

# The Role of Handouts in the M.Pharm Degree Pathway—Differentiating between the Inquisitive and the Acquisitive

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Handouts are an established and recognised way for teaching staff to facilitate learning within higher education, by supplementing traditional didactic Learning and Teaching (L&T) methods. Traditionally, teaching in UK Schools of Pharmacy has often relied upon the use of handouts as part of the L&T strategy. However, their use is inconsistent, and dependent upon the teaching style of the educator. To our knowledge, a systematic analysis of their impact on the student learning experience has not been conducted with respect to their use in the Master of Pharmacy (M.Pharm) degree programme. In this article, we survey the attitudes of undergraduate M.Pharm students with respect to the use of handouts and the effect on their learning at two UK schools of pharmacy and compare the results with an Australian (University of Queensland) school of veterinary science. We report that most students' stated preference is for comprehensive learning support in the form of handouts. This is at slight variance with one of our previous works which, although reported a similar result, also reported that there is in some cases an inversely proportional relationship between the number of handouts given to students and the value they place upon them, as well as that students place greater value on material that they have downloaded themselves by means of an intranet or Managed Learning Environment.

Two hundred and eighty five School of Pharmacy and Biomolecular Sciences, University of Brighton students (Levels 1–4) and 19 staff responded to questionnaire and 150 School of Pharmacy and Biomolecular Sciences, University of Portsmouth students responded.

Reporting from the view that handouts can be a coherent and effective educational strategy to promote lifelong learning, we compare attitudes of the staff and students of the schools and whether or not these influence the manner in which students and staff approach their subjects.

We report significant differences in the way five major questions were answered between each school. Comparisons of the responses from the different schools indicated that students from different universities and from both countries have different beliefs regarding handout usage. Eighty-three percent of Brighton students requested comprehensive handouts as an integral component of the lectures, compared to 56% of Queensland students, and 53% of Portsmouth students. Whilst staff favour the limited use of handouts as supplements to lecture materials and tended to agree on most responses, with only 32% of Brighton staff and 34% of Queensland staff agreeing that students should receive comprehensive handouts. More staff than students also agreed that handouts discourage further reading in a subject. Other factors that were significantly related to student responses were gender, year of study, choice of pre-registration field, the presence or absence of a part-time job and whether or not the student was studying in their native country.

*Keywords:* Handouts; Pharmacy education; Teaching tools; Learning guides

## INTRODUCTION

Learning and teaching methods (L&T) in United Kingdom (UK) higher education (HE) establishments vary considerably, depending upon a range of factors, including the type of course, the institution where the course is taught, class size and type of students, academic workload, personal lecturing styles of academics and social demographics.

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Both the UK Master of Pharmacy (M.Pharm) degree pathway and the Australian veterinary sciences programme, the subject of a previous work by McLennan and Isaacs (2002), are vocational courses that lead to qualifications and practice of a clinical nature. Pedagogically, the delivery of the theoretical aspects of these courses relies heavily on a lecture-based approach, supported by tutorials and seminar sessions. The majority of lecturers increasingly rely on the use of handouts in some form, usually by the lecturer providing them directly on the day of the lectures or indirectly via an electronic resource, such as an intranet, or a Managed Learning Environment (MLE) such as Blackboard™, which may be an expanded or abbreviated version of the lecture notes. The term “handout” refers to a physical paper or papers given to the student before, during or after the lecture or associated contact time. Handouts can take a variety of formats; not just lecture notes but can also include support material such as extra reading or model answers to practice questions. What ever the nature of the support material in handout form its ultimate aim has to be to enhance the learning activity. Note-taking during lectures has been found to foster generative learning, encouraging students to relate lecture content to concepts and facts already mastered. This has encouraged the provision of handouts, which allow students to listen fully during a lecture, and can also increase the amount delivered during a lecture session, when compared to dictatorial speaking or copying from overheads (Murphy and Cross, 2002).

We have previously reported (Sosabowski *et al.*, 1998) that 41% of a population of M.Pharm students value handouts less than material they had downloaded themselves, many citing an increased stakeholding in self-procured learning resources of this type.

Efficiency of learning is defined by the student’s ability to recall the content of the lecture immediately after the lecture (*immediate recall*) or at a later time (*delayed recall*) (Isaacs, 1989). The purpose of note-taking is to create an *external storage function* which is a student’s set of notes, from which they will carry out their revision, and to create an *encoding or storage function* which is a student’s personal understanding of a teaching session (DiVesta and Gray, 1972). Generally, students who utilise combinations of encoding and storage functions receive the best test scores (Collingwood and Hughes, 1972; Beard and Hartley, 1984; Kiewra *et al.*, 1989; 1991; Davis and Hult, 1997).

Consequently, partial or *skeleton* outlines of the information imparted during a lecture can provide a balance of storage and encoding functions, allowing students to listen during the majority of the lecture, but also to take supplemental notes where appropriate or necessary. More recently, studies on medical

students have been carried out to determine whether they should be given instructor’s notes before lectures (Morrison *et al.*, 2002). The results of this study indicate that the students who performed best during post-lecture testing were those who reviewed a combination of notes provided to them and which they supplemented with their own notes. This was particularly the case if the handouts followed a skeletal format, which the researchers found encouraged active note-taking.

The role of handouts has been recently investigated in the Australian veterinary program (McLennan and Isaacs, 2002). The authors identified the main issues with regard to lectures and their related teaching materials in order to develop a questionnaire-based study. Their results demonstrated significant differences in the perceptions of students and staff with regard to the role of handouts. As a result, the use of MLE’s has greatly improved student access to learning resources, such as electronic handouts, and as a result the need for formal handouts and lectures has been questioned.

The purpose of this study is to provide a comparison between staff and students in two UK schools of pharmacy and, with the work of McLennan and co-workers, a view to understanding the habits and attitudes that students may develop toward learning with or without such learning aids. While other methods of teaching such as Problem Based Learning (PBL) may offer an alternative to lectures and handouts, the implementation of such a course carries significant issues with respect to both the consistency of teaching and the resources required. The compromise of Problem Centred Learning (PCL) also has attractive benefits but still involves some aspect of lecturing and the provision of handouts and didactic teaching. It is therefore incumbent on educators to investigate and optimise the use of lectures and handouts. The provision of a hard copy handout, and what format this handout should take, is examined in this study from the perspectives of both staff and students. While the students’ perceptions are of great significance, it is clear that their point of view may be biased in some cases towards lowering their perceived workload and may have an agenda other than the achievement of the stated educational objectives. The staff point of view may be such that they wish to achieve a learning outcome that involves a process that is not suitably supported, either partially or fully, by a handout. This process may actually involve the attendance of several classroom sessions such that in order for the learning outcome to be achieved and ultimately assessed attendance is essential. It is possible that the provision of handouts or making them accessible via MLE may reduce the motivation of students to attend formal lectures. Students may not go to class and ask or pressure other students to pick up extra

TABLE I Staff and student questionnaire summary

| Question    | Description   | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|-------------|---|----------------|-------|---------|----------|-------------------|
| Question 1. | Lectures should provide handouts for all lectures                                 | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Question 2. | Handouts should be comprehensive (provide complete notes)                         | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Question 3. | Handouts should provide partial notes only  | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Question 4. | Handouts should encourage learning by enabling students to listen during lectures | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Question 5. | Handouts may discourage further reading in a subject                              | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |

handouts during lectures or duplicate the handouts. In this paper, we report our initial finding with respect to maximising the potential of handouts as learning resources.

## METHOD

The questionnaire used had previously been developed and validated (McLennan and Isaacs, 2002). The questionnaire was developed using the Nominal Group Technique (NGT), in order to identify the key issues concerned with the use of handouts in lectures (Carney *et al.*, 1996; Dowling and St. Louis, 2000; MacPhail, 2001; Nelson *et al.*, 2002). It is based upon five key questions that are answered by a five point Likert scale (Table I). The table shows condensed responses for clarity, but the statistical calculations were carried out on the full range of category responses.

TABLE II University of Brighton M.Pharm student and staff questionnaire results

|   | Agree (%) | Neutral (%) | Disagree (%) |
|---|-----------|-------------|--------------|
| Question 1. Lectures should provide handouts for all lectures                                 |           |             |              |
| Staff   | 32        | 5           | 63           |
| Students  | 83        | 12          | 5            |
| $\chi^2=29.545$ $p < 0.05$  |           |             |              |
| Question 2. Handouts should be comprehensive (provide complete notes)                         |           |             |              |
| Staff   | 5         | 16          | 79           |
| Students  | 65        | 17          | 18           |
| $\chi^2=26.937$ $p < 0.05$  |           |             |              |
| Question 3. Handouts should provide partial notes only  |           |             |              |
| Staff   | 42        | 42          | 16           |
| Students  | 29        | 22          | 49           |
| $\chi^2=11.384$ $p < 0.05$  |           |             |              |
| Question 4. Handouts should encourage learning by enabling students to listen during lectures |           |             |              |
| Staff   | 84        | 16          | 0            |
| Students  | 88        | 9           | 3            |
| $\chi^2=0.664$ $p > 0.05$   |           |             |              |
| Question 5. Handouts may discourage further reading in a subject                              |           |             |              |
| Staff   | 58        | 16          | 26           |
| Students  | 29        | 21          | 50           |
| $\chi^2=17.921$ $p < 0.05$  |           |             |              |

Further data related to biographical information (i.e. age, gender, year of study, choice of pre-registration career) were also collected. The questionnaire was assessed for linguistic compatibility and the absence of regional idioms between the Australian and British use of English Language with the Cambridge International Dictionary of Idioms (Walter, 1998).

Pharmacy students were surveyed by being given the questionnaire at the start of an appropriate teaching session across all four years of the M.Pharm programme. The students surveyed at the University of Portsmouth ( $n = 150$ ) were initially used as a check to ensure that the data generated from Brighton University was neither biased nor reflective.

The data were analysed by the SPSS<sup>®</sup> V10.1 statistical computer package. The significance of difference between the actual number of staff and students responding to a particular question was assessed using the  $\chi^2$  test and Fishers exact test, when appropriate. Statistical analysis was initially conducted upon the raw data obtained from questionnaires. These results were converted to percentages for easier intelligibility and interpretation. The  $p$  values for difference between variables are given in Table II, and were considered significant at less than the 0.05 level. Correlation analysis between questions were analysed using Spearman's rank correlation coefficient.

Where appropriate, the data obtained in the original Queensland study (McLennan and Isaacs, 2002) was used in a comparative manner with the data obtained from the Brighton and Portsmouth studies.

## RESULTS

Response rates were high in all studies, with 285 responses from 297 University of Brighton students (96%) from all four levels, and 148 responses from 148 University of Portsmouth students (100%), again,

from all four levels. Response rates for staff in Brighton were comparable, with 19 out of 21 staff (90%) responding.

Generally, staff and students held different views to the uses of handouts. Staff tended to agree on most responses between Brighton (Table II) and Queensland (Table III). For example, this is shown in the response to Question 1, with 32% of Brighton staff and 23% of Queensland staff agreeing that students should receive handouts. Conversely, students at The University of Brighton were overwhelmingly in favour of receiving handouts for all lectures, with 83% of respondents in favour. This was significantly different to their Australian counterparts, who favoured fewer handouts, in skeleton form. A similar bias was recorded when the nature of the handout was addressed (Questions 2 and 3). Overall, all groups agreed that handouts have a role in allowing listening and improving learning during lectures. No significant differences were observed with their responses to these questions, and this is comparable with results from the previous study (McLennan and Isaacs, 2002). Finally, staff agreed strongly that handouts may discourage further reading in a subject, whereas students disagreed strongly, indicating (Questions 3 and 5) that while handouts are favoured by both staff and students, the nature and content of such resources is the real point of difference between these groups.

Statistically, student responses to Questions 1, 2 and 4 were positively correlated to each other (Spearman's  $\rho > 0.55$  in all cases,  $p < 0.001$  in all cases,  $n = 285$ ). This implies that students who wanted handouts of lecture notes wanted them to be comprehensive, and suggested that they encouraged

learning by enabling listening. Questions 3 and 5 were weakly positively correlated (Spearman's  $\rho = 0.42$ ,  $p < 0.001$ ,  $n = 285$ ), indicating that those who agreed on the use of partial handouts also felt that they discouraged further reading in a subject.

Comparisons between student respondents in the Portsmouth and Brighton pharmacy schools were not as significant or clear as those between Brighton and Queensland. However, in certain cases significant correlations were observed; between Questions 1 and 2, and Questions 3 and 5 (Portsmouth vs. Queensland). No comparable survey was made of staff in Portsmouth in this pilot assessment.

## DISCUSSION

McLennan and Isaacs' work (2002) demonstrated significant differences in the attitudes of students and academic staff regarding the provision of handouts to support and enhance lectures. By the use of a series of questions that reflect the core needs of students on vocational, healthcare-related courses (i.e. veterinary medicine and pharmacy) it was felt that the questionnaire could form the basis of a study in the University of Brighton School of Pharmacy and Biomolecular Sciences.

The English language contains a number of regional differences, where the same word or phrase can often have different meanings in different environments (idioms). For this reason the original questionnaire was examined in detail to identify any particularly Australian idioms that might be misunderstood by a UK-English language audience. However, the original handout did not require any modifications for this reason; the only alterations made related to the information provided to students on the introductory page of the questionnaire, which were changed to conform with local ethical committee approval, where relevant.

The results of this study raise several key points. It is clear that students have a different perspective to that of their educators in the role that handouts and related supplemental materials have in their education. Students were heavily biased towards receiving as many handouts as possible that contained as much information as possible. They did believe that this will impact on the likelihood of their undertaking further reading in their subject. On the other hand, lecturers appear to be very much geared towards supplementing their lecture material with ancillary documentation, and they appear to produce handouts when they feel it is appropriate to do so. This would imply that lecturers feel that the provision of "full" notes will not provide a suitable educational experience, as this may affect the perceived need to attend lectures.

TABLE III University of Queensland Veterinary Science student and staff questionnaire results (from McLennan and Isaacs, 2002)

|   | Agree (%) | Neutral (%) | Disagree (%) |
|---|-----------|-------------|--------------|
| Question 1. Lectures should provide handouts for all lectures                                 |           |             |              |
| Staff   | 23        | 43          | 35           |
| Students  | 56        | 21          | 23           |
| chi <sup>2</sup> =14.756 $p < 0.001$  |           |             |              |
| Question 2. Handouts should be comprehensive (provide complete notes)                         |           |             |              |
| Staff   | 12        | 23          | 65           |
| Students  | 44        | 23          | 33           |
| chi <sup>2</sup> =17.617 $p < 0.001$  |           |             |              |
| Question 3. Handouts should provide partial notes only  |           |             |              |
| Staff   | 69        | 20          | 11           |
| Students  | 45        | 27          | 28           |
| chi <sup>2</sup> =7.751 $p < 0.009$   |           |             |              |
| Question 4. Handouts should encourage learning by enabling students to listen during lectures |           |             |              |
| Staff   | 71        | 6           | 23           |
| Students  | 86        | 7           | 7            |
| chi <sup>2</sup> =10.043 $p < 0.002$  |           |             |              |
| Question 5. Handouts may discourage further reading in a subject                              |           |             |              |
| Staff   | 63        | 23          | 14           |
| Students  | 37        | 22          | 35           |
| chi <sup>2</sup> =8.954 $p < 0.009$   |           |             |              |



Several studies (DiVesta and Gray, 1972; Isaacs, 1989; Kiewra *et al.*, 1989; 1991; Davis and Hult, 1997; Morrison *et al.*, 2002) have demonstrated that, in the medical and related fields, the provision of a *skeleton* of lecture notes as a handout, combined with attendance at the lecture, result in a higher rate of success. The dichotomy between the perceptions and demands of the students, and the evidence-based or experiential methods of teaching adopted by most academics in the subjects allied to medicine, suggests a difference in learning styles, between a more surface approach from students, as compared with a deep approach from staff, which may relate to differences between both groups in the perception of the task and learning outcomes (van Rossum and Schenk, 1984; Entwistle, 1988; Anderson, 1995). While it was felt that such differences may be most problematic in the initial successful provision of a course, a comparison between students in all four years of the Brighton M.Pharm degree did not show any significant differences, indicating that the student's attitudes to handouts did not change as they progressed through their course. Whether this difference is influenced by different modes of teaching prior to attendance is unclear, particularly as students in both Brighton and Queensland responded in similar manners. Educators therefore need to be aware of such differences, and to address the issue that students may be taught in a way that they may perceive as not providing an ideal learning experience, based on their prior learning and assessment modes. However, the fact that educators were, in this study, in favour of producing and using partially filled handouts skeletons would suggest that note-taking during lectures is a significant aid in maintaining or improving concentration, and provides an optimal learning environment (Collingwood and Hughes, 1972; Beard and Hartley, 1984; Morrison *et al.*, 2002).

Further, valid and significant comparisons were made between the veterinary and pharmacy programmes in Queensland and Brighton, respectively, suggesting that this questionnaire can be extended into other subjects allied to medicine. The possible limitation of this questionnaire is that it was validated on a sample of veterinary science students; a large-scale, multi-centred study could raise further validity issues with the questionnaire in its present format. Moreover, future work may include discursive data-gathering exercises such as interviews and focus groups. Its use and extension into other areas, particularly social science and arts subjects, is perhaps questionable, due to the very different modes of learning between these subjects, particularly with regard to the requirements of reading and learning outside the lecture theatre. In addition, a small scale pilot study was run in the Portsmouth Pharmacy School. This identified similar trends to

those found in the Brighton study. While this would provide a measure of qualitative validation for the results from Brighton, it does not provide a statistically valid comparison, due to the size of the dataset generated from Portsmouth. Undertaking a larger-scale, multi-centred study is the aim of current and future studies in this field as well as a follow up interview or focus group(s) and discussion with a selection of candidates as a complementary qualitative technique.

## CONCLUSIONS

The results of this study demonstrate clearly that lecturers feel that too many comprehensive handouts will discourage further learning, while too few may limit the learning environment. Conversely, students perceived that the provision of comprehensive handouts provided a more appropriate learning experience. Therefore, provision of a good "skeletal" handout, prepared with a view to aiding revision, both in and away from the lecture venue, is vital to optimise learning. However, the methods used to achieve these learning outcomes are defined differently by students and lecturers, and there would appear to be uncertainty in how this paradigm is best resolved. An overall shift in the emphasis and style of teaching provided by computer and web-resource based learning may provide a more comprehensive valid learning environment. It is also apparent from the high percentage of neutral comments in this survey that students may be in need of some instruction regarding the relationship between lectures, handouts and learning, and how this particularly will differ at university, compared to their previous educational experiences.

It is clear from the data collected that staff in the UK and Australia face similar issues in the delivery of clinically-based and scientifically-intense courses. The process of evaluating handouts is continuing, and it is hoped that comparative surveys of other UK schools of pharmacy may address this issue more clearly, and in a broader context (i.e. different entry requirements and educational backgrounds).

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