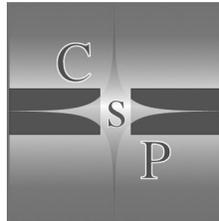


Teaching Psychology around the World

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Edited by

Sherri McCarthy, Ph.D.; Stephen Newstead, Ph.D.;
Victor Karandashev, Ph.D.; Carlo Prandini, Ph.D.;
Claudio Hutz, Ph.D., and William Gomes, Ph.D



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This book is dedicated to all of our colleagues who have devoted their time and energy to help us bring together information about the similarities and differences of teaching and practicing psychology throughout their respective countries. It is especially dedicated to Professor Ernesto Alvarez (1953-2007), former Dean of Psychology at Universidad Autonoma de Baja California (UABC), who spent much of his life bringing together students and professors of psychology from around the world.

TABLE OF CONTENTS

Index of Proceeds.....	ix
Preface	xii
Chapter One	1
Psychology Applied to Teaching and Learning Psychology at the University Level S. Newstead	
Chapter Two.....	27
Psychology Applied to Assessment of Student Learning of Psychology at the University Level S. Newstead	
Chapter Three.....	52
Teaching Psychology in Public Schools at the Pre-university Level C. Prandini	
Chapter Four	112
Best Practices in Secondary Psychology Education C. Prandini	
Chapter Five.....	167
International Perspectives on Psychology Teaching: Europe V. Karandashev	
Chapter Six.....	275
International Perspectives on Psychology Teaching: North America S. McCarthy	
Chapter Seven	344
International Perspectives on Psychology Teaching: Australia S. McCarthy	

Chapter Eight	381
International Perspectives on Psychology Teaching: Africa and the Mid-East S. McCarthy	
Chapter Nine	479
International Perspectives on Psychology Teaching: Asia and the Pacific Rim S. McCarthy	
Chapter Ten.....	545
International Perspectives on Psychology Teaching: South America S. McCarthy, C. Hutz and W. Gomes	
Chapter Eleven.....	607
Retrospective and Perspectives on Psychology Education: An International Endeavour V. Karandashev	

INDEX OF PROCEEDS OF THE FIRST JOINT
MEETING OF THE INTERNATIONAL CONFERENCE
ON PSYCHOLOGY EDUCATION AND THE
INTERNATIONAL COUNCIL OF PSYCHOLOGISTS
HELD IN FOZ DO IGUAÇU, BRAZIL,
JULY 12-15, 2005

Chapter Three

HIGH SCHOOL TEACHERS: HOW MUCH PSYCHOLOGY SHOULD THEY BE TAUGHT?.....	75
By L. Lotto, C. Tonzar and R. Job	
PERCEPTIONS OF AND INTEREST IN PSYCHOLOGY AMONG UPPER HIGH SCHOOL STUDENTS: SOCIOECONOMIC STATUS, SCHOOL TYPE, GENDER AND VALUE ORIENTATION	84
By R. Bennett, G. Brudenall, T. King, V. Palmer, M. Spicer-Wensley and S. Taylor	
CHALLENGES FOR TEACHERS OF PSYCHOLOGY IN U.S. PUBLIC HIGH SCHOOLS	107
By S. McCarthy	

Chapter Four

A CROSS-SECTIONAL STUDY ON RELIGIOUS AND MORAL STAGES	141
By A. Comunian	
MORAL JUDGEMENT DEVELOPMENT IN DIFFERENT CONTEXTS...156	
By A. Comunian	

Chapter Five

- WHAT MAKES A GOOD TEACHER? A COMPARISON OF RUSSIAN AND U.S. STUDENT PERCEPTIONS215
By N. Parnyuk, V. Sitnikov and S. McCarthy
- CADETS' AND OFFICERS' IMAGES OF TEACHERS AT THE RUSSIAN POLICE ACADEMY245
By N. Parnyuk, V. Sitnikov and S. McCarthy
- THE PSYCHOLOGICAL ASPECTS OF DIMINISHED RESPONSIBILITY: RECENT INTERNATIONAL RESEARCH260
By L. Lowenstein

Chapter Six

- ALCOHOL USE AND MISUSE CROSS-CULTURALLY: A CRITICAL REVIEW322
By L. Ray, K. Hutchinson, E. Marshall, S. McCarthy and C. Hutz
- GLOBAL WARFARE, VIOLENCE AND THE WELFARE OF WOMEN...336
By J. Rice

Chapter Seven

- PROFESSIONAL INTENTION AND ANXIETY RELATING TO THE SCIENCE OF PSYCHOLOGY: PRELIMINARY DATA IN AN AUSTRALIAN CONTEXT358
By P. Wilson, K. Dennis and S. Provost
- THE AUSTRALIAN UNIVERSITIES TEACHING COMMITTEE PROJECT IN LEARNING OUTCOMES AND CURRICULUM DEVELOPMENT IN PSYCHOLOGY371
By P. Wilson, O. Lipp, D. Terry, D. Chalmers, G. Hennan, F. Martin, G. Farrell, D. Bath and S. Provost

Chapter Eight

- FOSTERING THE RIGHTS OF YOUTH AT RISK: COUNSELLING APPLICATIONS427
By Amos Aloa

ALCOHOL USE IN UNIVERSITIES: ANALYSIS OF TRENDS AT THE UNIVERSITY OF BOTSWANA	439
By Amos Aloa	

THE EFFECTS OF DECIPHERING LIMITED BANDWIDTH AUDITORY STIMULI ON PERFORMANCE ON A CONCOMITANT PERCEPTUAL- MOTOR TASK: IMPLICATIONS FOR THE USE OF MOBILE PHONES WHILE DRIVING	458
By T. Amir, M. Abdel-Hafaz and K.S. Ali	

Chapter Nine

WHAT IS IN THEIR MINDS? THE PSYCHOLOGY OF SUICIDE BOMBERS IN INDONESIA.....	519
By S. Sarwono	

THE RELATIONSHIP OF RELIGIOSITY AND YOUTH CULTURE TO PREMARITAL SEX AMONG MALAYSIAN AND INDONESIAN ADOLESCENTS	526
By J. Jaafar, I. Wibowo, T. Afiatin and S. McCarthy	

Chapter Ten

CHILDREN'S PERCEPTIONS OF AND EXPERIENCES WITH VIOLENCE IN SOUTHERN BRAZIL.....	576
By L. de Souza, S. McCarthy and T. Sperb	

WOMEN AND MEN IN LATIN-AMERICAN AND EUROPEAN UNIVERSITIES	594
By A. Guil and V. Herrera	

PREFACE

This book is intended to be an overview of teaching and learning psychology internationally, including papers that demonstrate the current state of international psychological research and practice. It summarises what those of us on the Organising Committee of the International Conference on Psychology Education (ICOPE) know about teaching and learning, drawing on our own experiences, our published and edited research in the area and the many papers contributed from the International Conference on Psychology Education and International Council of Psychologists joint conference in Foz do Iguaçu, Brazil in 2005. The book disseminates information about good practice and covers many aspects of teaching, including curriculum, planning, activities and assessment practices from countries throughout the world. Useful papers from many areas of applied psychology that may be of interest to both teachers and students of psychology, as well as practicing psychologists, are included. The aim of the book is to provide up-to-date coverage of key areas of psychological research which have relevance to psychology education in a manner that is both technically accurate and readily understandable. The book incorporates research and perspectives from psychologists and professors from more than 20 countries throughout the world. It includes relevant information for secondary (high school), undergraduate (baccalaureate) and post-graduate (M.A., Doctoral and Post-Doctoral) programmes.

A key feature of the book is its international perspective on psychology teaching and learning. There is an enormous North American influence on psychology education, due in no small part to the success of textbooks such as the various versions of Hilgard and Atkinson's 'Introduction to Psychology'. However, there remain many differences in how psychology is approached and taught in various parts of the world, which need to be recognised. The authors have extensive experience teaching using many mediums, including interactive television, web-courses, distance seminars and traditional lecture courses in many countries, including Russia, Brazil, Italy, Mexico, the U.S. and the UK and have worked in programme evaluation and examination in those countries, as well as others. We draw on these extensive experiences in synthesising the material gathered here.

Members of the ICOPE Organising Committee with expertise teaching psychology at these various levels and in many places wrote the chapters and

edited the papers included within each. The papers were contributed by noted psychologists and professors of psychology from throughout the world, selected from those presented at the conference. Although all of the editors collaboratively shared knowledge in refining the chapters throughout, we each took specific responsibility for designated chapters most related to our own expertise.

Carlo Prandini of the University of Bologna wrote and edited the chapters on secondary education. Carlo has extensive experience in secondary teacher training in Italy and has also taught psychology at the secondary level. William Gomes, Universidade Federal do Rio Grande do Sul (UFRGS), Brazil co-wrote the section on university-level psychology teaching in Brazil. Dr. Gomes has extensive teaching and research experience in this area and recently served on a federal government committee for curricular reform for training Brazilian psychologists. He spent his last sabbatical at the University of Michigan in the U.S., broadening his familiarity of teaching practices with noted psychology educator William McKeachie. Dr. Claudio Hutz, also of UFRGS, also contributed to the chapter on South America. Originally educated in Israel and the U.S., he has worked in psychology teaching and programme administration for over two decades, and consulted and served on committees related to this field in China, the EU, throughout South America and elsewhere. He is currently actively involved with graduate programme evaluation in Brazil.

Victor Karandashev, the organiser of the 1st International Conference on Psychology Education in St. Petersburg, Russia in 2002 and a driving force behind the continuing success of the international conferences on psychology teaching and learning contributed his vision for the future of international psychology, and summarized psychology education in Europe at the present time. Dr. Stephen Newstead, Dean at the University of Plymouth, UK, noted cognitive psychologist and former president of the British Psychological Society, summarized recent research on best practices in psychology teaching and assessment. Dr. Newstead is an active force in programme quality evaluation in the UK and elsewhere.

I summarised teaching practices in other areas of the world with the help of colleagues who work in those regions based on my experiences and research projects in the respective countries presented. I also edited the text throughout, along with Dr. Newstead's assistant Sheila Truscott and Amanda Millar, our helpful editor and typesetter at *Cambridge Scholars Press*, for the sake of accuracy, clarity and consistency. I apologise in advance for any

mistakes with UK spelling and capitalisation conventions! They are certainly mine, and should not reflect on the authors.

I would like to thank all of the many contributors for sharing their expertise. We hope this book will be a valuable source of information to all psychologists, and especially to all teachers of psychology, regardless of level and subject, in countries around the globe. We also hope it will bring all of us closer together in making psychology a discipline which transcends national boundaries and better serves all of mankind as we share this fragile planet.

Sherri McCarthy—February, 2007

CHAPTER ONE

PSYCHOLOGY APPLIED TO TEACHING AND LEARNING PSYCHOLOGY AT THE UNIVERSITY LEVEL

This chapter is a summary of current research from cognitive and educational psychology highlighting important aspects of good teaching in psychology, particularly by lecture, since this seems to be the most common method used internationally. It is written by **Steve Newstead**, who gained his first degree at the University of Oxford and subsequently received a PhD from the University of Nottingham. His PhD research was on the psychology of language and thinking, an area in which he maintains a strong interest to this day. However, he has also established an international reputation in the applications of psychology to teaching and learning in higher education, and has published seminal articles on student cheating, biases in the assessment of students, and the reliability of the marking process. This work has led to invitations to give keynote addresses in a number of different countries, including Russia and Malta. He is currently a Professor of psychology and Dean at the University of Plymouth, where he has worked for more than 30 years. In 1999 he received the British Psychological Society's Award for Distinguished Contributions to the Teaching of Psychology. He was President of the British Psychological Society in 1995-96, and has also served the Society in a number of other roles, including chair of the Special Group of Teachers in Psychology, chair of the Membership and Qualifications Board, and Centenary Vice-President in 2001 when the Society celebrated its 100th anniversary. He recently chaired the group which drew up the national benchmarks for psychology teaching in the UK, and has also chaired a group set up by the Economic and Social Research Council to draw up guidelines for the research training of psychology postgraduates. He chaired a pan-European Task Force which looked at psychology training across Europe, which led to a number of publications, including an overview of psychology training which appeared in *European Psychologist* (1997). He has published nearly 100 refereed journal articles, about two-thirds of which are in the area of language and thinking. This includes papers in some of the most prestigious psychological journals, including *Journal of Experimental Psychology*, *Journal of Memory and Language*, *Cognition*, *Memory & Cognition*, and *Journal of Educational Psychology*. Perhaps his best

known book is the one he co-authored with Jonathan Evans and Ruth Byrne, *Human Reasoning: The Psychology of Deduction* (1993, Erlbaum), which has become the standard reference in this area. He has also published numerous chapters in books including *Adult learning: A reader*, edited by P. Sutherland (1997, Kogan Page); *Motivating students*, edited by S. Brown, S. Armstrong & G. Thompson (1998, Kogan Page); and *A handbook of teaching and learning in higher education*, edited by H. Fry, S. Ketteridge & S. Marshall (1999, Kogan Page).

The Applied Psychology of Teaching

There is little excuse for teaching psychology badly. Psychology teachers are in a privileged position since teaching is in many ways just a branch of applied psychology and hence psychologists should be able to apply the principles and knowledge they possess to the advantage of their students. This does not mean, of course, that psychologists always do this. As Gale (1990) put it: 'The typical psychology degree on offer today falls very short of the ideal. A major problem, or cause of the problem, is that psychologists have not used psychology itself to design the degree.'

In this chapter I will try to summarise some of the main areas of psychology that are relevant to teaching. My aim will be to indicate how psychological knowledge is relevant and how it might be applied to the teaching situation. The review will not be comprehensive, but hopefully there will be sufficient coverage to both assist teachers in their practice and also to inspire them to examine further their own psychological knowledge in order to seek out other implications and applications of psychological knowledge.

While teaching and learning can take many forms, the most prevalent form of contact between students is in the formal classes that are held, and of these much the most common format is the lecture. As Ramsden (1992) says: "lecturing remains the pre-eminent method of teaching in most subjects." In a more recent review, Bligh (2000) starts his book, provocatively titled 'What's the use of lectures?' with these words: 'In the United States lecturing is the most common method when teaching adults. And so it is all over the world.' I am sure that few would disagree with these claims.

Hence in this chapter the focus is on the effectiveness of lectures, and brings in research on individual differences, memory, learning, and evaluation, as well as more educationally-oriented research which investigates lectures directly. In a later chapter I examine other areas of psychology which have implications for the way in which we assess students. The focus in this chapter on lecturing is intentional since this is one of the few near-universals in

psychology teaching; I know of no country or institution where lecturing does not play a major part in the education of psychology students.

What is the Purpose of Lectures?

Although lectures are in such widespread use, there is not necessarily agreement as to what they are designed to achieve. Are they intended to transmit facts? To inspire students to read round a topic? To persuade them of the validity of a certain point of view? To encourage critical thinking? Or something other than these?

There are those who argue that the use of lectures is based more on habit and false assumptions than on any real insight into what their purpose is. Gibbs (1982) wrote a booklet entitled "Twenty terrible reasons for lecturing", in which he summarised some of the false assumptions that are often made. These include the assumption that lectures are the only way to ensure that the ground is covered, that they are the best way to get facts across, that they get students to think, and that they ensure that students have a proper set of notes. Gibbs challenges each of these claims, and suggests that the real reasons why we lecture are rather different, being based more on ignorance of the facts and of the alternative methods available, on unwillingness (or lack of time) to put in the additional work to explore and introduce other methods, and on a variety of other factors including conservatism and resistance to change in both teachers and institutions.

Hence for some the new conventional wisdom is against lectures. However, a more sober assessment comes from a widely used textbook in this area - Beard & Hartley's (1984) *Teaching and Learning in Higher Education*. They say:

One aspect of learning that is rarely mentioned is its efficiency. ... It is possible to teach large audiences within one building Lecturing is still an economical method.

One way of ascertaining the purpose of lectures is to ask the lecturers what they are trying to achieve. This provides a variety of different answers and a clear indication that different lecturers are trying to achieve different things. In a widely-cited study, Trigwell & Prosser (1993) described five different approaches to lecturing derived from interviews with lecturers, ranging from strongly teacher-focused (aimed at information transmission) to strongly student-focused (aimed at bringing about conceptual change in students). The approach taken depends in part on the context in which the teaching takes place

(institutional expectation, discipline taught) but also on the person doing the teaching. In other words, lecturers have different conceptions of the purposes of teaching.

A further complication here is that there is evidence that there may be a mismatch between what lecturers say and what they actually do. Murray & Macdonald (1997) found that lecturers who believed in student-focused teaching actually taught in ways which were more indicative of information transmission. Other evidence suggests that this disjunction between beliefs and actions represents a compromise between teachers' beliefs and the institutional and social context in which the teaching is delivered (Norton, Richardson, Hartley, Newstead & Mayes, 2005).

Thus we have some advocating the reduced usage, if not abandonment, of lectures on the grounds that they do not achieve the aims that lecturers have for them and that those aims are often misinformed. There are others who suggest that lectures are an efficient method and implying that, given the large numbers of students that need to be taught, their use should be maintained and even increased. Who is right? This of course is where research comes in. It is an empirical question as to whether lectures achieve the aims they are claimed to have, and one which psychologists are well fitted to address.

How well do Lectures achieve their Aims?

Given that lectures are both widely used and controversial, it might be expected that there would be a mass of research investigating how effective they are at achieving their aims. It is indeed the case that there have been numerous studies, but these are not always of high quality and certainly use a wide variety of different methods. Bligh's (2000) now classic text on lecturing (it was first published in 1972) provides a convenient review of the studies. However, it is noticeable that much of this research was conducted some time ago and there may be a problem in relying on Bligh's review since things have moved on since much of this research was done. Higher education in many countries has changed almost out of recognition in recent years, with an increased emphasis on the need for high level qualifications and the assumption that the 'knowledge-based economy' is the key to future prosperity. In many countries, this has led to a massive expansion of the higher education system. In addition, the availability of new technology has had a major impact on lecturing, not just on the lectures themselves but also on ways of supplementing lecture material, for example through the use of web-based material.

Bligh considered four main purposes of lectures. Firstly, their usefulness as a means of transmitting information; secondly, their use in the promotion of independent thought and critical thinking; thirdly their

effectiveness in bringing about changes in attitudes; and fourthly their use in the teaching of behavioural skills.

With respect to the first of these, Bligh found, in his meta-analysis, that lectures were as effective as other methods at transmitting information but not more so. In other words, some studies showed that lectures were better (e.g. as demonstrated in a multiple-choice questionnaire), others showed lectures to be worse, others showed no difference. This is a slightly simplified version of Bligh's table:

Alternative method investigated	Number of studies favouring lectures	Number of studies favouring alternative method	Number of studies with no difference
Programmed learning	8	20	17
Discussion	22	18	54
Reading and independent study	9	10	21
Projects	3	6	6
Other	20	27	57

Table 1: An Overview of Studies Favouring Lecture vs. Other Methods of Teaching

As can be seen from Table 1, the majority of studies showed no significant difference between lectures and other methods of teaching. The only possible exception (and even this is not clear cut) is that certain types of programmed learning, specifically one called Personalised System of Instruction, did in some studies prove more effective than lectures in getting information across.

With respect to the second aim, Bligh concluded that lectures were not more effective than other methods at promoting critical thinking and analysis. Relatively few studies have been done, but those that have been conducted have shown that other methods (primarily discussion groups) are more effective. One

problem in this area, of course, is that it is not easy to measure thinking skills. There are standardised tests but these are of dubious validity. Most studies have used specially designed tests of the ability to solve problems or to apply the principles learned; these have the merit of being relevant to what the lecturer is trying to do but the de-merit that we have no information as to how well they measure general thinking skills.

With regard to the third aim, Bligh's review of the literature on lectures as a way of changing students' attitudes suggests that lectures are ineffective at doing this. Lectures are actually worse than other methods (principally group discussion) at increasing students' interest in the subject, helping students acquire the values associated with the subject, or promoting changes in students' personality.

The fourth use of lectures that Bligh considers is in teaching behavioural skills. Lectures are relatively ineffective and other methods (such as practising the skill) are better. Thus Bligh came to the simple (and intuitively sensible) conclusion that lectures are a reasonably effective means of communicating information, but less effective at encouraging critical thinking, changing attitudes and acquiring skills. This conclusion seems inherently plausible and few would contest it.

How can Lectures be Improved?

Recent work has tended to focus not on the general effectiveness of lectures but on ways of improving their effectiveness. One focus has been on the use of active learning in classes. Active learning techniques involve a wide variety of possibilities. They may involve buzz groups, where the lecture group is broken down into smaller discussion groups to tackle a specific problem or issue; or short problem solving sessions, for example based on a case study; or discussions between the lecturer and the students; or short talks by students; in fact any activity in which students are actively involved rather than passive recipients of information. Gibbs, Habeshaw & Habeshaw (1984) produced a booklet entitled '53 interesting things to do in your lectures', and most of these involve the students in some sort of group or individual activity. While many of these might be fun and might fill up the time in an entertaining way, the important question is whether they actually improve the effectiveness of lectures. Some traditionalists might argue that these activities serve to distract students' attention away from the more important material and might lead to less comprehensive coverage of the topic.

Benjamin (1991) is one example of work in this area. She describes the ways in which she has used active learning techniques in her own very large lectures, and has even managed to personalise classes in groups of several hundred. In their feedback students were generally positive about these classes, but what is lacking is any thorough critical evaluation of the effectiveness of the techniques. Another fairly typical example of the kind of research conducted — and of the associated problems — is the study by Birchmeier & Bakker (2002). They delivered two associated classes in social psychology, one of which involved very little actual lecturing but instead held discussion groups, mostly led by students and on topics of the students' own choosing. The other class was the control group which was a standard lecture with some (though limited) discussion. Students in the active learning group felt that the material they had covered was more valuable and indicated that they were more motivated by the course. Such findings are not untypical since students often report that they find active learning programmes more engaging and enjoyable. But what is lacking, as in the Benjamin study, is evidence that they have actually learned more or that they do any better in their courses. Of course, student engagement and satisfaction is a good thing in itself, but it is important that these should not be the only criteria against which educational innovations are judged.

What are the effects of Class Size?

One recurring theme in research on lectures is the effect of class size. As size increases, so do classes become more and more impersonal, and one might expect that students' interest and involvement in the classes would diminish. Furthermore, lecturers almost always say that they prefer and are more effective in smaller classes. Again, what does the empirical evidence show? The picture is a little variable, but in general the evidence indicates that, beyond a certain size, it has relatively little effect. Jenkins (1991) reviewed the (mostly American) literature, and concluded that as class size increased up to about 20 students performance is affected by increasing size, but that further increases after that seem to make no difference. Indeed, on some measures, such as student feedback, there is even evidence that larger classes are preferred. On the basis of this evidence it is difficult to claim that large numbers in lecture classes are necessarily a bad thing.

However, Gibbs, Lucas & Simonite (1996) came to a slightly different conclusion in their research on the modular degree course at Oxford Brookes University in the UK. On this programme students have a very wide choice of modules which leads to the students being placed in classes of very different size. The authors were able to study how performance varied across modules as

a function of the number of students in the module. There was a very clear relationship between size and performance. In other words, the smaller the classes, the better the student performance.

How can these conflicting results be reconciled? Both studies agree that, with smaller sizes of classes, increased size does lead to less effective teaching. Over a certain size it may be that size makes little difference, and performance may be more attributable to the teacher than to class size. Jenkins' review was, as indicated earlier, based primarily on American studies, and it may be that the better lecturers are assigned to the larger classes, thus cancelling out any effect of class size; or it may be that lecturers make extra efforts with larger classes. But there is little evidence that larger classes in themselves are inevitably a source of poor lecturing.

Note-Taking in Lectures

Note-taking by students in lectures is an almost universal activity, but what exactly is the function of taking notes? Most students (and lecturers) would claim that notes help to focus attention, and serve as a memory and revision aid. But just how effective are they in this, or is note-taking just something that students do out of conformity – because everyone else does it?

Kiewra (e.g. 1989) makes a distinction between two main functions of note-taking: storage and encoding. The storage function emphasises that notes provide the basis for review which facilitates memory. The encoding function refers to the extent to which note-taking facilitates learning and comprehension even without review; it claims that note-taking helps students take in the information even if they never review their notes. Most studies of the effects of note-taking are in fact studies of both encoding and review: students have taken notes (encoding) and then reviewed them. Only recently have researchers looked at the effects of review of notes taken by other people, where the possible benefits of encoding have not been present. Hartley (1983) presents a review which suggests that whether it be from lectures, texts, films or whatever, recall is better if notes are taken. This is a summary of his findings:

	Helps learning	No effect	Hinders learning
NOTE TAKING			
Audio Presentation	21	15	2
Text Presentation	8	3	1
REVIEWING NOTES			
Audio Presentation	13	4	0
Text Presentation	9	2	0

Table 2: Effects of Note-taking on Learning

More recent studies have tended to confirm these findings, though not unequivocally. Most of this recent research on note-taking has been conducted in the USA by Kiewra and his colleagues. They have looked primarily at the effects of note-taking on recall, and most of their research has looked at multiple-choice type tests and real-life note-taking. Kiewra (1989) gives an excellent review, and many of the points I will make are derived from this summary.

The general consensus is that note-taking on its own (i.e. without review) does encourage more active learning and is better than not taking notes. If groups of students are given a lecture and required either to take notes or not take notes, the groups taking notes tend to do better. However, this is not the typical use to which notes are put: it is not usual to take notes and then do nothing with them. More normal would be to review the notes, sometimes re-coding them into revision aids, sometimes using them directly as revision aids. Most research done on review of notes has indicated that taking notes and reviewing them leads to better recall than just listening to a lecture or than taking notes and not reviewing them.

This has led to another question being asked: is it better to use your own notes or will someone else's do? Kiewra, du Bois, Christina & McShane (1988) found that it made little difference - those who borrowed notes did as well as those who took their own notes! A similar result derives from studies of provided notes (i.e. prepared by the lecturer). As long as these are sufficiently detailed, people will remember at least as much (and often more) from provided

notes as from their own. The reason for this is probably that students' own notes are notoriously inaccurate, with both omissions and inaccuracies. The lecturer's notes are presumably more accurate and serve to eliminate such errors. It does lead one to ask again whether lectures are on their own the best way of transmitting information. How effective would it be just to provide a summary of the points and not give the lecture at all?

Matrix notes have in some studies been found to be better than outline notes or free-format notes. Matrix notes are ones where the student is given a complicated matrix covering the lecture and has to fill in the various elements as the lecture proceeds. Since these effectively force students to contrast elements of the lecture, it is not surprising that they led to better essays, but it is far from clear that they will always do so. Outline notes - being presented with an overall summary of the main points and having to fill in the details as the lecture progresses - were no better than free-format notes (Kiewra et al., 1988).

Hence the research would seem to suggest that note-taking is useful in ensuring students actively engage with the material presented and helps them to pay attention to the lecture. And notes are also very useful in review and revision – though the notes can be prepared by someone else, they do not necessarily have to be the students' own notes!

Students' Perspectives on Note-Taking

A number of studies have looked at the kinds of notes that students make, and the results are sobering. Baker & Lombardi (1985) looked at the notes students took on a lecture which was an actual part of their course. The lecture was carefully prepared and the lecturer indicated what were the most important points being made in the lecture. The average number of these points actually recorded by the students in their notes was just over a quarter — though students did tend to accurately note down the very central points. Interestingly, students tended to note down accurately everything that was presented on an overhead. Baker & Lombardi also noted that there was a correlation between the presence of information in lecture notes and its subsequent recall in a test. Information that is noted down tends to be better remembered.

A number of studies have looked at ways of improving notes. Moore (1968) looked at this by trying to cue students as to what they should note down. He held up red and green cards to indicate whether a topic was one that should be noted down or not. Perhaps not surprisingly, this act of theatre led students to recall the principal points better than those who had not had such cueing.

A study by van Meter, Yokoi & Pressley (1994) looked at the students' perspectives on note-taking. The main findings to emerge from this qualitative study were:

1. Students are goal directed in note-taking in that the notes are thought to maintain attention, facilitate understanding, and serve as a study and revision aid.
2. Notes take different forms, in that some notes serve to select important information whereas others are aide-memoires. Some students tend to paraphrase information while others record what is said verbatim.
3. Note-taking is affected by contextual factors such as the pace of the lecture, the nature of the lecture outline, signalling of information by lecturer, and the organisation of the lecture
4. There are differences between students dependent on their familiarity with the material and their skill as note-takers.
5. Course demands affect note-taking; it makes a difference whether the lecture is covering facts or concepts, whether the material is easy or difficult, and what the course requirements are (e.g. whether verbatim recall is likely to be needed).
6. Notes have different fates: some are ignored, but most are re-read; some students re-write their notes; notes are often used in exam preparation; and some notes are made more personally meaningful to students.

Hence students try to be strategic in their note taking, varying their style of note-taking depending on the perceived purpose and context of the lecture. However, it is difficult to see how students can be completely successful in these strategic aims if their notes are as inaccurate as Baker & Lombardi found.

What Use do Students Make of Notes?

Most of the available evidence suggests that students rely heavily on lecture notes in preparing essays, be these for exams or coursework. Entwistle & Entwistle (1991) conducted a retrospective study of students' approaches to their assessment using in-depth interviews with students (mainly psychology students) who had graduated a few months earlier. The authors categorised the students' approaches to revision into one of these categories:

1. Reproducing content from lecture notes without a clear structure
2. Reproducing content and logical framework from lecture notes
3. Using own structure for individual topics, mainly from lecture notes
4. Adjusting structures from strategic reading to meet exam requirements
5. Developing an individual conception of the discipline from wide reading

The students reported using the first of these only in their early days on the degree course. They later tended to use strategies to organise the information, such as developing schematic representations. Most of their methods were geared primarily towards remembering what they had learned in order to reproduce it in the exams. What is more, this was a deliberate strategy that they believed would lead to a good mark in the exam. Even students who had reported using deep approaches to understanding the material in the first place tended to use fairly superficial revision strategies, aimed only at committing the information to memory. Students seem to believe, rightly or wrongly, that regurgitating information in an exam is what will get them good marks, and they gear their revision strategies accordingly; and they believe that their lecture notes help them in this.

Other studies have actually tried to investigate the source of information that is contained in essays. The most significant study here is one by Norton & Hartley (1986). We have already seen that note-taking seems to serve as a useful memory aid; what Norton & Hartley did was to study where the information reproduced in actual exam essays came from. For two successive years students in a subsidiary psychology class were given the same lecture on programmed and computer assisted learning. After the lecture, students' lecture notes were collected in and photocopied before being returned to students. The same exam question was set in both years of the study. Norton & Hartley then examined all the essays produced by these students and categorised every sentence as to whether the information in it was derived from the lecture notes, the lecture handout, the two main course texts or outside reading. One third of the students presented material in their essays which could be directly attributable to their own lecture notes; this was less than could be attributed to the course texts and outside reading, but more than could be traced back to the lecture handout. If the analysis is restricted to those students who actually attended the relevant lecture, then more than three quarters of them used their notes in writing their essay answers. Norton & Hartley also observed

a small positive correlation between the quality of notes taken and the overall mark awarded, and that women took more notes than men

Kiewra and his colleagues have also carried out research on the use to which lecture notes are put in writing essays. In the study by Benton, Kiewra, Whitfill & Dennison (1993) participants watched a video-recording of a 19-minute lecture on creativity, following which they were asked to write a short essay. The researchers measured the quality of the essays by looking at the number of words, the number of idea units and measures of coherence and cohesion. Students who took notes and had access to them during essay-writing produced longer, more coherent essays than non-note-takers (i.e. students who just listened to the lecture). Students who took notes but did not have access to them during the writing of the essay performed no better than those not allowed to take notes.

This rather lengthy review of note-taking suggests some fairly simple conclusions. Firstly, students would be well advised to take notes. All the evidence suggests that those who take notes pay better attention to the material being presented and take it in better. Although taking notes in itself is useful, students should also review and refer back to their notes; those who do so seem to recall the material better and are more likely to use it effectively in exams. However, it is important to ensure that notes are accurate since there is rather disturbing evidence that note-taking can be decidedly unreliable. Students perhaps need training in how to take effective notes. Lecturers should seriously consider providing ready made notes for students, as long as these are ones that the students needs to think about and add to; matrix notes have been shown in some studies to be effective in doing this.

Remembering Information from Lectures

As we have seen, one of the main purposes of lecturing (sometimes it seems as if it is the only purpose) is to enable students to remember information. Psychologists have studied memory in considerable depth and can provide an insight into the best ways to ensure that memory is as effective as possible. Of especial relevance are those studies which have looked at what we remember from information presented in classes, how notes help or hinder in this, and how information is remembered in exams.

An interesting study in this context is that by Nakamura, Graesser, Zimmerman & Riha (1985) who looked at memory for events in a lecture. Some of the events were part of the lecture script (pointing to information on the

blackboard, using eraser) others were not (wiping off glasses, bending a coffee stirrer). Non-scripted activities were better remembered. Why? Because we activate the script, and once activated we find it difficult to discriminate between events that are part of the script and events that have actually happened. Distinctive events, i.e. those that are not part of the script, are much more likely to be accurately remembered. Perhaps disturbingly, such distinctive events are likely to be remembered better than the actual content of the lecture: students may be much more likely to remember a minor disruption in the lecture than what the lecturer said!

Such research illustrates clearly the role that schemas play in memory. If we are asked to remember something, e.g. last week's lecture, our schemas will help. We know roughly what form a lecture will take, and can use this knowledge in re-constructing what actually happened. Indeed, even if we could not remember a thing (e.g. someone who had not attended the lecture at all) it would still be possible to "remember" it by using our schemas. Indeed, a lot of memory may be largely reconstructive rather than based on memory for what actually happened.

Other research has looked at long-term memory for material presented in class. Some of this has investigated very long term memory over 30 years or more. Bahrck has looked at memory for the names and faces of people who you were at school with, memory for a second language learned at school and for mathematics. Fairly typical is the study by Bahrck & Hall (1991) which looked at memory for mathematics (algebra and geometry). Those who had scored well in school exams or who had high SAT scores tended to remember better; but the loss of information was unrelated to these factors. The main determinant of loss was the level to which mathematics had been studied. Those who took mathematics to college level seemed to retain the information almost perfectly for up to half a century. But those who gave up maths at high school seemed to forget most of what they had learned. As Bahrck and Hall say: "Those who have taken three or more college mathematics courses with the highest level above calculus show minimal losses during the course of more than 50 years even though they report no rehearsal activities during that period."

Bahrck & Hall conclude that information which is learned well and understood conceptually and perhaps over-learned tends to be remembered indefinitely. They propose the idea of a permastore; once information has been put in to this store it tends not to be forgotten. One explanation for this is in terms of schema theory; if the information has been incorporated into a conceptual schema, then it is resistant to decay; but if it has not, and is just

another fact, then it is forgotten. If the aim of teaching is to ensure students remember the information (and this is surely one of the aims) this finding has implications for how we teach. Bahrick & Hall suggest that teaching might be changed to improve retention, for example by having cumulative re-examinations of material or by extending the time period over which information is taught.

Psychologists have investigated long term memory for material taught in psychology classes. Conway, Gardiner, Perfect, Anderson, & Cohen (1997) investigated memory for a psychology course - actually a cognitive psychology course run by the Open University in the UK. They studied graduates from the course up to ten years after they had graduated (longer term memory could not be studied because the course only started 10 years before the study). This course was in some ways ideal: it is a highly structured course, which changed little over the years.

Conway et al examined memory for five different areas, including familiarity with proper names and concepts; fact verification; concept grouping; cued recall; and research methods. A perhaps surprising finding to emerge was that recall declined considerably over the first 3 or 4 years, but after that did not decline further. This applied to both recall and recognition of names and concepts, and to concept grouping, though this latter declined less rapidly. This coincides closely with Bahrick's results. Fact retrieval showed a different pattern with only a small decline overall, even over the first 3 or 4 years. Research methods showed no decline at all over time. This latter may be because the material was overlearned through being used in practical classes and projects as well as in the cognitive psychology course.

It is encouraging that students remember some of the information they have learned in psychology courses for considerable periods of time. However, much is forgotten, especially information which has not been used regularly or overlearned in some way. If psychology lecturers want students to remember better, they need to ensure that the content is conceptually processed and continually used.

How do Students Memorise Material?

Another issue in the retention of material from lectures (and from other sources) is the way in which the information is committed to memory in preparation for exams. One study which looked at this is the study by Gruneberg (1973). He surveyed psychology graduates from the University of Wales at

Swansea to try to assess the techniques they had used in preparation for their exams. His particular interest was in the use of mnemonic techniques.

He found that mnemonic techniques were used quite regularly. When students were asked if they had used a mnemonic, 4% said they always used them, 8% that they used them most of the time, 18% that they sometimes used them, and 23% that they used them but only rarely. The remaining 47% indicated that they never used mnemonics.

The technique reported most frequently was the first letter technique or a modification of this, the first letter elaborated into a sentence technique. (A well-known example of this is the mnemonic used to remember the colours of the rainbow: 'Richard Of York Gave Battle In Vain'). The great majority of subjects who reported using mnemonics reported using this technique either on its own or, occasionally, in conjunction with other techniques. The only other technique that is mentioned in the Gruneberg article is what he calls descriptive story: linking key words by means of some invented story. Those who did not use mnemonic techniques mostly reported using repeated readings of material or rote learning of specific points.

There was little difference between the degree class obtained and whether a mnemonic technique was used. A relationship in either direction would be plausible: those who use mnemonics might learn the material better and thus get a better mark; or those who do not use mnemonics might concentrate more on other aspects of the material and thus achieve a higher grading. However, one revealing factor which came through is that there were four students who could not be classified as to the memorisation technique that they used; they said that memorisation occurred as a result of intrinsic understanding. Of these four students, two obtained Firsts, and two Upper Seconds – the highest degree classification awarded. These numbers are too small to analyse, and the point remains that overall the type of mnemonic technique used did not seem to be related to subsequent degree classification.

These results will probably not be too surprising; certainly they coincide with my own memory of what I did when I was a student. Perhaps, however, we *should* be a little surprised given what is known about mnemonic techniques. There is actually evidence that first letter techniques are among the least effective mnemonic techniques that are available. Carlson, Glover & Zimmer (1981) entitled their article: 'First letter mnemonics: DAM (Don't aid memory)'. Similarly, Carney, Levin & Levin (1994) have argued that students should be taught rather more sophisticated techniques for memorisation if these