Determinants of university students' attendance

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Abstract

Background: Attendance of university students at their timetabled teaching sessions is usually associated with higher levels of educational attainment (e.g. Credé, Roch & Kieszczynka, 2010). Attendance is usually considered to reflect students' level of engagement with their course and to be critical to student success; despite the potential for technological alternatives, lectures and other face-to-face sessions still tend to be the primary method of teaching at university.

Purpose: Here we review studies which have investigated these determinants of attendance in order to gain a better understanding of whether - and how - Higher Education Institutions are able to improve attendance rates.

Sources of evidence: Electronic databases (e.g. ERIC, Web of Science) were used to identify articles exploring attendance in Higher Education settings.

Main argument: Some of the most debated determinants of attendance are reviewed: teaching issues (e.g. quality, style and format); effects of university expectations and policy (e.g. mandating attendance, awarding grades for attendance); scheduling issues; provision of materials online; and the effects of individual factors arguably outside of the Higher Education Institution's control (e.g. finance, student employment, student demographics and psychological factors).

Conclusions: It is suggested that, although some individual factors influence student attendance and are arguably out of the control of HEIs, it is possible for them to facilitate attendance through adjustments to aspects of degree delivery such as attendance policies and monitoring, timetabling and style of teaching. Implications for policies on the recording of lectures, curriculum design and student term-time working are also discussed. Future research on student attendance should include longer and larger studies which simultaneously consider a range of influences; examining both inter- and intra- individual variability and different types of teaching sessions.

Keywords: attendance, university, higher education, review, students, engagement

Introduction

In the context of expansion of the Higher Education (HE) sector (with its associated costs to students and governments) and increased focus on student retention and success, engagement and attendance issues have come to the fore. Moral, reputational and financial imperatives exist for universities to retain and successfully graduate their students once enrolled. St. Clair (1999) argued that, if students are able to obtain degrees without good attendance, an institution's reputation is likely to suffer; if students do not attend and concomitantly do *not* succeed, reputation will also suffer. Attendance is usually considered to reflect students' level of engagement with their course and to be critical to student success; despite the potential for technological alternatives, lectures and other face-to-face sessions still tend to be the primary method of teaching at university. Webb and Cotton (2018) reported that a lack of opportunities to interact with fellow students, low one-to-one contact with teaching staff and a reliance on non-traditional delivery methods were all predictive of student contemplation of withdrawal from university. Student absenteeism can reflect a number of problems relating either to the specific learner (potentially indicative of a student '*silently withdrawing*': Bowen, Price, Lloyd & Thomas, 2005, p.376), or to the wider university. There is also an abundance of literature which suggests a significant correlation between attendance and attainment at university (e.g. Clark, Gill, Walker, & Whittle, 2011; Colby, 2005; Credé *et al*., 2010; Gump, 2005; Jones, 1984; Kassarnig, Bjerre-Nielson, Mones, Lehman & Lassen, 2017; Rodgers, 2001; Romer, 1993), although the causal nature of this relationship is debated, with some researchers contesting that poor attainment can cause low attendance as well as *vice versa* (e.g. Kahu, 2013; Jones, 1984). Despite this accepted relationship, traditionally, attendance is neither compulsory nor recorded.

A plethora of studies have explored absenteeism and attendance, revealing many reasons that explain these decisions, including the inevitable and non-avoidable issues such as illness and family emergencies. The majority of studies have been relatively small scale, based on a single module or programme of study (e.g. Grabe, 2005; Traphagan, Kuscera & Kishi, 2010). Others have focused on the relationship between attendance and attainment, rather than on factors influencing attendance *per se*, sometimes struggling to isolate the effects of attendance on attainment because of the purported bi-directional relationship (see Credé *et al*., 2010 for a review). Attendance has been measured in a number of different ways, including self-report methods via questionnaire, which research has shown to be not entirely predictive of actual patterns of attendance, particularly for certain groups (e.g. Woodfield, Jessop & McMillan, 2006). There has arguably been an impact from the increased availability of technology on attainment, and on the relationship between attendance and attainment, thereby diminishing the applicability and relevance of some older studies. Indeed, with the rise of online courses and flipped learning (Bergmann & Sams, 2012) approaches, universities may be rethinking the need for attendance at traditional lectures at all. Some may also be prioritising investment in digital platforms over investment in large lecture theatres, which can be poorly utilised.

Studies have tended not to make a distinction between attendance rates at different types of sessions (for example comparing active learning *vs.* traditional lectures) in terms of either different antecedents or consequences, most commonly measuring lecture attendance (e.g. Fjortoft, 2005; Gump, 2004). However, Bijsmans and Schakel

(2018), confirmed the importance of attendance for problem-based learning sessions, whilst elegantly controlling for a range of factors including motivation and previous performance.

Here, we review some of the most debated determinants of attendance in order to gain a better understanding of how Higher Education Institutions might be able to improve attendance rates. These include: teaching issues, effects of university expectations and policy, scheduling issues, provision of materials online, and the effects of individual factors arguably outside of the HEI's control, such as finance, student employment, student demographics and psychological factors. Electronic databases (e.g. ERIC, Web of Science) were searched to identify articles exploring attendance in Higher Education settings. Relevant articles were read and checked to retrieve further relevant literature. Both qualitative and quantitative studies investigating attendance in higher education were included, as well as theoretical papers, but the majority of studies included are quantitative.

Teaching issues

The relationship between lecture attendance and teaching quality and style is difficult to quantify objectively. Lecturers have different methods, styles and personalities and deliver different content. Notwithstanding these measurement difficulties, research has investigated the influence of student *perceptions* of lectures on attendance. Unsurprisingly, interest in the content of a lecture and lecturer likeability both play a role. Devadoss and Foltz (1996) found that classes taught by lecturers who had won teaching awards were better attended than other classes; these lecturers might be

expected to be more effective as teachers, or more likeable in some way. Fjortoft (2005) found that the effectiveness of teaching influences attendance and that students appreciate helpful and engaging lecturers. Application to real world settings was also a strong motivator for lecture attendance in this study, with 83% of respondents suggesting this as a reason for attendance. Gump (2004) reported the highest motivator (85% of respondents) for attendance amongst first year students was interesting instructor/material (see also Bati, Mandiracioglu, Orgun & Govsa, 2013; Field, 2012; Massingham & Herrington, 2006; Rocca, 2004).

Other evidence, however, suggests that the role of interest in lecture attendance may be overstated. For example, Friedman, Rodriguez and McComb (2001) found that only 57% of people stated their reason for attendance as being interested in the course content. Similarly, Van Schalkwyk, Menkveld and Ruiters (2010) found that just half of respondents conveyed interesting content to be an element in lecture attendance. Dolnicar (2005, p.103) argues instead that students have shown a '*shift towards pragmatism'* and reports the main function of attendance at lectures to be to find out what students are supposed to learn, not to miss anything important, and to find out about assessment tasks (see also Elton, 1988; Lomas, 1997; Oldfield, Rodwell, Curry & Marks, 2017a). In Dolnicar's (2005) study, 43% of respondents reported that attending lectures was *easier than learning myself* and 39% stated that attendance *made knowledge more meaningful* (see also Fitzpatrick, Cronin and Byrne, 2011; Friedman *et al.*, 2001). Clark *et al.* (2011) similarly reported motives for attendance including wanting better marks, not wanting to be criticised for not attending, the lecturer's enthusiasm for and knowledge of the subject helping learning, and lectures being perceived as enjoyable social occasions. Field (2012) also noted that students'

reasons to attend class suggest surface approaches to learning (Marton & Säljö, 1976), with over 90% of students attending to find out about assessment. Friedman *et al.* (2001) discovered 66% of respondents gave the reason for attendance as *information about course procedures and tests may be announced*. Dolnicar, Kaiser, Matus and Vialle (2009) critique much of the literature for being exploratory, either eliciting multiple factors for non-attendance - without concluding which are salient - or focussing on only a single factor. They examined a range of factors and suggested that only four were important for marketing students; one of these was topic difficulty, suggesting that students may be more likely to be absent if they are able to work through the material on their own without help (see also O'Brien & Verma, 2018).

A second factor identified as significant by Dolnicar *et al.* (2009) was lecture format. Students appreciate interactivity in lectures, such as in lecture discussions and group work (Van Schalkwyk *et al*., 2010). The appreciation of interactivity in lectures may also be able to account for the finding of Friedman *et al.* (2001) that class size was negatively correlated with attendance and Doyle *et al.*'s (2008) increased absenteeism at lectures compared to smaller tutorials. It seems reasonable to speculate that the larger the class, the less likely that interactive elements are introduced (see also Leufer, 2007), although smaller tutorials also provide reduced anonymity from absenteeism. Cleary-Holdforth (2007) suggests that lectures may even be considered a necessary evil due to high student numbers, but suggests lecturers review and reflect on their approaches to teaching in this format.

Academics wishing to encourage attendance should therefore seek to make their lectures interesting and interactive and try to create enjoyable social occasions. However, whilst low quality lectures are likely to encourage absenteeism, higher quality lectures will not necessarily encourage higher attendance. Optimising alignment between teaching and assessment practices may instead serve to increase the perceived value of sessions.

Expectations and policy

Setting fair and pedagogically justifiable attendance policies is not straightforward. St. Clair (1999) offered a purely theoretical standpoint against mandatory attendance, arguing that enforcing attendance would be expected to reduce students' feelings of control over their environment, thereby actually reducing attendance. She also argued against grading students on the basis of attendance or participation, citing Frisbie, Diamond and Ory's (1979, p.22) contention that *'course grades should reflect each student's competence in the course content*' and that classes should be attended because they are of inherent value. Macfarlane (2013; 2016) argued that mandatory attendance policies infantilise students and reported student concern over whether grading on the basis of attendance, participation and group work was appropriate and fair. Leufer and Cleary-Holdforth (2010, p.18.1) reflect on experience on mandating attendance in a school of nursing and suggest that '*the underlying motivation for generating policies that mandate attendance must be given careful thought to ensure that the implications for all potential stakeholders are duly considered*'.

So, what do stakeholders think? Muir (2009) reported student support for absenteeism penalties. Bowen *et al.* (2005) found that 75% of students thought attendance should be monitored, because it made them feel that their university cared about their success. However, Cleary-Holdforth (2007) noted that mandating attendance brought new problems of increased disruption in class from students not motivated to be there. Likewise, Brauer (1994) noted the disruptive nature of regularly absent students who then occasionally attend - having not caught up with the work - and those who consume lecturers' time outside of class instead of attending the scheduled teaching. Attendance issues can therefore present multiple challenges to both students and lecturers, whether or not attendance is mandated. It is possible for students to do well even with low attendance. Hyde and Flournoy (1986) cautioned against mandatory attendance, suggesting that (in a medical school) although the highest attenders *were* the best performers, there were also significant numbers of students who did well despite low attendance, highlighting that some students may learn best independently.

Several studies have found that mandating does generally work to improve attendance. Gump (2004) reported that 67% of first year students said they would be compelled to attend because it was either a requirement, or part of the grade for that module. Indeed, implementation of an attendance policy in Devadoss and Foltz's (1996) study resulted in a 13% increase in attendance. In some cases, however, the requirement to attend may have been supplemented by rewards/ penalties in the form of course grades (see also Chenneville & Jordan, 2008). In an economics class, Marburger (2010) compared the attendance of students who had been told that the university's attendance policy would be strictly enforced with students who were not told anything, but whose attendance was still observed. The university's attendance

policy made provision for awarding students a fail grade based on missing too many teaching sessions. Unsurprisingly, this enforced policy reduced absenteeism; in this case it also improved exam performance. Baum and Youngblood (1975) found that when attendance was compulsory on an undergraduate accounting course (and contributed towards the final grade), average daily attendance was 82% (vs. 76% otherwise).

Research has found some unintended side effects of mandating attendance. Hovell, Williams and Semb (1979) enhanced *overall* attendance rates using quizzes which contributed to students' final grade, but found that on non-test days, attendance fell below that of a control group whose attendance had never contributed. Furthermore, Rodgers (2002) showed how a grade incentive scheme improved attendance at tutorials (and that attendance was positively correlated with performance) but that the incentive scheme itself did *not* improve performance. Interestingly, Carroll and St. Peter (2017) found that the *relative* percentage of a grade available for attendance on different days influenced attendance more than the *absolute* percentage available on a given day. In their review, Credé *et al.* (2010) noted the lack of evidence relating to the effect of attendance policies on grades. They excluded articles from their meta-analysis if any grade was partly based on class attendance, ultimately including just three studies on the effects of a mandatory attendance policy on grades. Results suggested a small increase in average grades, with disproportionate benefit for low performing students. The relationship between grades and attendance was concluded *'unlikely to be an artefact of a common causal variable*' (p.285); however, they argued that even if only a small part of the relationship between attendance and grades is causal in nature, it should have strong implications for educational policy. In practice,

making the distinction between a requirement alone *vs.* a requirement with incentives may be futile, since it is difficult to envisage how an attendance policy might be implemented effectively in the absence of any 'teeth' to ensure compliance.

So, if mandating attendance raises questions of equity for students, or can produce unintended side effects, what are the alternatives? Shimoff and Catania (2001) discovered that simply by recording attendance (without awarding course credit), both attendance and overall examination academic performance improved significantly. Similarly, Dickson and Stephens (2016) increased both lecture attendance and course performance by informing students of their accumulated attendance percentage; with larger effects for students from low socioeconomic status backgrounds and amongst lower performers. Bicard, Lott, Mills, Bicard and Baylot-Casey (2012) showed improved attendance of 'at-risk' students when they were asked to text message a tutor to announce their arrival at class. Whether simply recording attendance would persist as a *longer* term measure, however, is not known; observing behaviour is known to change behaviour (i.e. 'Hawthorne' effects), but these effects may be time limited.

Student responsibilities regarding attendance, participation and self-directed study should therefore be transparent from the outset (see also Barlow & Fleischer, 2011). HEIs should transparently record students' attendance in order to foster greater awareness amongst the students themselves. However, careful consideration should be given to possible arguments of inequity and to unintended side effects before allocating a proportion of marks for attendance or setting attendance policies.

Individual factors

There are many factors which affect attendance that are arguably out of the control of the institution because they relate to the individual; these include student employment, financial issues, student demographics and psychological factors.

Research which has directly investigated the impact of sociodemographic characteristics on attendance in HE is sparse. This is despite the known impact of various characteristics on attainment (e.g. Smith & Naylor, 2001) and the fact that most researchers appreciate the need to provide context of the characteristics of their particular samples and of their particular university. Paisey and Paisey (2003, p.51), for example, noted that '*The context of the study reported here should be borne in mind. The students here were at university with one of the widest access policies in the UK and were generally from the least affluent social classes*'. Woodfield *et al.* (2006) found higher attendance levels in females at a UK university (see also Bati *et al.*, 2013; Mearman, Webber, Ivlevs, Rahman & Pacheo, 2014), although their male and female samples also differed in terms of entry qualifications. These researchers also used personality variables such as extraversion, agreeableness and conscientiousness to predict absences and speculated that more extravert males may be more likely to skip classes in favour of social activities. In contrast, Friedman *et al.* (2001) in the US found no gender differences in reported attendance, Oldfield *et al.* (2017b) in the UK found that gender did not predict (self) estimated lecture attendance and Gatherer and Manning (1998) in the UK also found no gender differences in attendance. It may be that males are more likely to underestimate their absenteeism

if asked to self-report (see Woodfield *et al.,* 2006), leading to discrepancies in findings dependent on whether objective or subjective measurements of attendance are used. Credé *et al.* (2010) included four studies in their meta-analysis and found only a small effect of gender on attendance. Conversely, O'Brien and Verma (2018) reported that their *digital students* tended to live a further distance from campus, be female and be older. Oldfield *et al.* (2017b) also found that first in family to go to university students were more likely to miss seminars.

It is not surprising that a number of psychological factors are known to affect attendance. The importance of a sense of belonging to student retention and success has long been recognised (e.g. Tinto, 1975). More recently, Oldfield *et al.* (2017b) found that sense of belonging significantly predicted self-estimates of both lecture and seminar attendance, but found no similar effects for *perceived confidence for learning*. The importance of sense of belonging was reiterated in a qualitative study, which noted the negative effect of large class sizes on this factor. However, Nicholson, Putwain, Connors and Hornby-Atkinson (2013) found that the marks of students with low *academic behavioural confidence* for attending taught sessions were more likely to be impacted if the students also attributed high levels of responsibility for their learning to their lecturers rather than themselves. Gump (2006) also found a positive relationship between attendance and the extent to which students rated attendance as important. Pownall (2012) reported that gaining a sense of social identity from attendance was important. Credé *et al.* (2010) included six studies in their meta-analysis which showed a small to moderate overall effect of conscientiousness on attendance.

Student paid employment is one of the most debated and researched influences on attendance. The growth of the HE sector in many countries has been coupled with changes in modes of funding, with a tendency towards a greater burden being carried by individual students and their families rather than the state. Arguably, in order to meet this burden, more and more full time students now undertake part-time work alongside their studies; a survey by Endsleigh (2015), suggested that around 77% of UK students undertook some kind of part or full-time work. Bradley (2006) found that 85% of his sample of 246 full-time students were in paid employment in Australia. But does engagement in employment affect attendance at lectures?

In Scotland, Paisey and Paisey (2004) found that the most frequent reported reason for missing lectures was part-time work (34% of respondents). In England, Oldfield *et al.* (2017b) found that working more hours in paid employment was a significant predictor of poorer attendance. In Australia, Massingham and Herrington (2006) also found that students gave part-time work as the third highest reason for not attending lectures, after genuine sickness and being too busy. In contrast, in Northern Ireland, Muir (2009) found that only 14% of students asked gave the reason of working at a paid job for lecture absence and that those working more than 15 hours per week actually had amongst the highest rates of attendance. Similarly, in the US, Friedman *et al.* (2001) found no evidence that students who spend more time working attend less regularly. In England, Curtis and Shani (2002) reported that 22% of students who worked reported missing lectures due to working, but also that 92% of students who did not work missed some lectures. In the UK, Metcalf (2003) suggested that

scheduled contact time was much less affected by term time working (17-19% of students who worked affected) than was non-specific study time (71% of students who worked affected). This same conclusion was supported by data from Davis *et al.* (2012) in Australia who reported a third of students agreeing that their paid job interfered with attendance, whilst 37-45% said that it interfered with their private study. In the UK, Woodfield *et al.* (2006) found that students cited paid work commitments as a reason for absence in only 3% of cases. In Ireland, Kelly (2012) also found mixed results; a large percentage of students reported that having a job is neither damaging nor beneficial, but that it *did* affect attendance in combination with other factors. For example, students who worked were more affected by whether or not a lecture was perceived to be interesting. Ford, Bosworth and Wilson (2006) argued for a need to consider more than simply hours worked when considering the effects, to include the distribution of hours, the conditions and the relationship of the employment (or not) to the student's area of study (also see Bradley, 2006; Wang, Kong, Shan & Vong, 2010). In summary, the majority of studies report that working certainly can affect students' decisions about whether or not to attend, but the magnitude of any effect on *actual* attendance is perhaps smaller than anticipated.

Financial issues more generally have also been proposed to affect attendance. Several authors have noted that a *reliance* on income from part-time working results in inequalities between different groups (e.g. Callendar, 2008; Hunt, Lincoln & Walker, 2004; Metcalf 2003; Moreau & Leathwood, 2006). Similarly, Yamatani, Wesner, Wright and Mann (1995) found that a lack of financial aid affected the attendance and success of low-income students in the US. Devadoss and Foltz (1996), however, also in the US, actually found that students financing their own studies through work or student

loans had better attendance records than students on scholarship or students who were financially supported by their parents, whilst Friedman *et al.* (2001) reported little correlation between attendance and levels of tuition fees and scholarship provision. Initially, the results from these studies appear difficult to reconcile, but in the case of Yamatani *et al.* (1995) the students may have been expecting some financial aid, because they qualified for it, but were denied it because of shortages of funding, whereas in the other studies students may have always planned to support themselves by working. In the majority of cases, one might assume that students calculate the affordability of attending university prior to embarking upon their study and therefore it is the unexpected financial pressures which pose more of a problem than the expected ones.

In summary, it is evident that universities would be well advised to try to encourage a sense of belonging amongst students (see also Wenger, 1998). They should also inform students of their learning responsibilities and educate them on the importance of attendance, perhaps also setting maximum paid working time policies. In addition, it is suggested that HEIs should make the costs of studying clear, including expected living expenses. Students should know well in advance whether any scholarship support will be available to them (and how much).

Scheduling issues

Attendance patterns are not randomly distributed throughout the day, the week or the year. Although evidence is mixed, most absenteeism occurs on Mondays and (especially) Fridays (Kelly, 2012; Marburger, 2010; Timmins & Kaliszer, 2002; but see

Paisey & Paisey, 2004). Predictably, Devadoss and Foltz (1996) found that classes scheduled between 10am - 3pm were better attended than other classes (see also Davis, Hodgson & Macauley, 2012). This conclusion was supported by Kelly (2012) who showed that early lectures negatively affect attendance, although only for students living off campus (although see Burd & Hodgson, 2006; Friedman *et al.* 2001). Having too few hours in a day, or long gaps between classes has also been found to reduce attendance (Davis *et al.*, 2012; Doyle *et al.*, 2008; Kelly, 2012). Van Blerkom (1992) found that attendance for a psychology class showed a steady decline during the term, even though credit was awarded for attendance (see also Burd & Hodgson, 2006; Colby, 2005; Davis *et al.*, 2012; Mattick *et al.*, 2007; Newman-Ford, Fitzgibbon, Lloyd & Thomas, 2008); although, perhaps unsurprisingly, revision lectures at the end of term were immune from this decline.

It is noteworthy and of concern that research has shown an impact of other *university* commitments on attendance; this may contribute to the decrease in attendance observed over the term. Muir (2009) reported that 46% of absentees had not attended lectures because they were doing other work for their course (see also Davis *et al.*, 2012; Fitzpatrick *et al*., 2011; Oldfield, Rodwell, Curry & Marks, 2017b; Thatcher, Fridjhon & Cockcroft, 2007). Fjortoft (2005) additionally found a negative effect of classes being before or after tests. Davis *et al.* (2012) even reported timetable clashes preventing students from attending lectures. Moore, Armstrong and Pearson (2008, p.22) similarly suggest that the avoidance of lectures '*may be a coping mechanism supporting other aspects of the course'*. These findings may be a consequence of students' inability to effectively manage their time around assessment periods, or simply poor curriculum design on behalf of the programme team; however, if large

numbers of students are not attending for these reasons, it seems unlikely that they *all* have poor time management skills.

The timing of scheduled classes may therefore be an issue for some students. Whilst HEIs may not be able to avoid timetabling in particular slots, efforts could be made to decrease long gaps between classes and to avoid single events on one day. HEIs could also provide timetables to students well in advance, particularly for any early morning or late afternoon slots. This should allow students to ensure that their paid work commitments (or caring responsibilities) can be arranged around teaching sessions rather than *vice versa*. We suggest that curriculum design teams should carefully consider workload and assessment timings across the entire programme. They might even map out the weeks in which notional study hours for modules and programmes might be expected to take place for each learning activity.

Provision of materials online

Over the past three decades, technology has provided lecturers with myriad different ways to provide learning materials to students so that they do not have to study at potentially inconvenient times. Fully online courses are prolific and most modern universities now use some kind of virtual learning environment to provide lecture notes and recordings online to campus-based students, with some lecturers opting entirely for flipped classroom approaches to capitalise on the benefits of this technology. Recorded lectures allow students to access this material at any time, at any pace, and anywhere. As Parson, Reddy, Wood and Senior (2009, p.215) argue, *'traditional distinctions between part-time and full time study, campus-based and distance learning….are breaking down, presence and absence are becoming blurred'.* Whilst

some universities make the recording of lectures mandatory for academic staff in order to support student learning, not all teaching staff have fully embraced these ways of providing material to students; poor attendance at lectures is reportedly a primary reason why some hesitate to do so. Interestingly, the same issue over provision of lecture slides online occurred several years ago (see e.g. Babb & Ross, 2009; Billings-Gagliardi & Mazor, 2007; Grabe, 2005), with the overriding conclusion that these were positive for students' learning, whether or not they affected attendance. Provision of slides is now remarkably uncontroversial and this practice is ubiquitous across the sector.

Students generally agree with lecturers' contentions that access to online material is a factor in absenteeism from lectures. Kottasz (2005) found that 38% of students agreed with a statement that a reason for missing a lecture could be *I can get the material in other ways*; whilst the corresponding amount for tutorials was 15%. Grabe, Christopherson and Douglas (2005) administered attendance questionnaires to their cohort of psychology students and investigated the correspondence of the questionnaire self-reports, with empirical data detailing student access to online material. Students were asked to attribute their reasons for absences to five different categories; illness or personal emergency (22%), competing academic commitment (24%), non-academic university conflict (6%), work (6%) or voluntary absence (44%). In each case, the percentages of students claiming that access to online material played a *very important* factor in their decision not to attend was above 25%; this percentage was highest (61%) when students reported missing lectures for what was labelled as *voluntary absence*, indicating that absenteeism may increase if online material is available.

Evidence from records of actual attendance when online material is available paints a rather different picture. Brotherton & Abowd (2004) found that one-third of students were in agreement that recorded lectures encouraged non-attendance, yet *actual* attendance in their study did not decrease significantly. Similarly, Harley *et al.* (2003) found that 25% of students reported replacing lecture attendance with webcasts, although also noted that comparisons with another class where webcasts were not provided suggested that their provision was not the only reason for absenteeism. Nordmann, Calder, Bishop, Irwin and Comber (2018) found no evidence that attendance and recording use were related. Copley (2007), Larkin (2010) and Von Konsky, Ivins and Gribble (2009) all found little impact of provision of recordings on *actual* lecture attendance. In agreement with Grabe *et al.* (2005), Traphagan *et al.* (2010) found that the availability of recordings *did* decrease attendance, although not to the same extent as the availability of lecture slides. Moreover, access to webcasts actually negated any negative effects of student absence on performance. Bos, Groeneveld, van Bruggen and Brand-Gruwel (2016) also suggested an impact of recorded lectures, but based conclusions on a shift across the course of the term from students attending to students using recorded lectures – they did not have a control group without any access to such lectures.

Von Konsky *et al.* (2009) showed that higher achieving students were most likely to access lecture recordings and least likely to rely on the lecture alone, suggesting a supplementary (as opposed to substitutional) use of the technology (see also Parson *et al.*, 2009; Aldamen, Al-Esmail & Hollindale, 2015). However, O'Brien and Verma

(2018) performed a cluster analysis of actual student utilisation patterns, identifying the largest two groups as *traditional* (characterised by high attendance, but low use of recordings) and *digital* (low attendance, but high use of recordings). No cluster was identified which suggested that recordings were frequently used in addition to attendance, although lecture notes *were* used as complementary in this way. Interestingly, weighted average mark was not able to differentiate between the likelihood of being a digital *vs.* a traditional student. Similarly, Edwards and Clinton (2018) found that, for a matched cohort, those provided with lecture capture were less likely to attend classes, even after controlling for ability and gender, but that the reduction could mainly be attributed to those attending some rather than all lectures, with most students still achieving high overall attendance. Lecture capture usage only had a negligible association with attendance, but lecture capture availability was reported to have an overall negative effect on cohort attainment. This study thereby highlighted an important distinction between availability and usage of recordings. Gysbers, Hancock, Johnston and Denyer (2011) reported that fundamentally students actually appreciate lectures as part of the university experience, for social interaction and for learning. Mattick, Crocker & Bligh (2007), however, found no difference in attendance at live lectures delivered telematically *vs*. in person, suggesting that peer interaction may be critical, rather than lecturer interaction.

Availability of lecture recordings does seem to decrease attendance overall, although those who do not attend are not necessarily the highest users of them. Withholding of recordings seems likely to disadvantage the higher achievers most, although it might encourage the lower attenders and achievers to attend. However, Edwards and

Clinton (2018, p.1) warn of the *'pitfalls of an overreliance on lecture capture as a replacement for lecture attendance*'.

Conclusions

Despite the proliferation of digital alternatives, student attendance at teaching sessions is still usually associated with better outcomes for students in terms of both retention and attainment and so it is an important aspect of student engagement for HEIs to consider. There are a multitude of influences on attendance decisions in students, including institutional, psychological and socio-demographic factors. These factors interact, resulting in a complex picture, with some apparently inconsistent results. Research findings should be considered in the context of the country, the funding system, the publication year, the student demographic of the particular university investigated, the size and nature of the class, and the discipline of study. Research has employed a number of different measures of attendance, from manual headcounts and registers, to retrospective self-reported estimates, to electronic measurement methods. All of these methods have potential weaknesses and are open to various forms of inaccuracies, including student cheating; although electronic monitoring may be sometimes considered the gold standard in accuracy, it is easily foiled if a single student registers multiple cards. It should be noted that this literature review was exploratory and not intended to be exhaustive or systematic. Nevertheless, assuming that the overriding conclusions of these studies hold true despite any potential shortcomings or omissions, some recommendations for HEIs can be made.

Future research should consider a range of sociodemographic influences on attendance and be larger in scale, investigating the behaviour of entire university cohorts rather than single modules. Longitudinal studies spanning a year or more are also necessary to investigate possible Hawthorne effects. In some cases, observing students' attendance alone *may* be sufficient to increase their attendance (see e.g. Shimoff & Catania, 2001), in which case it would be important to understand whether or not this effect is likely to endure across the whole course of a student's study. Observation of an individual's attendance across multiple classes – and different types of classes - may also impart additional insight into the relative contributions of individual *vs.* institutional factors. Although many attendance issues can be attributed to the motivation and circumstances of an individual student, HEIs may still be able to facilitate attendance at an institutional level and should evaluate and disseminate the success of any strategies which they employ; in terms of attainment, retention and attendance itself.

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