
Attendance and Attainment are they Linked: A Study in the First-Year of a Bioscience Degree

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Abstract

There is much evidence in the literature that suggests that student attendance rate is linked with both attainment and retention. Levels of attendance have been shown to be influenced by many factors, such as part-time work and day and time of learning opportunity. The aims of this current study were to investigate the links between a) attendance and attainment b) attendance and day/time of the module in two first-year modules of a bioscience degree. The results confirm the link between attendance and module attainment, but did not find a relationship between attendance and timetabling of the module. Therefore, for any university aiming to increase their overall student attainment the key recommendation would be the introduction of a robust and visible attendance monitoring system.

Introduction

Retention

Student retention is currently amongst the most fundamental issues affecting policy making in Higher Education Institutions (Longden 2006). Annual performance indicators from the Higher Education Statistics Agency (HESA 2008) show a worrying 11.3% non-completion rate for first-year, full-time, first degree entrants in 2005/06 at Liverpool John Moores University (LJMU). This has obvious financial implications and indeed it has been estimated by Bowden et al. (2005) that in their institution, an improvement in retention of only 1% would increase income by approximately £87,000. These financial implications cannot be dismissed by any higher education institution and current research into potential reasons for student non-completion must be considered if this trend is to be reversed.

The Higher Education Academy conducted a two-phase study into the first-year experience of UK students. The first phase of the study (Yorke & Longden 2007) investigated the perception of

students of their first-year experience at university. The second phase of the study (Yorke & Longden 2008) investigated the reasons for students discontinuing, and therefore not returning to their original higher education institution for Year 2 of their study. This latter study identified seven factors that were interpreted as general reasons for non-completion (Table 1).

Factor	Interpretation
I	Poor quality learning experience
II	Not coping with academic demand
III	Wrong choice of field of study
IV	Unhappy with location and environment
V	Dissatisfied with institutional resourcing
VI	Problems with finance and employment
VII	Problems with social integration

Table 1 The seven factors and their interpretations for students not returning to Year 2 of study at their original higher education institution (adapted from Yorke and Longden 2008).

These diverse reasons for non-completion should all be considered by higher education institutions in their attempt to increase retention. Furthermore, when investigating the literature surrounding non-attendance at lectures and other learning opportunities, many of these same reasons have also been identified as potential explanations (Hunter & Tetley 1999, cited by Dolnicar, 2005; Paisley & Paisley, 2004). Indeed, Yorke and Longden (2008) identified that students who missed a higher number of timetabled sessions had a greater number of factors affecting their reason for non-completion, including *"a lack of commitment to their programme; a lack of studying outside timetabled sessions...the stress associated with their studies; the lack of study skills; and academic failure."* Consequently, a clear correlation between attendance and attainment has been found (Newman-Ford et al. 2008; Paisley & Paisley 2004) and this has been extended by Tinto (1975 Cited in Scott & Graal 2007) to include the link between student engagement, attendance and academic success. These factors all indicate the importance that higher education institutions should put on improving student attendance if they wish to address retention.

Attendance

There have been a number of studies in the area of student attendance and these have indicated a range of factors that can be linked to non-attendance. Specific factors include: part-time employment (Paisley & Paisley 2004); deadlines for coursework submission (Paisley & Paisley 2004); gender differences, with females more likely to attend than males (Woodfield, Jessop & McMillan 2006); class size (Ward & Jenkins 1992, cited in Dolnicar 2005); poor lecture quality (Hunter & Tetley 1999, cited in Dolnicar 2005), and day or timing of learning opportunity (Newman-Ford et al. 2008; Paisley & Paisley 2004).

The impact of part-time work on attendance has been exacerbated since the abolition of student grants and increase in fees. This has meant that many of today's students need to work part-time to support themselves whilst they are studying. It has also been suggested that students attending post-1992 universities, such as LJMU, are more likely to undertake part-time work than students from pre-1992 universities (Cooper et al. 2002, cited in Paisley & Paisley 2004; Paisley & Paisley 2004). The implications of part-time work on attendance are clear and this is backed up by Paisley & Paisley (2004) who reported that part-time employment was a commonly cited reason for non-attendance.

A number of studies have linked attendance with start time, and with the day of the week that the lecture takes place. However, there appears to be no real consensus as to what problematic days and times would be. Burd and Hodgson (2005) reported that attendance was worse on Wednesdays and this was attributed to the tradition of university sport events taking place on this day of the week. However, Newman-Ford et al. (2008) found that attendance was significantly worse on Fridays. This is supported by studies in secondary schools that also found poor attendance on Fridays (Collins 1998, cited in Paisley & Paisley 2004). This is corroborated by anecdotal evidence from students and staff at LJMU that suggests that more students undertake part-time work on Fridays, with others leaving early to go home for the weekend. Consequently, Friday afternoon teaching slots are nick-named the "graveyard" session termed by many staff. Winn (2002 cited in Newman-Ford et al. 2008) reported that lectures that were timetabled later in the day could be particularly problematic for students with young children. Paisley & Paisley (2004) reported poor attendance in lectures that occurred on Thursdays at 4pm, and they attributed this to late night opening at local shops where students

worked part-time. Conversely, Burd and Hodgson (2005) found that, of the morning lecture times studied, attendance was worse in the 9am slot and this was corroborated by Woodfield et al. (2006). These findings were contradicted by Newman-Ford et al. (2008) who found that attendance at the 9am lecture slot to be no worse than other time slots. However, while there is no compelling argument for or against any particular day or time, there appears to be plenty of evidence that attendance decreases as the semester/term progresses (Burd & Hodgson 2005; Collins 1998, cited in Paisley & Paisley 2004; Newman-Ford et al. 2008).

Class sizes also seem to affect attendance. Ward and Jenkins (1992, cited in Dolnicar 2005) found that students in large lectures complained about periods of inactivity resulting in loss of interest in the lecture, which Dolnicar (2005) argued might affect attendance. Additionally, students in large class sizes may feel anonymous, and this may lead to them feeling that the lecturer would not notice, if they did not attend. In fact, Harrison (2006, cited in Scott & Graal 2007) found that students in large class sizes felt that lecturers did not care about them.

Link between attendance and attainment

Not only is poor attendance linked to attrition (Yorke & Longden 2008) but there is also plenty of evidence that attendance is linked to attainment (Burd & Hodgson 2005; Colby 2004; Halpern 2007; Paisley & Paisley 2004; Newman-Ford et al. 2008). Colby (2004) found a direct correlation between the level of attendance and the marks obtained in a first year module. From this investigation the author developed a number of "rules" that emphasise to students the strong connection between attendance and attainment. Firstly, the "70% rule" was defined by Colby as *"If a student does not attend at least seventy percent of teaching sessions they have a two in*

three chance of failing, and a four in five chance of not getting a first or upper second." The "80% rule" was *"If a student does not attend at least eighty percent of teaching sessions they have an even chance of failing, and a two in three chance of not getting a first or upper second."* Finally, Colby defined the "week two rule" as *"If a student is absent for only one or two teaching sessions (depending on teaching load) during the first two weeks of any module then this is cause for concern"*.

Burd and Hodgson (2005) extended from this to investigate the link between attendance at 5 core, Level 2 modules and attainment in those modules. This was found to be significant. Paisley and Paisley (2004) also reported a clear correlation between attendance and attainment. However, their study explored the link between attendance and both coursework marks and examination marks. Although both were linked, they found the strongest relationship between attendance and examination marks. Woodfield et al. (2006) took a broader perspective on the association between attendance and attainment to demonstrate a relationship between average attendance throughout a degree programme and final degree outcome.

Aims of the study

The literature suggests that attendance is related to attainment. However, there is conflicting evidence regarding the effect of learning opportunity time and/or day of the week. Therefore, the aims of this study were:

- a) To investigate whether there is a link between the level of attendance in two first year modules and the final module mark
- b) To investigate the link between day and time of the learning opportunity with average attendance

Methodology

The modules selected for this study were two first year, semester two modules in the Faculty of Science at LJMU – module A and module B. These modules are core for a large number of programmes from both School of Biological and Earth Sciences and from the School of Biomolecular Sciences. In addition they are optional for some programmes within these two schools. The learning opportunities for both modules comprise of lectures and two laboratory practical classes. There were a number of reasons

for choosing these two modules for this study. First, a large number of students take both modules. This is important when considering differences in attendance rate between modules timetabled on different days and time slots. Secondly, both modules have very large student cohorts; with 200+ students registered on Module A and 100+ students registered on Module B. For both of these modules, data on attendance and attainment were available for a three-year period (academic years 2005/2006 to 2007/2008), ensuring large *n*-numbers in the study for statistically meaningful analysis of the results. A small number of students, for various personal reasons, failed to obtain any marks in the assessment, even if they had attended some of the learning opportunities. As the aim of the study was to investigate the link between attendance and module attainment these students were excluded from the analysis, and this is in line with the study by Paisley and Paisley (2004). Therefore, the numbers of students included in the analysis were 597 for Module A and 381 for Module B.

In the study by Burd and Hodgson (2005), attendance in practical classes was removed from the study as the authors felt that, as practical classes contained work that contributed to summative assessment, this resulted in an

artificially higher level of attendance in these classes compared to lectures. In the present study attendance in both modules was also higher in the practical classes compared to the lectures, for presumably similar reasons as described by Burd & Hodgson. However, the author felt that as the attendance level was not 100% in the practical classes this attendance data was relevant and should not be discounted in the study.

As discussed earlier, there is conflicting evidence regarding the impact of the day of the week and the time of the day on attendance at learning opportunities. Module A is timetabled on a Friday afternoon between 2-5pm, and Module B runs on a Tuesday morning between 9am-12noon. Therefore, the average attendance rates in both these modules will be investigated, along with any impact on module attainment.

Each session takes place in a three-hour slot, with two breaks. A register was distributed after the second break (usually between 11am and 12noon for Module B and 4-5pm for module A) and students asked to sign it on an honesty basis. In the weeks when the modules had laboratory classes, two registers were taken - one in the lecture and the other in the laboratory. This method of data collection has a number of weaknesses as highlighted by Colby (2004). These include students not signing the register, students signing in the wrong place and students signing in their friends. The latter problem was removed in the practical classes for both modules as the register was taken from student to student by a member of staff, thus ensuring that students were not able to sign in their absent friends.

Attendance and attainment data were recorded on an excel spreadsheet and statistical analysis was performed using SPSS. The data is presented in either a tabulated format or graphically, and in such a way that protects all students anonymity.

Results

Each student's average attendance rate for both modules was compared to her/his total module mark. Figures 1 and 2 show the relationship between attendance and attainment for module A and B respectively. As it would be possible to trace specific module performance to individual students, care has been taken to protect their anonymity. Hence, in Figures 1 and 2, the data for all students with the same average module attendance rate was plotted against the mean module mark for that corresponding attendance rate. However, in the analysis, raw scatter plot data was used in the statistical analysis, and all R^2 values and statistical significance values are calculated on the individual student's data, rather than the averaged data presented. This was analysed using a Pearson's correlation because this statistical test measures the strength of linear dependence between two variables (Clegg 1997). The average attendance data for each student taking Module A was compared to their total module mark (Figure 1). There was a significant correlation ($R^2 = 0.4068$ and $p \leq 0.001$) between module attendance and attainment, showing a relationship that is unlikely to occur by chance. A similar pattern was seen in Module B (Figure 2). When using the same method of analysing the data there was a R^2 value of 0.5295 and a level of significance of $p \leq 0.001$ when correlating the module attendance with attainment. This again suggests that this relationship is unlikely to occur by chance.

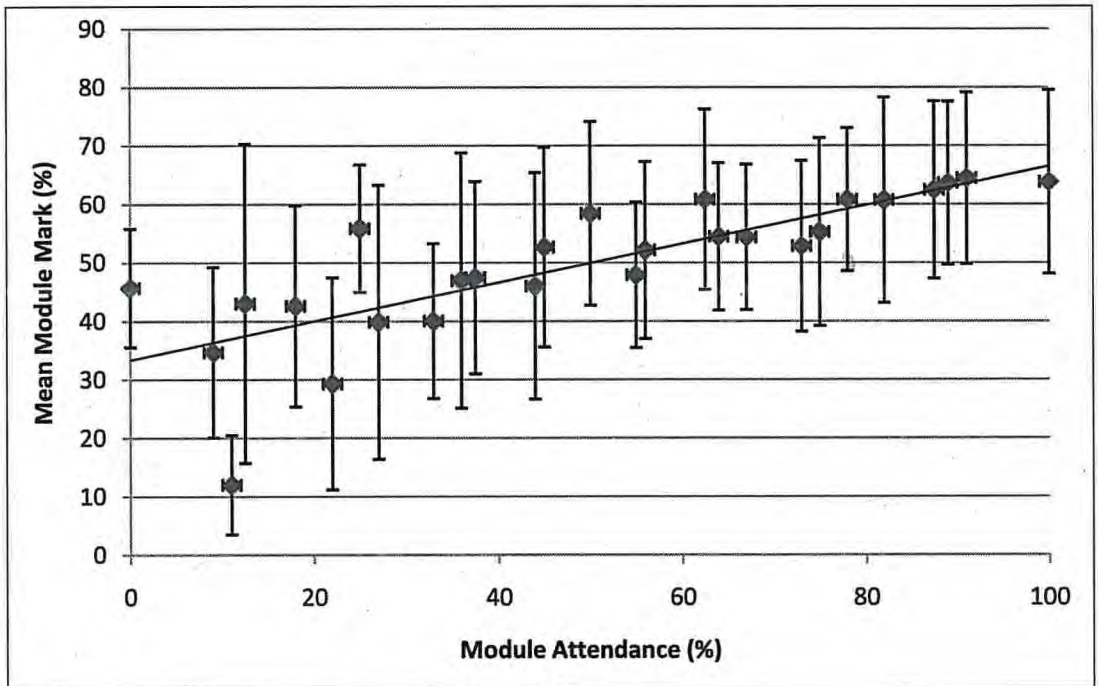


Figure 1 The relationship between module attendance and mean module mark (%) over a three year period for the Module A. $n = 597$ students, mean results shown, \pm standard deviation (SD).

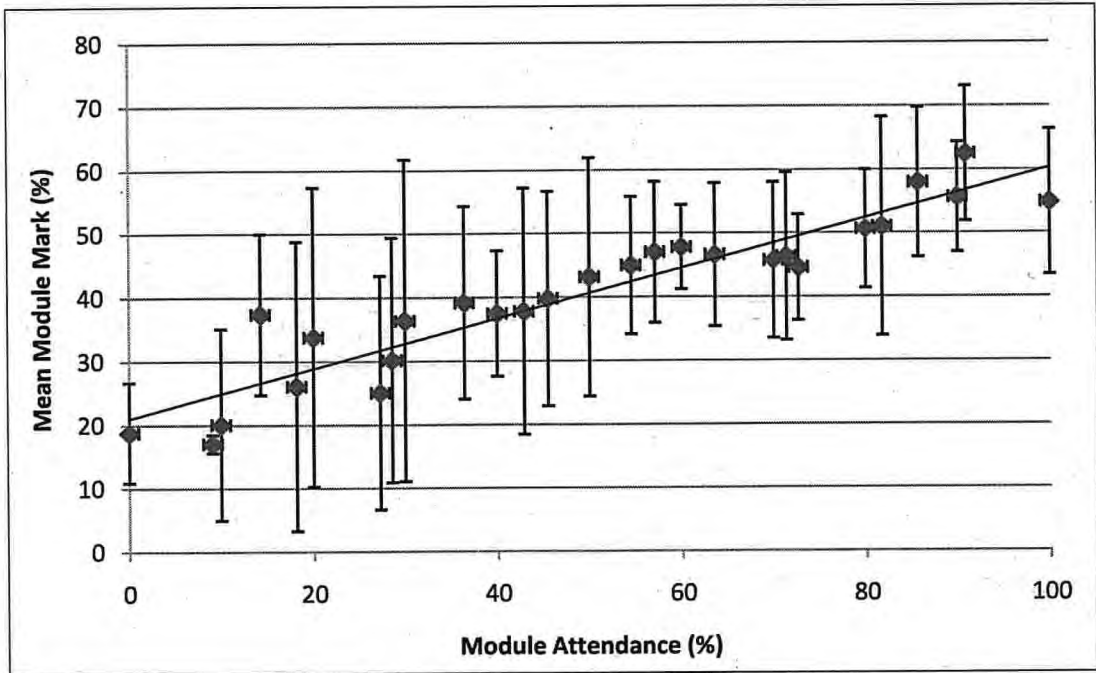


Figure 2: The relationship between module attendance and mean module mark (%) over a three year period for the Module B. $n = 381$ students, mean results shown, \pm SD.

The module marks for each student were classified according to a traditional scoring system (Table 2) and this was used to compare average student attendance with their performance (Colby 2004).

Module Mark	Module Classification
Below 30%	Fail
30-39%	Bare fail
40-49%	Third
50-59%	Lower Second
60-69%	Upper Second
70% +	First

Table 2 Traditional scoring classification of module marks for Module A and Module B used in Figure 3 (adapted from Colby 2004).

A clear relationship was found between the module classification score and the average attendance of students in this category for both modules (Figure 3). Although the relationship between attendance and attainment is clear, it should be noted that the attendance data has been averaged and therefore there will be some degree of variation of attendance by individual students within each module scoring classification.

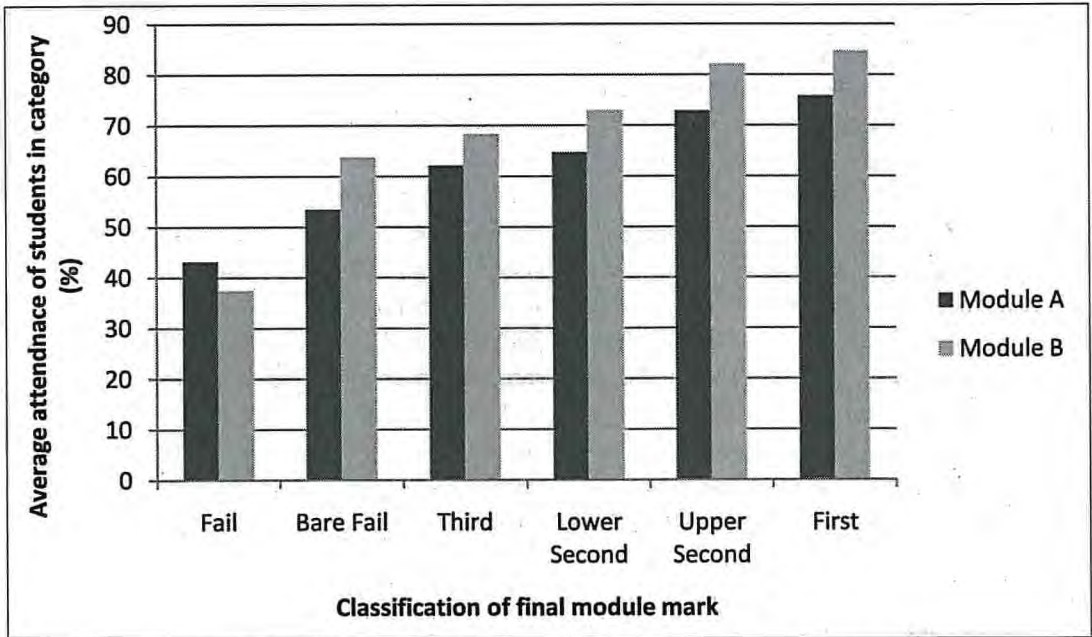


Figure 3 The relationship between average student attendance, over a three year period, in both module and notional classification of their module mark. $n=597$ for Module A and $n=381$ for Module B.

To investigate the influence of module timetabling on attendance, the mean attendance of the Module A, which is timetabled on a Friday afternoon between 2-5pm, and Module B, which is timetabled on a Tuesday morning between 9am-12noon, were compared (Table 3). However, even though there was a significant difference ($p \leq 0.001$) in the mean module mark between the two modules there was not a significant difference between the mean attendance rate of the modules.

	Module A (Friday 2-5pm)	Module B (Tuesday 9am-12noon)	P value	Significant
Mean Attendance (%)	66.5	67.0	0.763	No
Mean Module Mark (%)	54.8	46.2	<0.001	Yes

Table 3 Comparison between mean module attendance and mean module mark for Module A and Module B over a three year period ($n=597$; $n=381$).

Discussion and conclusions

A benefit of the design of this current study is the large amount of quantitative data that it generates. With such large *n*-numbers the results are more likely to be statistically significant, giving greater meaning to the results. However, this type of study only identifies a potential relationship between attendance and attainment in a module, but it does not give any information about why students fail to attend. An alternative strategy, and one that could follow on from this study, would be a longitudinal study that utilises other data collection techniques such as a questionnaire or focus group. A number of other studies have used questionnaires in an attempt to find out the main reasons why students do not attend lectures. Paisley and Paisley (2004) used both an attendance register and a questionnaire in their study. The questionnaire contained a number of open questions that enabled the authors to identify three main reasons for students missing lectures. These were part-time employment, coursework preparation to meet deadlines, and illness. The questionnaire also identified reasons why students thought they should attend lectures, with the main reason being to increase their knowledge and understanding of their topic. This is backed up by a questionnaire style study by Dolnicar (2005) who identified that the main reasons for attending lectures was to "find out what I am supposed to learn". Such additional information would be of value in developing effective intervention to address attendance.

In this study, the method used to record student attendance may produce flawed data. There are alternative methods of recording attendance, for example, Burd and Hodgson (2005) used an electronic administration system called ARCADE to record student attendance. Similar electronic systems include UniNanny® (Bowen et al. 2005; Newman-Ford et al. 2008). These systems would also have a number of further benefits.

These include saving staff time in data collection, removal of human error in data recording and, not least, allowing attendance to be easily monitored. Unfortunately, there is no such electronic data collection system in place at LJMU, and there are obvious cost implications if such a system were to be purchased. However, it can be argued that any purchasing cost of the system would be offset by improving retention with its associated financial benefits (Bowen et al. 2005). In the absence of sophisticated attendance recording mechanisms, this research had to rely on traditional registers. However, despite their acknowledged limitations, there is no reason to suggest that the data generated will significantly be inaccurate. In light of this, such attendance recording techniques have been widely used in similar research (Paisley & Paisley 2004).

This study found a clear and significant link between attendance and attainment in the two modules considered. However, there was a large variation in the mean module marks for students attending the same percentage of learning opportunities (Figures 1 and 2). In fact, there were some students who did not attend any of the learning opportunities for Module A, but who did pass the module (10 out of 13 students with zero attendance). However, this may be a result of previously referred or deferred students, who had already attended the module, being included in the data. The link between attendance and module attainment is further emphasised in analysis that shows the relationship between average attendance and nominal classification of module mark. This pattern was similar to that found by Colby (2004).

This research adds to the strong case already made in the literature of a link between attendance and attainment (Burd & Hodgson 2005; Colby 2004; Halpern 2007; Paisley & Paisley 2004; Newman-Ford et al. 2008). Further to this, with an associated link between

attendance and retention (Yorke & Longden 2008) it is clear that it is not just in the interests of student to increase attendance, but also in the interests of higher education institutions. However, just because a student has a high attendance rate, they are not necessarily engaged with the module. There may be a 'chicken and egg' scenario occurring; do students attend because they are engaged, or do they become engaged because they attend? Is this prior engagement the reason why they obtain good module marks, rather than their level of attendance? This was extended by Paisley and Paisley (2004) who argued that low attendance could be the result of the student distancing themselves from the educational process due to their lack of aptitude for the topic. Furthermore, marks may be dependent on many other factors, including entry qualifications, which have been identified as a significant factor in determining academic success (Halpern 2007; Woodfield et al. 2006). Students with good A-level qualifications may already have the level of study skills required for academic success.

It is interesting to note that students have reported understanding the benefits of attending lectures, and recognise that if they attended more frequently they would perform better (Paisley & Paisley 2004). However, even bearing this in mind, they may still fail to attend. Burd & Hodgson (2005) suggested that this is because students are trying to find their work-life balance. Scott and Graal (2007) found that students knew their first year marks did not count towards their degree and therefore often aimed just to pass the module. This may explain why some students fail to attend first year teaching sessions as they may not place the appropriate level of importance on them. It is worth noting that this study focussed on first year modules, and additional research is needed to assess whether a similar relationship exists at Levels 2 and 3. Furthermore, students may not equate

attendance with learning. They may, for example, feel that they can catch-up on missed lectures (Newman-Ford et al. 2008); perhaps by looking at lectures notes on the virtual learning environments (VLEs), such as Blackboard. Indeed, anecdotal evidence suggests that some members of academic staff believe that if lecture notes are placed on a VLE, this may result in lower attendance. However, Burd and Hodgson (2005) showed no correlation between availability of lecture notes and lecture attendance. In fact, it could be argued that by not placing lecture notes on the VLE, students with disabilities may be discriminated against as they may find attendance difficult or require notes in advance.

This research found no significant difference in the rate of attendance and day or time of the session. This was unexpected as there is evidence that attendance is lower on a Friday compared to other days of the week (Collins 1998, cited in Paisley & Paisley 2004; Newman-Ford et al. 2008). However, there is conflicting evidence regarding the effect of time of day on the attendance at the learning opportunity, with some authors claiming that the 9am slot is worse (Burd & Hodgson 2005; Woodfield et al. 2008) and others claiming that time slots later in the day are worse (Paisley & Paisley 2004; Winn 2002 cited in Newman-Ford et al. 2008). It is possible that both the time slots of these modules are equally disliked by students and this may explain why there is no difference seen in the attendance rates. It is worth noting that both modules comprise of a three hour slot that, in the case of the weeks when lectures take place, were broken down into three individual lectures with the attendance register being taken in last lecture. Thus, there is no guarantee that attendance as recorded reflects full or part attendance. Therefore, it is difficult to draw any firm conclusions from this study on the effect of time of day on attendance at learning opportunities and further study is needed.

In conclusion, this study found a clear link between student attendance and attainment in two first-year modules. With this understandable relationship, and the reported link between attendance and retention (Yorke & Longden 2008), the author feels that higher education institutions should focus their attention on not only encouraging attendance, but also being more proactive in monitoring attendance. In fact, the evidence suggests that students who have their attendance monitored feel that their university cares about them (Bowen et al. (2005)). Hence, there may be significant added value in the development of robust and visible attendance monitoring systems

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