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Lectures in higher education: A 22-year systematic review

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Abstract

Large-scale lectures alongside sandstone buildings are two of the most romanticised facets of higher education. While the Latin root to lecture means 'to read' (*lectus* is the past participle of *legere*), its practice has evolved with technology. Using a systematic review methodology leveraging a clear search strategy, screening and PRISMA reporting for articles between 2000-2022, this study curates knowledge on the contemporary lecture to provide a clear evidence base for future educators to draw upon in curriculum and learning design. Using Braun and Clarke (2006)'s thematic analysis of 296 papers on lectures, we identified six key theme areas: defence and critiques, examination of types of lectures, pedagogical adaptions, use of supports, student motivations and influences, and comparative evaluations of lecture-based instruction. We identify conflation and explore the clarity of the university lecture. Importantly, we identify that as the face-to-face lecture decreases in popularity as a research subject, it increases in online and recorded lectures are being observed. While longer-scale analysis is needed to understand the impact of this evolution on student engagement, attendance, and learning, it is evident that conflation of the types of lectures is making this kind of analysis difficult. We offer a clear typology of lectures to support future researchers and practitioners to be consistent in the application of lecture-based instructional pedagogy.

Introduction

In the public imagination, university education is synonymous with lectures (French & Kennedy, 2017). There are strong historical reasons for this association. The current form of the lecture arose in the first European universities in the early 14th century (Haskins, 2002). Laurentius de Voltolina's painting from Bologna during this period is instantly recognisable as a lecture (see Figure 1). The instructor is positioned at the front, his sourcebook on the lectern, with students arranged in rows, either taking notes, talking, or sleeping.

Figure 1. A digital reproduction of Laurentius de Voltolina's painting depicting a University of Bologna fourteenth century lecture (Wikimedia Foundation, 2008).

Most lectures in early universities usually consisted of the instructor reading directly from a sourcebook. The term 'lecture' itself – from the Latin lectus or 'to read' (*lectus* is the past participle of *legere*) – is likely derived from this practice. Such a practice has become increasingly rare since the invention of the printing press made books accessible to individuals and not merely well-resourced institutions such as Churches and Universities, although its translation to replacement of all practice was considerably slow in some parts of the world; with lecturers reading to students evident in the twentieth century (Brookfield et al., 2023). Much more recently, the rise of the internet has seen different types of lectures evolve (Kekkonen-Moneta & Moneta, 2002). In a contemporary university, lectures now occur online, face-to-face, synchronous, and asynchronous. Not only have lectures evolved in response to the latest technology and the affordances that they provide, but there is a substantial body of research on such adaptions to the lecture (e.g., Bredow et al., 2021; Elavsky et al., 2011; George et al., 2013). Closely related to studies of different types of lectures are studies on the adaptation of the lecture more generally. Contemporary versions of the lecture can include significant interaction with the audience. This interaction goes well beyond the audience merely asking questions of the lecturer and, in many circumstances, leverages hardware and/or software specifically designed to facilitate such interaction or cooperation, although this is not new pedagogically (e.g., Slavin, 1980). Lectures have also adapted to make systematic use of social media or podcasts. The purpose of some lecture variations has moved away from content delivery to being designed to build a sense of community, professional identity or connection between peers. Other forms attempt to model behaviour or demonstrate specific techniques. Often, the principal aim of these variations is to increase student engagement – or to support students to affectively, cognitively, and behaviourally connect with content through some meaningful learning experience (Kelly, 2012); although more recently understanding its effects on student belonging (Crawford et al., 2024a). This is to combat what has become a consistent and conspicuous problem with lectures in the modern university: a decline in student attendance.

Various studies have discussed the role of attendance in student performance (Credé et al., 2010) and the changing nature of student attendance (Kelly, 2012; Massingham & Herrington, 2006). There seems to be a form of consensus in the literature that this decline is to be bemoaned – that students who are engaged and attend lectures perform better than students who are disengaged and do not attend. However, this position is not universally supported by the literature. As we go on to discuss, the relationship between attendance and learning in lectures is contested (e.g., Clark et al., 2011; Nyatanga & Mukorera, 2019; Obiosa, 2020).

Perhaps because of its long association with university instruction, the very term lecture can often take on a political dimension (e.g., Webster, 2015). This mostly occurs in public defences of the lecture or institutional reactions to attempts to deemphasise lectures as the dominant form of instruction. While not as overtly emotional or political, echoes of this can be seen in conceptual or philosophical treatments of lectures in the literature. These papers either defend or criticise lectures rather than present a disinterested analysis of the benefits and challenges of the lecture as an instructional format (e.g., Webster, 2015). Interestingly, general defences tend not to examine the effectiveness of lectures as a method for discipline skills or knowledge, but either their efficiency or their ability to support other aspects of learning, such as generic skills (e.g., active listening, notetaking) or positive social aspects (e.g., development of community). Similarly, general critiques of lectures tend also to be conceptual, arguing that the format does not support some other desirable characteristic (e.g., student-centredness) rather than directly criticising the ability of lectures to effectively support student learning. These also are not new arguments, with McMann (1979, p. 270) writing in defence of the lecture against "the new social studies" in the late 1970s.

What is clear from a current scan of the literature is the general lack of agreed understanding of what a lecture is, is not, and could be. Our paper offers an objective response by examining the effectiveness or efficacy of lectures using a systematic review method. The purpose of this study is to address the following research question: What is currently known about the instructional pedagogy of the lecture in higher education? To address this, we leverage the PRISMA approach to explore the current knowledge on the practice of lectures in higher education. Following the method

explication of the present study, we present a summary of themes identified through thematic analysis and continue to discuss what this knowledge base means for lectures in higher education. We take a post-pandemic view to this discussion but recognise that the COVID-19 pandemic has likely had a role in shifting the current dialogue on contemporary higher education lectures. We conclude by discussing the implications of this work. Further, we provide the conceptual resources to support a nuanced discussion of the place of different types of lectures in the contemporary university by offering a clear set of terms for the categorisation of current variations.

Method

Search strategy

The search strategy comprised a single search phrase conducted over multiple education-based databases based on a previous systematic literature review (Ives & Castillo-Montoya, 2020): APA PsycInfo, ERIC (through EBSCO*Host*), and Academic Search Ultimate (through EBSCO*Host*). The search phrase selected was restricted to between 2000 and 2021, English, and academic journals only: *Lecture (title)* AND "*higher education" (full-text)*. The simplicity of this search was possible as lectures are a distinctive concept in higher education, with scholars likely to only refer to the lecture concept by that name. Some studies that discussed alternatives to lectures (e.g., flipped or blended learning) would have been excluded from the study unless they explicitly discussed lectures. The aim of this research is focused on understanding current assessments of lecture-based instruction, and as such, it was considered appropriate to exclude alternative practices that did not explicitly discuss lectures. There were 1,832 results identified: APA PsycInfo (194 results), ERIC (1,149 results), and Academic Search Ultimate (489 results). After duplicates were removed, 1,310 were screened by the authors. An additional manual search of Google Scholar was conducted, viewing the first ten pages of results, with no new manuscripts identified.

Selection procedure and quality assessment

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA: Moher et al., 2009) statement was used for the presentation of search results and selection (see Figure 2). A single screening of the titles and abstract was completed to ensure manuscripts were: a) based primarily on lectures and b) situated in higher education. This resulted in the exclusion of 387 manuscripts. A quality decision was made to exclude all manuscripts (n = 629) that were not in the top 25 per cent of Scopus Education rankings (Q1). This was to support a deeper analysis of the highest-quality articles within the study. Following a full-text review, 20 manuscripts were excluded as out of scope (e.g., not higher education, discussed 'lecture-based courses' instead of lectures). A snowball search of the final sample was conducted to ensure no additional articles were missed (Bae et al., 2021). 21 manuscripts were identified. However, eight were duplicates, and 13 were not Scopus Education Q1 manuscripts. The final sample included 294 manuscripts.

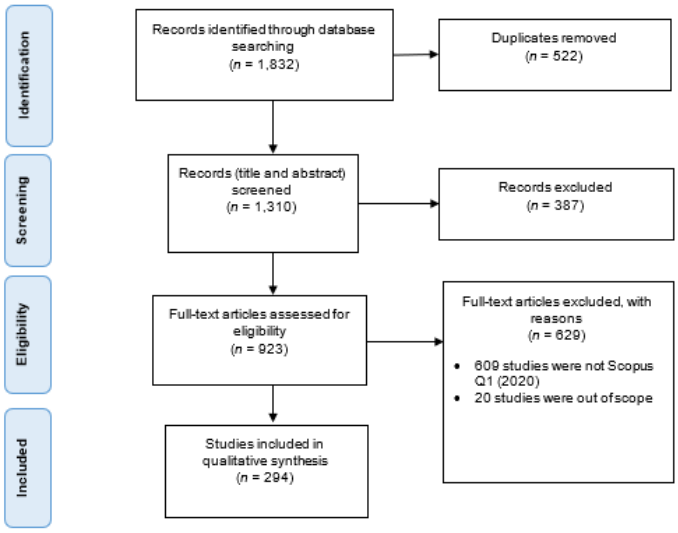

Figure 2. PRISMA statement.

Thematic analysis

The authors conducted a thematic analysis using Braun and Clarke's (2006) approach. To do so, the lead author became familiar with each paper. This occurred through the process of screening and full-text reviewers, where the manuscripts were reviewed multiple times prior to their final inclusion. Initial data coding occurred at the point of full-text reviews, where manuscripts determined to be included were assessed for their initial coding themes. The thematic review was conducted by sensemaking across the initial codes, grouping and ungrouping to generate collective meaning across codes. Each theme was then defined and named, with a write-up conducted for each theme individually, given the size of studies included after a re-review of the manuscripts in that sample. Due to the volume of papers on the topic, not all sources are referenced in each theme, with key subthemes and examples extracted from the sample.

Bibliometric summary

There were 68 top-tier journals that published at least one manuscript included in the final sample; of these, only ten journals feature ten or more publications (see Table 1), representing almost half (48.8%) of the final sample. Over the 22-year period of this review, there was a consistent incline in manuscripts on lectures in higher education across Q1 (divided across the Top 10 as per Table 1, and the balance of Q1s) and non-Q1 publications (see Figure 3).

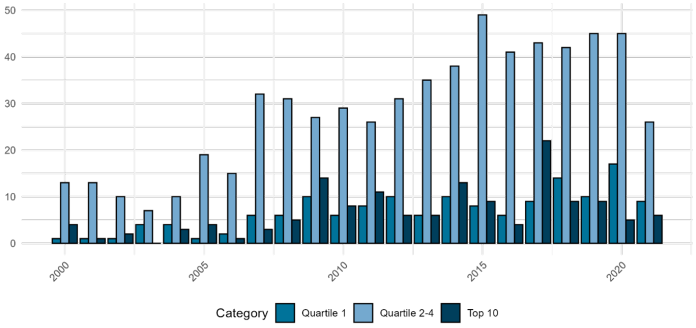

Figure 3. 22 Years of higher education lecture publications.

In 2017, eight manuscripts stemmed from a Communication Education forum on lectures (see Mazer & Hess, 2017), resulting in a skew in that year.

Table 1. Journals with more than 10 manuscripts in the final sample.

Source	n
Computers & Education	24
Australasian Journal of Educational Technology	19
British Journal of Educational Technology	16
Innovations in Education & Teaching International	15
Medical Teacher	14
Active Learning in Higher Education	13
Journal of Chemical Education	12
Communication Education	11
Interactive Technology and Smart Education	10
Journal of Computer Assisted Learning	10

Results

Through the thematic analysis, broad themes were identified using Braun and Clarke's (2006) method. The aim was to, given the size of the final volume, identify key themes within the sample to enable deeper analysis for each set of manuscripts within the sub-samples. This resulted in the following initial themes (see Figure 4): student-based (student bring-your-own-device, attendance and motivation, cognitive load), pedagogical reviews (critique or defence of lectures), adaption to traditional lectures, modality evaluation (didactic lectures, recorded lectures and lecture capture, online lectures), teacher supports (pre-learning materials, note-taking) and comparison studies (e.g., traditional lectures and alternate models). In defining these themes, manuscripts that appeared in the final sample for themes had to have a specific focus on the theme. For example, in the theme of student support in the manuscripts, each had an objective to explore a particular support rather than a peripheral mention of student support in a broader study.

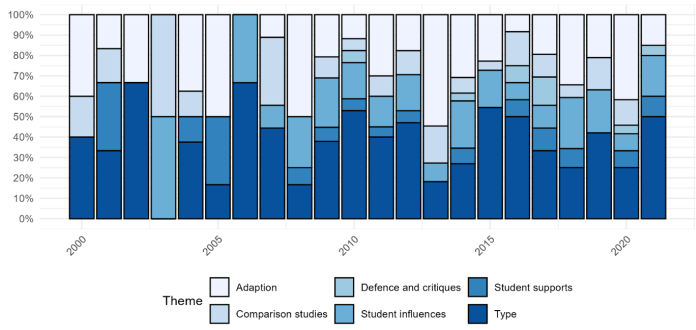

Figure 4. Distribution of themes over the 22-year period.

The defence and critique of lectures

In the sample, there were five formal critiques of the lecture and five defences. Those that defended the role of the lecture often took deep philosophical perspectives. Some key defences documented included the experiential and real-world nature of a quality lecture (Belenkinsop et al., 2016), highlighting that lectures can provide context and structure for a unit of study, create opportunities for sustained lecturer narrative, can motivate and challenge students, can promote skills such as note-taking and active listening, for students to be made aware of emergent research, offer a cost-effective teaching offering, and can create a communal sense of understanding and community (French & Kennedy, 2017). French and Kennedy (2017) also highlight the need for more innovative approaches to lecturing. Fulford and Mahon (2020) also comment that lectures are not simply a practice of content dissemination but a mode of address where students are invited (or required) to respond, a practice argued as essential for a student's identity, their being, and their becoming. Nordmann et al. (2021) take a different perspective and argue that the post-pandemic push for the reduction or abolition of lectures is equally as unhelpful as arguing for lectures as a learning default. In their case, lectures have a specific instructional and pedagogical value that, at times, can be the most efficient and effective modality in a given context.

In contrast, there were some explicit critiques of the lecture. For example, in a paper titled 'The lecture is dead, long live the e-lecture', Folley (2010) presents that students are increasingly seeking self-directed learning opportunities to assess the relevance of the lecture content to their assignments. Students see less relevance to lectures as they progress and increasingly prefer alternatives. Stearns's (2017) work somewhat confirms this position by arguing that active learning and student-centredness are not feasible within traditional and passive lecture environments. One possible observation from the defences and critiques of lectures, however, was their one-sided academic nature. Each manuscript typically took a particular angle to argue in favour of or opposition to the traditional lecture. As the reader will see further, while many manuscripts do speak to strengths, weaknesses, or alternatives to the traditional lecture, most tend to take a more balanced position.

The types of lectures

Almost half of all manuscripts specifically discussed the pedagogy, efficacy, or practical approaches to a specific form of lecture delivery (n = 125, 42.5%). The studies in this theme were not those that made peripheral mentions of a delivery modality, but rather those which studied and evaluated that modality. Across the sample, three key types emerged: recorded lectures (n = 67), face-to-face lectures (n = 34), and online lectures (n = 24). Figure 5 highlights how the sector has changed over time in its research to a progressive decline in face-to-face research, a temporarily heightened online lecture environment, and a consistent incline in studies on recording and recorded lectures. The scaling to 100 percent per year does, however, miss that there were more manuscripts published in later years (see Figure 3), but shows a representation of the research published in that year. Discussion in this section remains limited, as the emergent conversations within these studies are typically addressed in future sections.

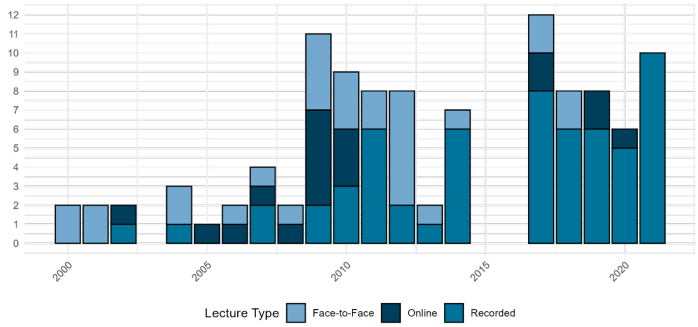

Figure 5. Distribution of lecture modality over years.

Face-to-face lectures. The studies on face-to-face lectures were commonly oriented towards incremental improvements to the speaking, slide decks, and language used or curated by the lecturer. For example, studies explored performance differences in how lecturers vocalise photography (Hallewell & Lackovic, 2017), academics after public speaking training (Mowbray & Perry, 2015), using personal pronouns (Fortanet, 2004; Yeo & Ting, 2014), using organisational cues (Titsworth, 2001), and using laughter (Nesi, 2012). One study identified that lecturers deployed different discursive decisions in small and large lecture classes (Lee, 2009). There tended not to be extensive innovation but rather an incremental improvement to the existing model of teaching, which is not surprising for a mature method of teaching.

Online lectures. Online lectures, or lectures delivered synchronously online, were discussed for their incremental improvements also, with some commentary on more advanced innovation in this context. Incremental improvements discussed included synchronous annotation and text (Debuse et al., 2009; Grünewald et al., 2015) or larger changes like the integration of communities of inquiry (d'Alessio et al., 2019). Most studies focused on student engagement and their usage of this modality of learning. However, many used inconsistent language as to their lecture type, including e-lectures, online lectures, video lectures, virtual lectures, and web lectures. There is perhaps a need for a clearer pedagogical perspective on online lectures and the evidence surrounding quality online lecture practices, which are uniquely different from their face-to-face counterpart.

Recorded lectures. Asynchronous recorded lectures occupied a large part of the sample in more recent years seeing significant growth in the use of the recorded lecture (particularly in the 2020-2021 COVID-19 years). The studies on recorded lectures highlighted greater commentary on optimal practices. However, these were typically discussed in isolation. For example, the effects of instructor facial expressions on student learning (Wang et al., 2019), instructor gestures on student learning (Pi et al., 2017a, 2017b), and contradictory understandings of lecture spaces by staff and students (MacKay, 2019) were all explored independently. These studies, along with many others, seem to begin the indicative pedagogy of recorded lectures. However, few studies took integrated perspectives on the recorded lecture. The somewhat systematic review of lecture recordings (O'Callaghan et al., 2017) begins to point to useful practices within the recorded lecture space, yet their recommendations tend to orient towards institutional practices rather than pedagogy. For example, the concluding comments of this work are oriented towards ensuring students are trained in technology for learning use, lecturers are educated on the benefit and use of recorded lectures, and institutions support the technological practice. While these are useful propositions, there is perhaps greater theoretical positioning needed for the recorded lecture pedagogy prior to assuring what is being assessed or evaluated for performance.

How teachers adapt lectures. Perhaps to no surprise, studies that focus on the adaptation of lectures were the second most prominent by size (n = 89, 30.1%). To be clear, these studies tended not to prioritise evaluation within a specific lecture modality (e.g., face-to-face), but rather speak more holistically to the instructional method of lectures. Many studies spoke to general adaptation (n = 42, 47.2% of the theme), such as time of day, including images or movie clips, and reviewing the semiotics of slides. There were repeated references to audience response systems (n = 11), developing peer interaction and community (n = 9), using podcasts (n = 8), low-level artificial intelligence support including learning analytics (n = 6), social media (n = 5), clickers (n = 5), and gamified learning (n = 3).

Audience Response Systems. The sample highlighted a series of academics embedding audience response systems into traditional lecture formats to enhance interactivity and autonomy. These were typically in the form of voting to choose elective content in the lecture (e.g., Grund & Tulis, 2020) or to engage synchronously with questions and answers using a student device (Abdulla, 2018). Studies tended to conclude, as early as 2004 (Draper & Brown, 2004), that providing students with choice in content or enabling the lecturer to track student conceptual understanding in real-time fostered higher engagement, more targeted teaching, and higher end-of-semester results. In an early review on the topic, Simpson and Oliver (2006) highlight that their efficacy depends in part on how teaching staff use the tools to guide learning and that feedback should be embedded into the process (e.g., after voting or after content selection) to support sustained engagement.

Developing community and peer connection. Peer learning, communities of practice, and communities of inquiry were discussed in some lecture-based studies. The goal of which was typically to support active learning (Tomkin et al., 2019), support student learning generally (Luo et al., 2016), and distribute learning (Risko et al., 2013). In one introductory physics unit, students, when afforded opportunities to have peer discussions, tended to discuss (in order of prevalence) content knowledge, metaconceptual comments, practical issues, and set up future discussions (Leinonen et al., 2017). The individual students who addressed peer content-related questions and the groups who had a higher volume of content-related discussions went on to perform better in tests. The use of collaborative and interactive learning was discussed briefly in many studies, but there were only a small number of manuscripts where this was an explicit focus.

Using Podcasts and Social Media. Social media (particularly Twitter and Facebook) were used to support higher degrees of active learning and engagement in lectures (e.g., Elavsky et al., 2011; George et al., 2013). In a study of 321 freshman US students, students who used a class-level Facebook group performed better in the end-of-semester grades and tended to have a positive attitude toward using it in class (Bowman & Akcaoglu, 2014). Podcasting was also used to supplement the learning content of lectures as a primer (Popova et al., 2014) and after class (Jiménez-Castillo et al., 2017). The effective integration of podcasts with lecture content supported higher learning of new knowledge. However, there was limited evidence of podcasts within lectures like social media usage.

Embedding forms of Artificial Intelligence. In the latter half of the sample by year, artificial intelligence supports increased in usage (and publication). Many of these were designed to support student resistance to common practices within lectures (e.g., asking questions when unsure). For example, one study used robotic question support (Shimaya et al., 2021), and another used automatic emotional recognition (Tonguc & Ozkara, 2020). These were also used to embed automatic lecture summarisation (Shimada et al., 2018) and augmented reality-informed feedback (Zarraonandia et al., 2013). Although this area has progressed significantly, many scholars indicated the current limitations of these systems at the time of their publishing. For example, Zarraonandia et al. (2013) argued that a head-mounted augmented reality display is obtrusive to a seamless lecture experience.

Student support to succeed in lectures

Student support to succeed in lectures was represented through 20 manuscripts (6.8%). In further examination, two key types of support were embedded into lecture-based studies: provision of pre-learning materials (30%) and notetaking during lectures (70%).

Lecture notetaking. There was a series of studies discussing the efficacy of note-taking during lectures. Chen (2021), for example, highlighted that students tended to emphasise writing key points they find significant in their note-taking, followed by comparing missing writing to peer's notes and copying important notes, using the lecture notes to organise the topics to write notes against, writing verbatim lecturer speech, and elaborating on lecturer comments with examples or homophones.

Several of the studies focused on student performance (e.g., more complete notes, higher word volumes, quality of notes) and preferences. This included key findings that undistracted laptop notetakers outperformed longhand notetaking (Flanigan & Titsworth, 2020), notetakers were more effective when partial and full slide decks were not provided (Kim, 2018; Machida et al., 2018), although Aguilar-Roca et al. (2012) provide evidence that laptop-based notetaking resulted in lower performance. Students also found it easier to take notes digitally (van der Velden, 2020). When reflecting on lecturer influence, lecturer organisational cues and the use of immediacy supported higher-quality note-taking (Huxham, 2010; Titsworth & Kiewra, 2004). Lecture pace also affected student performance (Bui & Myerson, 2014).

Pre-learning materials. The provision of pre-learning materials – often embedded in flipped or blended curriculum – was discussed as a mechanism to enhance the efficacy of existing lectures. Evans et al. (2021) found that when students were provided low-stakes pre-lecture quizzes, students were incentivised to attend and engage in lectures. In a similar study, Grabe and Christopherson (2008) provided online pre-lecture resources and saw that when students engaged with pre-lecture notes, their performance in the three exams of the subject improved, but engagement with pre-learning notes only outperformed attendance in examination at the end of the third module: highlighting mixed results. Students also tended to review complete lecture notes within two days of the lecture rather than in the two days prior to the exam. This finding was consistent with Kinsella et al. (2017), who identified that pre-learning materials, although designed as pre-lecture content, were regularly (re)engaged with after the associated lecture.

Student motivations and influences

There were 55 manuscripts in the sample that discussed key student drivers of engagement (or disengagement) with lectures (18.7%). These were observable from three subtheme groupings: use of student technology in lectures, attendance, and student cognitive capacity in lectures.

Student technology use. While students in the original fourteenth-century lectures recorded notes on parchment or vellum, increasingly, students now are engaging in mobiles, laptops, and tablets to take notes. Roberts and Rees (2014) identified that in one Australian lecture, 66 per cent of students used a mobile device in their lecture to type notes and access lecture slides. Some academics saw this as an opportunity to increase interactivity in didactic settings (Gan & Balakrishnan, 2014), and others introduced 'laptop-free zone' trials (Aguilar-Roca et al., 2012). There does seem to be conflict, however, in students being on- and off-task when using technology. Ragan et al. (2014) highlights students were off-task two-thirds of the time, whereas Roberts and Rees (2014) articulate the opposite. Similar to the evidence on note-taking, there seems to be continued conflicting evidence on the role that technology plays in supporting learning against paper and pen methods (at least in the lecture context).

Student attendance. When coding the papers within the student influence thematic area, a vast number of these were related to unpacking student attendance and motivation. There seemed to be a general consensus that when students were motivated, attended, and engaged, they also performed better and were more satisfied (e.g., Clark et al., 2011; Nyatanga & Mukorera, 2019; Obiosa, 2020). However, this was not universal. For example, nonattendance had no effect on programming exam performance in one study (Veerasamy et al., 2018). Many studies referred to the general decline in attendance over the semester (Brennan et al., 2019; Mattick et al., 2007). Some highlighted the use of supplementary materials that equally supported student

learning compared to face-to-face attendance (Meehan & McCallig, 2018). This finding was congruent with Bos et al. (2016) who demonstrated no significant exam performance difference between students attending by recording or in-person in a psychology course. Yet, Brennan et al. (2019), in an analysis of 'richness' and 'evenness' behaviours in 255 courses, identified that students considered 'present' was significantly higher in online classes than in their face-to-face equivalents.

In examining the motivations for attending, Forsgren et al. (2021) found in qualitative analysis of 131 students' open-ended question answers that vivid lectures, multisensory experiences, opportunities for understanding key points of the subject, and the offer of a structured 'shortcut' to learning were reasons for attending. The misalignment to time commitments or learning pace, lecturers being difficult to understand, multiple lecturers may cause confusion by highlighting different arguments, and personal life constraints were reasons to non-attendance. Motivational predictors of situational interest in lectures included novelty, cognitive activation, perceived utility, individual interest, and perceptions of the teacher (e.g., enthusiasm, approachability, and expertise: Quinlan, 2019). However, these were argued to change over the course of a semester (Moss et al., 2015).
Student cognition. Student cognitive load was discussed as a key consideration regarding the format of instructional lecture content. In video lectures, cognitive load changed across declarative and procedural knowledge with instructor visibility increasing cognitive load when learning procedural knowledge only, with instructor visuals being effective in declarative knowledge instruction (Hong et al., 2018). Costley et al. (2012) offer an extension of this finding articulating that instructors need to support students to deploy viewing strategies that emphasise the right kind of load. That is, germane load (or cognitive processing that contributes to learning) contrasted with extraneous load (or cognitive processing that does not contribute to learning). Pre-lecture resources were used as one response (Seery & Donnelly, 2012).

Table 2. Summary of key comparison studies.

Author	Method	Key variables	Key Findings
Brallier et al. (2007)	Quasi-experimental analysis of exam performance with undergraduate sociology students (n = 139).	Demographic and historical academic effects on exam performance.	Online courses were affected more significantly by race-based differences than lecture-based courses.
Wijnen et al. (2017)	Quasi-experimental study with undergraduate law students (n = 338).	Information processing, student regulation (self, external, and lack of), self-study time.	Problem-based learning supported higher rates of deep and stepwise processing, but not concrete processing, than lectures. Students experienced higher self-regulation and external regulation in problem-based learning over lectures. Self-study time was higher in lecture-based courses.
Moneta and Kekkonen-Moneta (2007)	Survey with undergraduate computing students (n = 414).	Student intrinsic and extrinsic engagement, negative affect.	ELearning modules enabled higher levels of intrinsic motivation, equivalent extrinsic motivation, and higher negative affect than lectures.
Savoy et al. (2009)	Quasi-experimental survey with undergraduate engineering course students (n = 62).	Information retention, student preference.	Lectures with engaging PowerPoint presentations were preferred by students over didactic lectures, but in didactic lectures students retained 15 percent more information.
Dalsgaard and Godsk (2007)	Quantitative study with postgraduate students (n = 14).	Student achievement, student preference.	Problem-based blended learning supported higher student achievement than lectures, and students preferred the interactive learning environment over lectures.
Peroz et al. (2009)	Randomised control trial with pre-clinical dental students (n = 85).	Knowledge acquisition, student enjoyment.	Computer assisted learning was more preferrable than traditional lectures, with short-term learning higher as an outcome of lectures and medium-term learning showing no differences.
Pearce and Scutter (2010)	Survey with undergraduate health science students (n = 1,112).	Attendance, student preference.	Podcasting and mLearning offered an alternative to lectures, but had limited effect on attendance, particular with ESL student.
Wijnia et al. (2011)	Quasi-experimental survey with undergraduate psychology students – lecture (n = 117) and problem-based learning (n = 126) environments. Focus groups (n = 14)	Student competence, autonomous motivation, mandatory attendance, student uncertainty.	Problem-based learning supported higher student competence than lecture-based learning, but not higher autonomous motivation. Mandatory attendance and uncertainty affected student motivation.
O'Bannon et al. (2011)	Quasi-experimental survey with technology students (n = 69).	Student achievement, student preference.	Podcasts had no significant effect on student achievement over lectures, although students preferred to podcast over attending lectures. Students disagreed that one should replace the other.
Grimley et al. (2012)	Quasi-experimental survey with undergraduate students (n = 108)	Student experience, student preference.	Computer games offered students greater challenge and higher value than lectures, but students tended to want to do something else. High achieving students reported preferring lectures to games, and low achieving students had better experiences in games.
Gupta and Saks (2013)	Quantitative survey with undergraduate medical students (n = 213).	Attendance, first and second year differences.	Recorded lectures were attended less by first year students than on-campus lectures, but second year students attended them equally.
Maher et al. (2013)	Quasi-experimental pre- post-test survey with undergraduate medical students (n = 216).	Student achievement.	Web-based lectures had the same level of student achievement gains (21% higher test scores) as on-campus lectures.
Conway (2014)	Quasi-experimental study with health science students (n = 576).	Exam results, student achievement.	Guided inquiry learning and students with guided and lecture-based learning had higher achievement and results than lecture-based learners.
Alluri et al. (2016)	Randomised control trial including pre-, post-, and post-delayed tests with medical students (n = 20).	Student achievement	Simulation and lectures enabled higher achievement, however, only simulation-based students showed improvement in the immediate post-test and delayed post-test.
Lucieer et al. (2015)	Quantitative survey with undergraduate medical students (n = 384).	Self-regulated learning.	Self-regulated learning experienced a decline over the medical studies, regardless of lecture-based or problem-based learning.
Tang et al. (2017)	Quasi-experimental study with undergraduate health science students (n = 95).	Student motivation, student skills, comprehension, communication skills, clinical thinking, student achievement.	Flipped classrooms were seen to support higher student achievement, motivation, comprehension, communication, and clinical skills than lectures. However, students preferred lectures and reported feeling higher pressure in flipped classrooms.
Gustin et al. (2018)	Quasi-experimental study with undergraduate medical students (n = 1,394).	Student perceptions of learning, deep learning.	Problem-based learning and integrated curricula (including lectures) supported student learning than lecture-based learning.
Liu et al. (2018)	Quasi-experimental pre- and post- test survey with X undergraduate chemistry students (n = 166).	Extrinsic motivation, sex.	Flipped classrooms supported higher extrinsic motivation for students, but student sex had no effect between lectures and flipped classrooms.
Bolden et al. (2019)	Quasi-experimental survey with undergraduate students (n = 309).	Student active engagement, information processing, and attention.	Small classrooms supported higher student engagement and meaningful information processing, but lectures supported deeper processing, greater understanding, and higher attention.
Opdecam and Everaert (2019)	Eight-year study using institutional datasets on student satisfaction, performance, and selection.	Learning outcomes, student choice, student satisfaction.	Team learning had a larger effect on learning outcomes than lecture-based learning, although the majority preferred to choose lectures, and satisfaction was comparable.
Kay et al. (2019)	Quantitative survey with undergraduate computing students (n = 103).	Social presence, cognitive presence, and learning performance.	Active learning supported the highest overall teaching, social, and cognitive presence, compared to flipped learning and lecture-based learning.
Kestin et al. (2020)	Quasi-experimental survey with undergraduate physics students (n = 110).	Student learning, student enjoyment.	Online lecture demonstrations enabled higher student learning and student enjoyment than on-campus lectures.
Sudarmika et al. (2020)	Quasi-experimental study with undergraduate nursing students (n = 72).	Student achievement, student character	Group discussion-based flipped classrooms showed higher student achievement and student character than lecture-based learning.

Comparing efficacy of lecture-based learning

There were 23 direct comparison studies identified in the sample, providing empirical evaluations of lectures versus alternatives (e.g., online lectures, recorded lectures, problem-based learning, podcasts, flipped learning, blended learning, computer-assisted learning). There was inconsistency across the results series. However, there were some key insights that were true of most studies (see Table 2). Lecture-based learning, on balance, tended to support poorer student motivation than alternatives. This was particularly true of those with active learning components, and in supporting external motivation. Student achievement (e.g., grades, exam results, passing subjects) was higher in lecture alternatives such as simulation, flipped classrooms, and guided inquiry. Short-term knowledge acquisition was higher in lecture-based environments, but there was no significant difference in longer-term knowledge retention. Yet, student enjoyment and student preferences had far more mixed results with several studies highlighting that students preferred lectures, despite the majority of studies reporting students perform worse in lecture-based studies.

Discussion

In addition to the manuscript-specific themes identified during the thematic analysis, there were three key areas that emerged with conflict. The first was the terminology associated with lectures. To support clarity in future work that reviews the efficacy of specific styles of lectures, we offer a typology of modality and pedagogy using the terms commonly expressed across the sample. We offer perhaps a more contentious view of recorded lectures and lecture recordings in the following section and seek to elaborate on the role of recordings in contemporary higher education. We also highlight a key challenge with the incongruence of evidence used to support or refute the value of lectures and offer some solutions for future researchers.

A typology of lectures

Across the sample studies, there was general confusion in the terminology for different lectures, including lecture, didactic lecture, digital lecture, e-lecture, face-to-face

lecture, flipped lecture, online lecture, recorded lecture, video lecture, and more; and we have contributed to that ambiguity (Crawford et al., 2024b). We propose as a solution a series of terms that were most prevalently used across the literature alongside clear definitions for each of these (Table 3). A lecture, to be clear, is instruction designed to provide students with an awareness of subject knowledge through conversation (typically unidirectional conversation).

Table 3: Typology of lecture modes.

Modality	Definition
Face-to-face lecture	A lecture that is physically proximate, in-person, and typically conducted in a lecture theatre.
Online lecture	A lecture that is conducted synchronously through use of educational technology or videoconferencing software.
Lecture recording	A recording of a lecture where the recording is a secondary purpose.
Recorded lecture	A lecture that is conducted and filmed for the primary purpose of present or future viewing.

There were also observable differences in the pedagogical approaches taken to lectures. A key difference between modes and pedagogies is that some pedagogies may overlap (e.g., it is possible to have a synchronous didactic lecture). Table 4 provides a summary of the terms used throughout the sample and definitions proposed for each.

Table 4: Typology of lecture pedagogies.

Pedagogy	Definition
Asynchronous lecture	A lecture developed in advance of the time when students will view it.
Demonstration lecture	A lecture where the lecturer presents knowledge and proceeds to complete a limited-interaction practical demonstration.
Didactic lecture	A lecture where the lecturer is primarily speaking *at* the audience with limited, if any, opportunities for engagement.
Flipped lecture	A lecture that has the primary purpose of instruction preceding a workshop or tutorial.
Interactive lecture	A lecture where there are short periods of instruction followed with breakout opportunities for students to work on the lecture content.
Lectorial	A lecture-tutorial hybrid where the lecturer provides a brief didactic lecture and follows this with tutorial-style activities.
Synchronous lecture	A lecture presented while students are present and observing the lecture.

The typologies, while discrete, should allow most subtypes of lecture terminologies to be categorised within. For example, a Socratic lecture (lecture by asking one student a sequence of questions) is didactic for all students but one. It is arguable, however, that to be considered a 'lecture', the instruction must have a majority of, or a key focus on, the practice of lecturing. Activities with a five-minute instructional period using a slide deck in a workshop-style room followed by thirty minutes of group activities are better characterised outside the realm of a lecture (including when such activities take place inside a lecture theatre). Importantly, scholars and educators ought to ensure that the embedding of technologies (e.g., Burton, 2019) considers first the aspired educational teaching method and the technology's relevance to that context.

The rise of lecture recordings

This review highlights a significant incline in the use of lecture recordings and recorded lectures in higher education. Yet, we found significant evidence for growth in the digitalisation of content over designing recorded lectures using a pedagogy suited for the medium. This is congruent with emerging evidence seeking to distinguish digitalisation and digital pedagogies (Bygstad et al., 2022; Cowling et al., 2022). In this study, there were inherent challenges associated with distinguishing which manuscripts used a specifically designed recorded lecture to support student learning, and a recording of a lecture specifically designed for an alternate delivery. Each of these serves a unique purpose and has been conflated in the literature. For example, a recorded lecture is an opportunity to provide students with asynchronous access to learning materials. This may be through a cohesive immersive video, TED Talk-style recording filmed in a recording studio (or lecturer's office), or narrated PowerPoint slides.

A lecture recording, however, is a category of lecture where a student has the opportunity to access a previously accessible lecture. This is a valuable activity for students to return to a lecture they observed live and revisit content they did not understand or to view a lecture that they were unable to attend. A lecture recording is, however, a secondary output of a previously accessible lecture and its use as the primary mode of instruction is not a best practice. The latter was prevalent during the pandemic years 2020-2021 to digitalise lectures quickly and economically from previous semesters (e.g., Witt et al., 2021; Zawacki-Richter, 2021) for continuity of learning, not quality of learning. The value of recorded lectures and lecture recordings is not proposed as of contention in this section, but rather that their value is in environments where they are implemented with purpose. Recorded lectures are synonymous with a YouTube video that was recorded for the specific purpose of being a video. Lecture recordings are supplements to existing practices of lecturing to allow students to revise and catch-up when they are seeking to strengthen their knowledge.

Incongruence in evidence

The purpose of this systematic review was to identify the current practices and knowledge associated with higher education lectures since 2000. The sample was large, and it pointed to a lack of consensus on several key topics assessing the efficacy of lectures. These have been highlighted in their respective sections but point to a need for more rigorous studies on the effects of lectures. Many of the studies referred to, while published in top-tier journals, reflect localised samples that are missing key references to broader and international literature, congruent with what Crawford et al. (2021) term place-based context useful for enhancing individual practice with limits to its broader applicability. And the emergent effects of generative artificial intelligence on the lecture modality (Rudolph et al., 2023) are only likely to exacerbate the challenge of congruent delivery of lectures consistent with pedagogical aims.

Conclusion

The objective of this study was to address the research question: What is currently known about the instructional pedagogy of the lecture in higher education? Through a careful review of the literature, it was identified that much is known about the nature of lectures, yet there is

an inconsistency in the practices and terminology of what a lecture is and is not. In this study, the aim was not to investigate the lecture's utility from an objective standpoint but to present the current knowledge of the lecture. It was also an opportunity to categorise the types of lectures identified in this study. It was clear that pedagogical approaches were conflated with lecture modalities with frequency, and these were distinguished during this study. There were strong opportunities identified for further research on the pedagogies and modalities of lectures in seeking to understand the relative efficacy of each type of lecture in context. As the higher education sector moves through and beyond the COVID-19 pandemic, there is a genuine need for rigorous evidence that can inform curriculum and instructional decisions that include or exclude lecture-based content. Indeed, there needs to be a more targeted evaluation of models. It was also identified that there is a need for clearer conceptualisation of newer forms of lectures, and deeper reviews of existing methods to prevent continuous conceptual overlap. Such overlap reduces the efficacy of such studies and the ability to engage in future meta-analyses and transferral of practice across jurisdictions.

In reflecting on the strengths and limitations of this study, there were a few to note. The study reviewed top-tier journals (Scopus Quartile 1) in education as a way to maximise the potential rigour of the final sample and likewise had a strong international sample to draw upon. However, it was limited by the size also, with the ability to engage in in-depth analysis of specific elements of lectures made difficult by size. Future scholars should consider reviewing individual components of this study, from lecture recordings to specific modalities. This paper serves as a key foundation for future scholars and practitioners in decision-making regarding lecture use in curriculum and should continue to inform scholarly pursuits in studying the efficacy of lecture-based curriculum and its alternatives. Importantly, as lectures continue to evolve with the advent and popularisation of generative artificial intelligence (e.g., Rasul et al., 2023) and as universities progress beyond COVID-19 digitalisations, scholars and educators alike are required to do a more substantial job of applying consistent language for their lecture materials to support a clearer long-term picture of the relative efficacy of each type of lecture across temporal, human, and spatial contexts.

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**Studies in the final sample.*