may be unable to attend a lecture (e.g. due to a low blood sugar meaning I cannot walk to the department) and the lecture recordings can ensure I don't miss content. (Man, 22, ND & Disabled)*

For some, commuting was not merely an expense of time and money as mentioned above, but also an expense of energy that burdened already depleted resources.

*I have to do labs in person, and I have a very little energy, so if i can reduce the number of trips to department then i need to do that any way I can. If I spend all my energy just getting to and from the department. (Woman, 22, Disabled)*

Neurodivergent participants were particularly susceptible to their learning being compromised by the social and sensory environments experienced within crowded lecture venues.

*The sensory issues of being in lecture halls often means that I miss sections from being distracted by my senses or I have difficulty processing what the lecturer is saying, sometimes quite substantially. (Non-binary, 20, ND & Disabled)*

But this was also experienced by participants with other mental or physical health challenges with specific concerns about pressurised social dynamics and wider social expectations and evaluations.

*On days when it feels like I can't face the world and don't want to be seen by other people it's really convenient. (Man, 20, Disabled)*

Ultimately, participants emphasised that recordings gave an opportunity to access their education in a way that balanced their need to occasionally prioritise self-care in order to optimise their learning.

*Because I struggle with executive disfunction, I struggle to feed myself properly so recorded lectures allow me to prioritise actually eating over attendance so that I am well fed enough to concentrate on the lecture and not on my hunger. (Woman, 20, ND).*

Importantly, able-bodied participants, and those who were not, all endorsed the need for other-care as well as self-care to protect the health of their peers, staff, and anyone vulnerable and immunocompromised.

*Good to have the option if you have to stay home - Covid is NOT over and I'd rather people not be punished for doing the right thing if they stay home with it (or anything infectious). (Woman, 35, ND & Disabled)*

## Questioning assumptions and prototypes

Regardless of their own need, nearly 30% of participants explicitly noted that recordings were a necessity to ensure equality and fair access to learning for all students, but particularly students with diverse needs.

*It levels the playing field between able bodied/ neurotypical students and those who aren't. Every student gains an advantage by having them available, but the most important thing is that those with disabilities are finally NOT at a disadvantage. (Woman, 29, ND & Disabled)*

Beyond surface descriptions of need for flexibility, there was a strong sentiment of rejecting anachronistic learning environments and assumptions of what both learning and learners should look like. A number of responses questioned the wisdom of conventional learning environments and particularly the assumption that long uninterrupted in-person lectures are ideal for optimal learning. One participant contrasted these traditional approaches with the flexibility of using lecture recordings thus:

*You get the same level of knowledge but with more opportunity to approach it at your own speed. It makes for actually beneficial learning instead of performative learning. (Woman, 25, ND)*

By describing traditional in-person lectures as “performative”, the participant seems to question who is best served by obligated physical attendance. Indeed, when asked to state what they perceive to be the disadvantages of providing recordings, several responses suggested that they believed teaching staff might feel “less valued” (Woman, 20, ND) and less

engaged in delivery if recordings resulted in reduced attendance. This could suggest a deprioritisation of student needs in favour of what the ideal learning environment “should” look like to educational institutions and/or individual educators.

The majority of participants with disabilities, who described access to recordings as being essential to their learning, also stated that it did not become their default, and physical attendance remained their first and motivating preference:

*I sometimes struggle to motivate myself to leave my room or do work at certain times. Live lectures are great for motivating me, as I thrive more when seeing other people and being able to converse with others – it’s more intellectually stimulating. However, on days where I’m low or feeling burnout, online would be my preference. (Woman, 20, ND)*

For some, physical attendance was in fact a strategically protective tool for well-being, yet recordings are a necessary tool in reserve:

*I try to go to live lectures. I am currently very much struggling with my mental health and worry that staying in and living recorded lectures will result in my mental health getting worse as I socially isolate myself further. So although I would prefer to use recordings, I remind myself that I HAVE to go and I paid for more than videos. (Woman, 35, ND & Disabled)*

The question of attendance and the impact of lecture recordings would have featured consistently when participants were asked to describe disadvantages. However, it was always discussed in the hypothetical as something that “may” or “might” happen, or something that had been “cited” by universities themselves as a response to not providing recordings. More than 25% of participants echoed some variation of “*I suppose it could make some students not bother to come to lectures?*” (Woman, 18, ND), and yet less than 1% of participants explicitly stated that they did not attend lectures and that they were “*less of a priority*” (Man, 21, ND) because recordings were available to them. Frustration was palpable in the responses of participants who rejected this hypothetical impact to attendance and the threat it poses to their access to learning. One participant describes this threat as “*infuriating*” (Woman, 21, ND & Disabled), and others expand thusly:

*What would it achieve to take away a helpful resource? That’s like arguing against sick leave because people wouldn’t come into work – they’re sick, they need the day off regardless of if you offer it to them or not so refusing to offer it just causes harm. Any argument that people would take the mick and not show up out of laziness inherently denies priority to people who need help in favour of a minority (that can’t even be known to exist, just assumed) that damages only themselves by choice. (Woman, 20, ND)*

*The modules which I lack lectures recordings for, I attend with equal frequency to the ones I have recordings for. That is, when I don’t attend it is due to my chronic illness, which is beyond my control. It feel frustrating and alienating to be denied access to these recordings because I should simply ‘make the effort to go’. (Woman, 19, ND & Disabled)*

The implicit ableism underpinning this idea of “*making an effort*” echoes earlier themes that identify a need for some participants to prioritise care and safety over attendance. Traditional lectures create an exclusionary, and on occasion, physically punishing experience for some due to both the physical environment of the space and the cognitive demands of the event itself.

*I have chronic pain which is triggered by lecture theatre seating as it is not ergonomic. I physically cannot sit in a lecture theatre for more than 2 hours per week without having severe pain management issues. If I sit on an ergonomic chair at home/ in the college library, I can watch lecture recordings and be a 'normal' student. (Woman, 29, ND & Disabled).*

For this participant, being a “normal” student is defined by having an accessible opportunity to learn and not contingent upon the conditions under which this learning takes place. This flawed assumption that learning is somehow contingent upon physical conditions is reinforced further by another participant who shares:

*Forcing me to attend in person does not mean I will learn - if I'm not well enough to be attending lectures in person, I'm not well enough to be learning. (Woman, 21, ND & Disabled).*

The traditional learning environment poses a number of known demands and challenges beyond the physical for students of all neurotypes, and those with and without disabilities. As previously identified, the sensory environment, social environment, and cognitive/attentional demands of traditional lecture delivery influenced participants' readiness and ability to learn and thus necessitated supplementation of in-person attendance with revision and additional note-taking.

In contrast to the assumption that accessing recordings may be a “lower stakes investment” alternative to attendance, it is clear that recordings as a learning tool pose new challenges and are rarely less effortful.

*Using lecture recordings does of course mean that I take longer on the lectures than if I was just attending in person. That being said, the extra time is not a result of the lecture recordings, and more just a symptom of my disability – it would take me extra time to read a page of information compared to a peer, as it takes me longer to process information. The extra time isn't a disadvantage of lecture recordings, but perhaps a disadvantage of lectures as a method of teaching. (Woman, 23, ND & Disabled)*

Indeed, more than 15% of participants specified that lecture recordings posed not only familiar challenges related to processing demands and sustaining attention for an entire lecture, but new and unique challenges to motivation, maintaining effective study habits, and most frequently to self-regulation.

*Can overly-rely on them, and they can feed into perfectionism e.g. if you are using them to create verbatim notes. (Woman, 19, ND & Disabled)*

Resonating through these accounts was an acknowledgement of the benefit of structure for all learners and the external regulation imposed by a timetable when it was compatible with a student's lifestyle and competing demands. Alongside the aforementioned accountability, however, there was an acknowledgement of the tension between external regulation and the need for the individual to accept personal responsibility and agency in their learning.

*They \*can\* let people fall into bad habits, but we're adults and need to be responsible for ourselves now (Woman, 19, ND)*

Finally, participants challenged the assumption that lecture recordings diminish in-person experiences but are in fact an essential and complimentary supplement to maximise

learning opportunities in spite of the possibility of extra effort. The diverse accounts of preferences, strategies, and methods of engaging with teaching reject the notion of there being prototypical students and prototypical methods of learning. One consistent thread that arose was a questioning of traditionally lengthy lectures as the predominant mode of delivery and an acknowledgement that recordings ameliorate the barriers that lectures can impose. This tension between tradition and progress is powerfully expressed by a participant thus:

*In this day, we should be capitalising on technology to deliver and maintain learning, not grasping onto historical methods in an attempt to prove something. (Man, 27, ND).*

## Discussion

Our analysis highlighted the need for flexibility, questioned traditional lecture efficacy, and viewed recordings as essential for inclusive learning despite self-regulation challenges. Notably, it calls attention to the frustration felt by neurodivergent and disabled students at the perceived threat to accessibility, and the value of lecture recordings irrespective of attendance patterns.

What emerges strongly from participants' responses is a desire to attend and an acknowledgement of the benefits of attendance, but a plea for understanding that the traditional lecture environment was not always the best place for them or their learning for a multitude of reasons. Whilst participants discussed whether attendance at long didactic lectures was the best environment to learn in, there were no calls to reduce in-person contact. In a similar vein, Podsiadlik (2023) investigated blended learning for those with specific learning disabilities and found that direct communication with an instructor was an important component for student success, that is, the online content was not enough without the follow-up, and participants in our study seemed to recognise this.

Our findings and our participants also do not support an uncritical view of lecture recordings. Students were aware that effective usage required self-discipline, not only through ensuring that they kept up with any missed lectures but also in the time that they spent on a single recording. Whilst participants did not express it in this way themselves, the manner in which many described using the recordings is reminiscent of MacKay's (2021) findings regarding the "lecturer as canon" with students focusing too heavily on the lecture as the sole source of information. However, in context of the clear impact on inclusivity and accessibility, we repeat Nordmann et al. (2020) call that the response to these issues should not be to remove recordings but to focus on developing generic study skills to use recordings effectively and to design assessments that encourage deep and authentic learning.

Anecdotally, a proposed solution to the issue of balancing concerns about attendance with inclusivity is to provide recordings for only those students with declared disabilities. The provision of lecture capture as an inclusive technology is perhaps best understood under the framework of Universal Design for Learning (UDL, Meyer et al., 2014). UDL proposes that rather than making accommodations for specific learners, the design of learning activities should allow for multiple ways of representing knowledge, demonstrating understanding, and engaging students. Although it is arguably a shallow interpretation of inclusive education principles (Wang, 2023), lecture capture aligns with UDL by providing

flexibility in how information is presented and how students can interact with that information, and so, in a climate in which there are calls to reduce the use of this technology, it is important to understand the full impact of such choices on *all* students. Whilst providing recordings for those with declared disabilities may seem inclusive, such a move would not support students who choose not to declare, those on the borderline of diagnostic criteria or without access to diagnosis, or those with lifestyle challenges that impact lecture attendance beyond recognised disabilities, such as caring responsibilities. The responses reveal the enormous impact that the provision of recordings (or not) had on these students' ability to maintain engagement. To provide recordings for only those with declared disabilities would be to compound disadvantage on the already disadvantaged.

Whilst our findings echo pre-Covid lecture capture literature, the pandemic has profoundly reshaped higher education and societal work patterns. Flexible and remote working is now common-place with only 8% of workers intending to return permanently to their place of work and 38% of those earning £40,000 or more (a bracket that would include the majority of academics) working hybrid (Office for National Statistics, 2022). Higher education is often criticised for not producing graduates with skills to succeed in the world of employment (Somerville, 2019). Transitioning between online and on-campus engagement is arguably now a crucial graduate skill.

Although our study supports concerns about the relationship between self-regulation and lecture recordings, it also provides multiple examples of students using lecture recordings to *maintain* engagement as a successful self-regulated learner. What it means to be an engaged employee has changed, and the same is true for students, and our learning environments, policies, and procedures should reflect that. There is an urgent need for a review of the current state of lecture capture policies as existing work was conducted on pre-Covid policies (e.g., Ibrahim et al., 2021; Nordmann & McGeorge, 2018) and so does not capture the reality of post-pandemic higher education. Based on our findings reported here, we argue strongly that the case for lecture capture as an inclusive technology should be *explicitly* embedded in all policies. Importantly, this call to inclusivity should not be confined to supporting learning disabilities such as dyslexia but rather highlight the wider impact of providing flexibility to neurodivergent and disabled students broadly defined, as well as those with caring responsibilities and the need to undertake paid employment.

Exact statistics on how many institutions currently have formal lecture capture systems do not seem to be available; however, in the most recent Jisc student digital experience survey (Jisc, 2023), 49% of students reported being provided with live streams whilst 76% had at least some access to recordings of live sessions. These figures are encouraging, but given the myriad of pressures facing institutions, educators, and students following the pandemic, in addition to more students identifying as neurodivergent or disabled, lecture capture cannot be viewed as an optional investment. UK higher education is in the midst of a funding crisis (Higher Education Policy Institute, 2023), and it may be tempting to argue that what limited resources there are may be better used elsewhere. However, given the broad support lecture capture can provide, particularly to those students who may otherwise be at risk of disengaging, we argue that this would be a false economy.

## Limitations and future directions

Although our study was exploratory and not designed for broad representation, it is worth noting the sample predominantly came from two elite Russell Group universities. Additionally, our sample was self-selected, and it is likely that students with stronger feelings

about the provision of recordings and/or highly salient experiences with lecture recordings will have responded. As is the case with much educational self-report research, our sample is also less likely to have representation from less engaged students and those with poorer self-regulation. Given the interaction between these skills and how students use and view lecture recordings, our results will inevitably have under-reported some of the negative effects of providing recordings.

For future research, we should better comprehend the impact of “**Functional flexibility**” in students’ use of recordings. Whilst there is some experimental research on the impact of pausing (Merkt et al., 2018) or adjusting playback speed (Murphy et al., 2022), there has been little work conducted on how these behaviours translate to ecologically valid settings of hour-long, multi-week courses and their impact on learning. Whilst many students report functional flexibility improved their learning experience, there is a vast literature on the failures of metacognition (Karpicke et al., 2009) with learners often choosing ineffective or even harmful. It is particularly important that we better understand the impact of such functional flexibility and how we can advise and support students to use recordings more effectively given that many neurodivergent and disabled students report relying on these features to help manage their conditions. Finally, there is also a clear need for an updated review of lecture capture policies and ensuing best practice recommendations to help support the inclusion of inclusivity at a policy level.

**Author contribution** Chiara Horlin: conceptualisation, methodology, formal analysis, investigation, resources, writing—original draft, and writing—review and editing. Barbora Hronska: investigation, writing—review & editing. Emily Nordmann: conceptualisation, methodology, formal analysis, investigation, resources, writing—original draft, and writing—review and editing, visualisation, and project management.

**Data Availability** The data that support the findings of this study are openly available on OSF at <https://doi.org/10.17605/OSF.IO/UE628>

## Declarations

**Conflict of interest** The authors declare no competing interests.

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