THE UNIVERSITY OF ADELAIDE
AUSTRALIA

Developing Your Teaching Portfolio

CLPD

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Contents

Why should you develop a Teaching Portfolio?

A teaching portfolio is an essential part of your professional development. It is a document that records your achievements, allows you to reflect on your teaching and supports your applications for tenure and promotion. A teaching portfolio is a living document; it will change over time as you evaluate your teaching, reflect and act on the results, and develop different approaches to teaching.

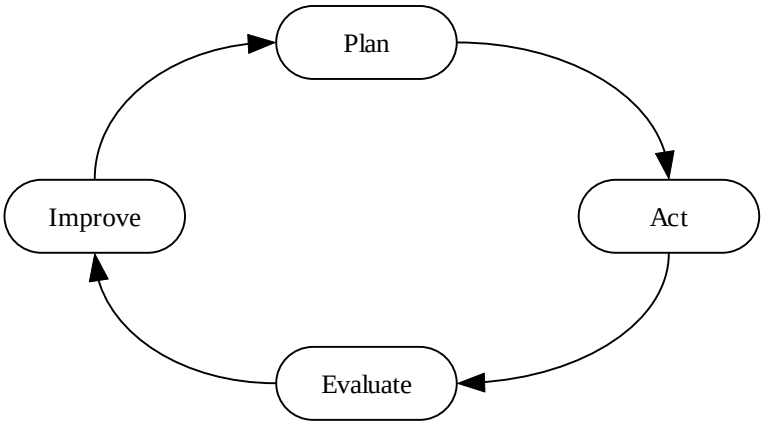
Teaching portfolios are usually 6–12 pages in length, and may contain supplementary material in appendices. They provide a *summary* of your major teaching accomplishments with selected examples that substantiate your commentary. The portfolio is usually written as a scholarly reflection of your teaching and the principles that you have used to inform your approach to academic work. The document will highlight any changes you have made to your teaching on the basis of reading the educational literature, student and peer evaluations, research you have conducted on learning and teaching and participation in professional development programs.

There is no prescribed way to write a teaching portfolio; it is your document. You are not expected to reach some hypothetical standard; the document is a commentary on reflection and development. It is quite acceptable to reflect on teaching activities that did not have the desired effect of improving student learning, as well as those activities that were successful. Portfolios usually develop in stages, from the collection of information, to exploring new methods of teaching through to scholarly reflection and informed action.

Those reading your portfolio for tenure or promotion will be seeking evidence you have:

- a scholarly approach to teaching
- obtained student and peer feedback of your teaching and that you have acted on the results
- reflected on how your teaching has influenced student learning
- made an impact on student learning

You might consider using a model to assist you in reflecting on your teaching. The following simple diagram can be used for quality improvement in many situations.



Preparing Your Teaching Portfolio

Components for your Portfolio

There is no prescribed proforma for a teaching portfolio. Each portfolio is unique, but usually contains most of the following information:

- personal details, including name, department, contact details
- a list of contents, so it is easy for the reader to find items
- an introduction containing your teaching and administrative duties
- a summary of your teaching philosophy, including reference to University learning and teaching plans
- a critical reflection of your teaching activities and their impact on students and your school. This could include a description of the approach you adopted for a particular activity, including the context and rationale for the approach. You could comment on any difficulties or unexpected results from the activity, discuss any student and peer evaluations, and add a reflective summary of the positive aspects resulting from the activity and any changes you would make if you repeated the activity.
- a summary of professional development activity
- a summary of any future developments you would like to undertake and a timeframe for their implementation
- a plan of action for improvements in your teaching
- conference presentations, publications, awards and grants related to learning and teaching
- appendices with documentary evidence in support of your details listed above

Your portfolio should be set out clearly and concisely with an appropriate contents page. It would be advantageous to list relevant references from the literature where these have been used to inform your approach to teaching or actions taken as a result of evaluations and reflections. It is appropriate to cross-reference any statements you make with documentary evidence and literature citations.

What details should you include in your Portfolio?

It is useful to have two sections to your portfolio; the first is a summary containing the statements of your teaching activities, reflection and impact, and the second consists of the appendices containing the evidence to support the summary.

The summary

Two important books on teaching are *Scholarship Assessed*, *Evaluation of the Professoriate* (Glassick, 1997) and *Scholarship Reconsidered: Priorities of the Professoriate* (Boyer, 1990). You should read these papers and consider using the following guidelines for describing your activities in the context of the scholarship of teaching (see also Appendix A for a summary of some of the components and criteria often associated with effective learning and teaching activities).

Some examples of questions you might reflect on for your portfolio include:

Your teaching context

- In your discipline, what content area do you regard as your strongest? Are there content areas in which you need to improve your knowledge?
- What do you regard as the most effective teaching activity you undertake? The least effective activity?
- Which teaching approach has been most beneficial for students? Why?
- Give examples of alternative teaching approaches you have used.
- Do you always use the same teaching methods for all students?
- What is your primary goal with respect to your students?
- How would you describe your relationship with students?

Discipline Knowledge

- How do you ensure your teaching materials reflect the latest knowledge in your discipline?
- Do you discuss with colleagues current developments in your discipline area?
- What do you do to broaden and deepen your knowledge of content in your discipline?

Specific aspects of your Teaching

- Have you stated the goals of your teaching clearly, including learning outcomes?
- Are there aspects of your teaching you would like to change? How would you implement such a change?
- What would you most like your students to remember about you as a teacher?
- Overall, how effective do you think you are as a teacher? How effective are you in assisting students to learn? Would your students agree?
- In what way has your teaching changed in the last five years? What has led to these changes? Are you satisfied with the changes?
- Do you regularly evaluate the learning outcomes of your students?
- Do you use student and peer evaluation, think about the results, and use them to improve the quality of your teaching?

The details you include should be representative enough for the key dimensions of teaching as a scholarly activity to be evident. If you wish to begin a systematic method for developing your portfolio then consider the following approach:

- Identify your teaching activities and responsibilities
- Select indicators for your teaching activities and their impact and effectiveness
- Begin collecting documentary evidence to support your claims

The appendices

Examples of Student Evaluations of Learning and Teaching (SELT). Student ratings are one commonly used method of evaluating teaching. However it is known that teaching context may influence results, for example, class size, course level, and whether a course is required or elective. For this reason you should provide a brief commentary on your evaluations and how you have used them to inform your teaching practices. You may also wish to select a few particularly relevant student comments from your student evaluations. (For the guidelines on how to interpret SELT see Appendix B).

Examples of Peer evaluation. Fedback from peers will provide evidence that cannot be obtained from students, such as scholarship in teaching, administration, and contributions to curriculum development and impact of publications. The LTDU provides a Peer Evaluation of Teaching (PET) proforma for you to use.

Letters from Students. Unsolicited letters from students can provide a valuable indication of the impact of your teaching. However, you need to comment on how the letters were obtained and what prompted the students to write such testimonials. If you are actively seeking student feedback on your teaching then it would be more appropriate to use the Evaluation services of the LTDU.

Examples of Student Work. Where you have implemented an innovative approach to student learning that has encouraged students to produce work of high calibre, it may be appropriate to illustrate your claims with specific examples.

Presentations and Publications. In addition to a list of conference presentations and publications that may have resulted from your scholarly approach or research in teaching, you may wish to provide one or two examples, perhaps a Powerpoint presentation or a copy of a paper.

Workshops and professional development courses. Where you have participated in seminars, workshops and professional meetings intended to improve learning and teaching you may wish to include an outline of the programs and the extent of your participation.

Service on Learning and Teaching Committees. Where you have been actively involved on such committees you may wish to provide documents such as the minutes from meetings where these provide evidence of your activities and their impact.

Reviewing your Portfolio

Once you have prepared a draft of your teaching portfolio, ask a colleague, or a staff member from the LTDU, to review the draft and offer advice regarding improvement. The key aspects that others will look for in your portfolio include:

- Is your portfolio clear and concise? The portfolio should be set out logically with a table of contents. It must be concise and yet representative of the range of your teaching activities. Your colleagues should be able to judge this last point.
- Does your portfolio accurately reflect your teaching?
  Be honest about your teaching. The teaching portfolio is meant to be a reflective document. Others should be able to understand the basis of your approach to teaching. They will be looking for evidence of the impact of your teaching. Think about what documents you will need to provide and make sure you cross-reference appropriate evidence.
- **Have you taken a scholarly approach to your teaching?** Others will be looking for evidence of the scholarship that has informed your teaching. Is your approach likely to promote student learning? What literature have you cited?

Appendix C is an example of a teaching portfolio from a staff member in the USA. It is well structured and reflective in nature. This particular example is quite detailed and you are not required to have all the same information in your portfolio. It does serve to highlight the personal and reflective nature of a portfolio. You might consider adding references from the primary literature in your portfolio where they have had an impact on your teaching.

In Appendix D you will find a list of web sites containing other examples of Teaching Portfolios. They have been selected so you could appreciate the different approaches academics adopt in reflecting on their teaching.

References

Boyer, E.L. (1990). *Scholarship Reconsidered: Priorities of the Professoriate.* San Francisco: Jossey-Bass. [Barr Smith Library 378.73 B791s]

Glassick, C.E., Huber, M.T. and Maeroff, G.I. (1997). *Scholarship Assessed, Evaluation of the Professorite.* San Francisco: Jossey-Bass. [Barr Smith Library 378.125 G549s]

Appendix A

Reflecting on Good Learning and Teaching

Before beginning to write your portfolio it would be helpful to consider the broader context of your teaching, not only the formal contact hours of lecturing and tutorials. Your teaching involves all your interactions with students and colleagues. A Teaching Portfolio should reflect the full range of your teaching activities.

Your teaching may involve activities from the following 4 areas and you may like to reflect on your approach to each one during the present academic year.

Student Learning

- showing concern and respect for all students and their learning;
- organizing and presenting content in a logical way;
- showing an interest in pedagogy;
- promoting students' independent learning;
- producing appropriate materials for online learning;
- appropriately supervising research projects.

Management of learning and teaching

- arranging appropriate assessment and student feedback;
- planning or revising a curriculum;
- responsibility for formal University policies (such as safety, codes of practice, equal opportunity);
- managing school/faculty resources;
- organising projects, field trips, laboratories etc.

Scholarship in teaching

- reflecting on your teaching and its impact on students;
- making judgements on the quality of course content;
- undertaking research on learning and teaching;
- disseminating information on Learning and Teaching eg papers, books.

Interactions outside the course/classroom

- making yourself available to students;
- advising and counseling students;
- acting as a mentor to colleagues;
- facilitating student support programs;
- teaching outside your university;
- displaying leadership in learning and teaching development programs.

Appendix B

Student Evaluation of Learning and Teaching (SELT)

Student evaluations, in the form of quantitative data from questionnaires, are the most commonly used method of evaluating teaching. Literature reports support the thesis that student evaluation tends to be reliable, valid, relatively unbiased, and useful (see References at end of this Appendix). The key aspect to remember with evaluation methodologies such as SELT is that teaching context (class size, course level, whether a course is compulsory or an elective) can influence results. When presenting summaries of student evaluations in your portfolio, include a representative sample of courses (large and small enrolment classes, different year levels, face-to-face or online delivery), and comment on whether you were implementing innovative teaching methods or using an alternative format.

Interpretation of SELT

Reviews of the literature (see References at end of this Appendix) on student evaluation of teaching generally support the following:

- Student evaluations are generally consistent across raters, rating forms, courses and time periods for a given teacher.
- Student evaluations usually correlate with evaluations made of the same teacher by independent observers.
- Student evaluations often correlate with their perceptions of their expected performance in assessment.
- Student evaluations have generally low correlations with factors such as class size, course years, ease of grading, etc.

The following points should be borne in mind when interpreting your SELT results:

Distinguish between individual teacher, teaching teams and course evaluations. Data from a course evaluation will likely have responses to the teaching for more than one person and this may be unsuitable for determining the impact of your teaching unless you focus explicitly on your role as a team teacher.

Students can only comment on some aspects of your teaching. Students can comment on the effect of your teaching on their learning but are not in a position to comment on your impact on the curriculum, research publications or contributions you make outside the classroom.

Compare your results for similar courses over a number of years. For decisions about teaching effectiveness and impact on students, review evaluation results from different courses and different year levels (lectures and tutorials, face-to-face and online, graduate and undergraduate). Results over at least three years and from two different classes should be used for meaningful trends to emerge. For course improvement, multiple evaluations of a single course over three years can be useful.

Compare the number of students in the class and the number of respondents for each question on the SELT. The response rate from each class should be approximately two thirds to ensure that results are representative.

SELT results are contextual. Results of student evaluations need to be interpreted in context. Characteristics known to have an impact on evaluation responses from students include:

- *Gender.* There is some evidence that females may receive lower ratings from male students and higher ratings from female students. The ratings of male teachers do not seem to be affected by the gender of the student. This is still a disputed area in the literature (see references below).
- *Class size.* There is a slight tendency for smaller classes to receive higher ratings.
- *Course level.* Higher level courses, especially graduate courses, tend to receive higher ratings.

- *Discipline.* Mathematics, natural science and engineering courses tend to receive lower ratings than those in the humanities or professions.
- *Compulsory course or elective.* Elective courses (and the teachers of these courses) tend to receive higher ratings than do compulsory courses.
- *Race.* This has not been researched sufficiently in the Australian context for a definitive comment.
- *Course topics.* Courses (and teachers) that explicitly challenge students' assumptions about certain topics, especially controversial topics such as gender, race, or sexual orientation, can generate resistance among some students, which may be reflected in ratings that vary significantly between students.

All these factors usually explain only a small amount of the variation typically seen in student feedback. The most significant factor that usually influences student's perception of staff teaching is the impact that staff have on student learning.

References for Appendix B (checked June 2005)

McKeachie, W.J. (1997). Student ratings, the validity of use. *American Psychologist*, 1218-1225.

Northwester University, Searle Center for Teaching Excellence, includes references from the primary literature. http://president.scfte.nwu.edu

Learning Technology Dissemination Initiative produced a "cookbook" on assessment was a project funded by the Scottish Higher Education Funding Council. http://www.icbl.hw.ac.uk/ltdi/cookbook/

University of Minnesota use of 7 point scale for student evaluation. http://www1.umn.edu/usenate/policies/stuevalpolicy.html

Cornell University Teaching Evaluation Handbook, 1997, Chapter IV-Criteria for Evaluating Data on Teaching. http://www.clt.cornell.edu/resources/teh/ch4.html

Student Ratings of Teaching, from the Center for Faculty Evaluation and Development, Kansas State University. http://www.idea.ksu.edu/papers/pdf/Idea_Paper_20.pdf

Student Evaluation of Teaching: A Methodological Critique of Conventional Practices, Robert Sproule, Bishop's University (Canada). http://epaa.asu.edu/epaa/v8n50.html

Student Ratings of Professors are not Gender Blind, Susan Basow, Reprinted from AWM Newsletter, Vol. 24, No. 5, Sept.-Oct. 1994. http://www.awm-math.org/newsletter/199409/basow.html

Reflections on Class Size and Teacher Quality, Jennifer Buckingham (2003). http://www.cis.org.au/IssueAnalysis/ia29a/IA29a.htm

Student ratings of Teachers: The Research Revisited. William E. Cashin, Kansas State University. http://www.idea.ksu.edu/papers/pdf/Idea_Paper_32.pdf

Ballantyne, Christina (1998). Improving university teaching: Responding to feedback from students. Paper presented at Adult Learning Cultures: Challenges and Choices, Wellington Polytechnic, New Zealand, February 1998. Published in Zepke, N., Knight, M., Leach, L. and Viskovice, A. (1999) Adult Learning Cultures: Challenges and Choices in times of change. Ch. 11, p155-165, Wellington, WP Press.
http://www.tlc.murdoch.edu.au/pubs/docs/respfeed.html

Appendix C

TEACHING PORTFOLIO

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http://www.math.iastate.edu/wagner/Teaching_Portfolio.html (checked June 2005)
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Spring 1998

Table of Contents

1. Teaching Philosophy and Goals

I base my teaching on the belief that the only way to learn mathematics is to *do* mathematics. While the process of reading examples and proofs in textbooks and from lecture notes is valuable, the real learning comes through one's own efforts at solving mathematical problems, either computational, theoretical, or both. This is achieved mostly through class assignments, but also through in-class discussions and exercises. I view my role as a facilitator for this process. I must design the framework in which learning can take place, and then stimulate and nurture the students' development, giving help in terms of knowledge, techniques, and encouragement.

My goals in teaching are not just to promote learning of the subject matter. I also try to help the students learn to think logically, learn problem-solving methods and techniques, and improve writing skills (writing clearly and concisely, explaining step-by-step processes, providing valid reasons for logical arguments). In addition, I try to help students see the course material in a holistic context by requiring them to synthesize the various concepts of the course by applying them together.

2. Teaching Responsibilities

Courses taught: I have taught a wide variety of courses, from the precalculus through graduate levels. At the graduate level, I have taught Linear Algebra, the Real Analysis sequence, and the Functional Analysis sequence. Upper division courses include all of the Numerical Analysis courses, Advanced Calculus, Topology, Complex Analysis, Partial Differential Equations, Linear Algebra, and Abstract Algebra. In the lower division, I have taught the engineering Calculus sequence, including computer-enhanced sections, Differential Equations, precalculus Algebra and Trigonometry, and the large lecture Discrete Mathematics course. I have taught Calculus in several different ways: traditional, computer-enhanced (via class projects using Mathematica), and with graphing calculators. Programming and use of numerical software is a large component of the Numerical Analysis courses. I have served on numerous Masters and Ph.D. committees. I have given reading courses in Functional Analysis in Summer 1995, Fall 1996, and Spring 1997.

Grading: I view the purpose of grading as mostly motivational, not judgmental. By requiring students to demonstrate knowledge of course material, this motivates them to do the necessary work required to learn mathematics. I do not grade on a strict curve. I usually curve each exam and also the total assignment scores and quiz scores. The curve is based on a mixture of class performance, percentage correct, and comparison with past classes' performances on the same material. Thus, it is possible for everyone in the class to get a good grade, or the opposite. For example, I have had classes in which everyone received a C or

better, and others with only one A. It is rare for a student who attends class regularly and does all of the class work to receive a grade below a C. On the other hand, to receive an A, one must score consistently high marks on exams and assignments.
I generally have high expectations of my students. When grading midterm exams, I try to strike a balance: be fairly strict while at the same time avoid discouraging the students. First of all, this gives a signal to students who are not doing the work, or for whom the course material is too difficult, so that they can either drop the course or make the decision to devote more time and effort to the course. Second, it gives students a good idea of where they stand in the course, so that there are no surprises at the end. And finally, it allows me to take other factors into account when I make up final grades, resulting in increases for some students at the end of the course. I spend quite a lot of time in the process of figuring and deliberating final grades. As a result, I very rarely have any student who thinks that his or her final grade is unfair or unexpected. Other information related to grading is included in the Exams and Homework sections below.

Feedback: I have tried to increase communication and feedback both to and from my students. I encourage the use of office hours, and I make myself available at other hours as well. I have instituted a World Wide Web page for each class, which allows students access to all sorts of class information (see the Course Syllabi and Information section below), and which also includes a feedback form for students to submit suggestions and comments. I collect the email addresses of all students at the beginning of the class so that I can quickly notify them of changes or hints on assignments, temporary changes in office hours, etc. I also publish this class list on the class Web page so that the students can contact each other for notes and group study. Also, in graduate and upper division courses (except Math 473, which is quite large), I have a small conference with each student about midway through the semester. I tell them how I view their work so far and try to give them suggestions for areas in which to improve, and I find out from them about any problems they are having.

Availability: I always hold five office hours per week, and I make myself available at other times as well. I tell my students they are welcome to come by my office at other times, and unless I have an immediate deadline or meeting or class, I will be able to help them. My detailed schedule is posted on my Web homepage.

3. Teaching Methods

Class sessions - lecture and discussion: I try to begin each class with a brief summary of the previous class session, and a reminder of where we are in the topic we are currently working on. At this point I usually ask if there are any questions from the reading, homework, or previous class. In lower division classes I usually assign homework and reading every day, so I spend a substantial amount of class time discussing homework problems. After this discussion, I usually give a lecture on new material. I try to begin the lecture with a brief outline and a list of objectives, and I try to always include examples during the lecture. I always encourage questions and pause in the lecture to answer them. Depending on the time and topic, I may then have an in-class exercise, probably involving cooperative learning (see the next topic), with a follow-up discussion to end the class.
There is usually more lecture in upper division classes, and more discussion and in-class exercises in lower division classes. However, in upper division and graduate classes I often incorporate discussion into the lecture. For example, in theory classes, rather than simply writing out a proof on the board, I try to first motivate the proof (see if the result seems to be intuitively true, look at some examples), and then have the class participate in the writing of the proof (provide the next step, fill in details, etc.). I also have found that group problem-solving (i.e., proof-writing) sessions are very effective in these types of courses.
As much as possible, I try to present course material in analytical, numerical, and graphical contexts. This approach of course depends on the particular topic, but it is particularly valuable in calculus, differential equations, and numerical analysis courses. I am especially conscious of using pictures and graphs to help illustrate different concepts, as most students can then at least intuitively understand the concepts even if they have trouble understanding the analysis.

Cooperative learning: For many years I have assigned group projects in some of my classes (see the next topic). And in the past several years, I have incorporated more cooperative learning techniques into the class sessions, especially in lower division classes. These techniques usually involve working in pairs or groups of three on a short problem, with specific instructions on how to share ideas and come up with a common solution. While the groups are working, I can move around the classroom to help various groups, and at the end we compare and discuss the various groups' solutions. Sometimes I have a more complex group exercise (usually a sequence of connected problems) that takes up most of the class session. In order to learn more about cooperative learning techniques, I have participated in a workshop and a seminar series on cooperative learning, and have also read extensively about these techniques.

Homework - level of difficulty, projects, group work: As stated at the beginning of this document, I believe that the only way to learn mathematics is to do mathematics. For this reason, I usually assign a lot of homework. I try to assign a mixture of routine and challenging problems so that I can stimulate the more advanced students but still enable the poorer students to at least learn the basics of the course material. In small classes, usually upper division, I try to grade as much of the homework as possible. However, in large classes, usually lower division, it is not possible to grade all of the routine assignments. In the latter classes, students can check their work on routine assignments by using solutions manuals, the help room, and posted solutions, and by asking questions in class.
In larger classes, I also often assign more involved projects, and I always grade these. The projects involve a writing component, and also often involve the use of calculators or computers (see the next topic), but not always. Usually they are completed in groups of three or four. In this case, each group has a "scheduler" who is directed to arrange meetings and make sure the group has a plan for

completing the assignment. Another group member, the "historian", turns in a paragraph which details the meetings, who attended, and any problems encountered. A third member, the "assembler", checks to make sure that all problems are completed, that the solutions are assembled in the correct order, and that all group members have photocopies of the solutions. These jobs rotate for each assignment. After several assignments, I usually mix up the groups, and at this time I ask the members of the old groups to rate each other. This will help prevent one group member from just coasting on the work of the others. Overall, I have had good success with group projects. I am able to assign more challenging and interesting problems, and the students help teach each other through working together. Also, the students often find the group experience more enjoyable than individual work, and I have consequently received mostly positive comments about group projects.
Recently, in small theory classes, I have started a policy of allowing students to rewrite incorrect proofs. This encourages the students to take my suggestions, look at the problem again, and work through a new (hopefully correct this time) argument. I think this idea promotes much more learning since it require more active work by the student, rather than the more passive approach of simply looking at the comments and reading the written solutions.

Exams: When I create an exam, I try to follow several guidelines. First, I try to test over a reasonable range of class material, and I try to stress the important concepts. I don't include unimportant items or problems which require some "trick" that the students may have only seen once. I also include problems of varying difficulty. However, I usually do not include trivial problems. Before each exam, I spend some time in class discussing what topics will be covered and which are most important. I usually give more detail for undergraduate courses, especially the lower level courses. I also try to be careful not to make the exams too long, but I sometimes fail in this regard. I find this is especially hard in higher level theory courses, where it is very hard to judge how long it will take students to do the creative thinking necessary to come up with a correct proof. Consequently, in these courses I do not expect students to solve all of the problems on the exam.
I always keep old exams, and I notate them if they are too long or if a certain problem was not worded well or was not a good question for this particular class (i.e., if most of the class missed it). When I teach the same course again, I do not usually ask the same questions, but I often ask similar ones. So in this way, I keep some uniformity when I teach the class again, and the exams should get better, in theory at least. I know that I have a reputation for giving difficult exams, but I have observed that over time my exams have been getting easier. One reason is that the students' overall abilities and preparedness, especially in the lower level classes, has decreased over the years, and it makes no sense to me to give an exam on which most of the students do very poorly. For one thing, this would be extremely discouraging for the students. Also, after all, part of the purpose for an exam, especially a midterm exam, is to help the students learn. It shows the students what they do and do not know, so that they can go back and work more on the areas in which they are having trouble. For the same reason, it also makes no sense to give an exam which is too easy and which gives no indication of problem areas.
However, I should note that I do not grade exams on a strict curve. If the entire class does well, then everyone gets a good grade, and conversely if everyone does poorly. My grading of exams usually follows a percentage scale which is modified by class performance and also by comparison with previous sections of the same course.

Uses of technology: I have used computers for demonstration purposes in many courses. I have also taught several "computer-enhanced" calculus sections, and one calculus section which used graphing calculators. In the computer-enhanced sections, I assign several group projects which require the use of Mathematica. In the calculator sessions, students use the calculator daily to help with in-class exercises and homework. Some of the homework assignments are designed to be solved with the help of a calculator.
Programming and use of numerical software is a large component of the Numerical Analysis courses. Most assignments are designed to be completed using Matlab, but Fortran or C is required on a few problems. In addition, a working knowledge of Unix on Project Vincent is needed.
All courses make use of the World Wide Web for informational purposes and some distribution of class materials (see the Course Syllabi and Information section below). In real analysis classes, I have also used interactive Web-based instruction.

4. Course Syllabi and Information

At the first class meeting, I hand out a syllabus which gives the basic information for the course. It lists ways to contact me: office number, phone number, and email address, and also the address of my Web homepage and the homepage for the class. It also informs the students about the prerequisites, text, topics to be covered, the number of exams and quizzes, information on homework assignments (approximate number, types of problems, grading policy, possibilities for revision of incorrect solutions, etc.), and grading policy. If the class requires use of a calculator and/or computer, the syllabus includes a section describing how they will be used in the class and what will be expected from the students in the areas of programming and calculator/computer expertise. Finally, the syllabus also includes a section on use of the class Web page.
During the first week I announce my office hours (also listed on my Web homepage, along with my more detailed schedule). I do not give out a list of all homework assignments for the semester as some instructors do. I prefer the flexibility of changing the problems and due dates during the semester as I get to know the strengths and weaknesses of the students. This allows me to tailor the assignments to the needs of the class.

Use of the World Wide Web: Each of my classes has a World Wide Web page which allows students access to all sorts of class information. The syllabus and classlist is available here, as well as lists of homework assignments and reading assignments (updated as they are assigned), and a list of materials placed on reserve at the library. As each exam approaches, I include

information about the exam that they will need for studying. I have a "Latest News" section that informs the students of upcoming deadlines, new postings outside my office (usually homework solutions), etc. There is also an anonymous feedback form for students' suggestions, compliments, and criticisms. Additional information is available depending on the class. For example, for numerical analysis classes I have included a lot of helpful information on computer use (see the link for *math473.html* below). For real analysis, I have added links to interactive Web-based instruction, which acts as an alternative supplementary source for the course material. For the large lecture Discrete Mathematics course, I have a Help page which has hints for improving performance in the class and sources for obtaining help, another page which gives instructions for doing some of the class problems using calculators and computers, and also a page which lists all of the scores and grades for each student, along with the detailed results of each multiple choice exam. The following three links are examples of class Web pages I have used in the past:

- *http://www.math.iastate.edu/wagner/math473_f96/math473.html*
- *http://www.math.iastate.edu/wagner/math414_f96/math414.html*
- *http://www.math.iastate.edu/wagner/math150_f97/math150.html*

5. Evaluation of Teaching

Summary of student evaluations: On a scale of 1 (high) to 5 (low), my student evaluations have fallen in the following ranges:

EVALUATION	# OF COURSES	# LOWER DIVISION	# UPPER DIVISION	#GRADUATE
1.00-2.00	21	6	8	7
2.01-3.00	24	15	9	0
3.01-4.00	1	0	1	0
4.01-5.00	0	0	0	0
average	2.08	2.36	2.02	1.37

As the chart shows, I have received excellent evaluations in graduate and upper division courses, and a bit lower evaluations in lower division courses. See Appendix F for a detailed listing of my evaluations.

Students generally comment positively on my class presentation, organization, fairness, and availability. Some of the negative comments are that I go too fast in class and try to cover too much material (of course, for some courses I have no choice in this matter), exams are too hard, and there is too much homework. I used to get complaints that the class was boring and that I showed little enthusiasm, but I have rarely received these types of comments any more. I have included various samples of comments below. See Appendix F for a more extensive collection of student comments.

Sample comments from graduate students:

"The instructor taught very well and clearly. He always gave us lots of homework. But now that the term is going to end, I think I learned the material very well."

"Excellent lecturer! Very clear, concise, well prepared. Very thorough coverage of the topic - I learned a lot!"

"Even though I found the course material very difficult and sometimes tedious, Dr. Wagner's enthusiasm made the course very enjoyable. I felt a camaraderie in the class which made it fun and interesting. Dr. Wagner was very helpful and always available outside of class, and I think most students took advantage of this. He was always well-prepared and I'm extremely amazed at his knowledge and level of understanding of this material."

[only some examples have been reproduced in this Appendix]

Sample comments from undergraduate students:

"I learned an extraordinary amount and found the class rewarding and worthwhile…On the whole, I really liked the course, and I applaud the rewrite opportunities - they are very instructive…I think you teach very well - your presentation is clear, direct, and not hard to follow…I felt there was great camaraderie among the students."

"Wagner did a fine job teaching this course."

"The grading is tough, but that's good, because I need to know my mistakes, even the little ones…The rewrites are good. They really help us learn from our mistakes."

"I really enjoyed being in his class."

"This was a difficult class for me, but I feel I have learned quite a bit."

[only some examples have been reproduced in this Appendix]

6. Teaching Improvement and Future Plans

I have been working very hard in the last several years to try to improve my classes. The primary focus in this process is providing an environment which promotes better learning. This means looking at all aspects of the course, not just trying to improve my lecturing skills. I have found that it is especially important to remain flexible, and modify the teaching methods to fit the students in the class. Some students thrive on lectures with lots of theory, others need lots of examples and visual materials. Some students learn well in groups, and others prefer more individual attention. It is important to talk to the students and grade some assignments

and/or quizzes early in the course to get an idea of the various students' strengths and weaknesses. Then I can try to adjust my teaching methods accordingly, and in the process hopefully benefit all of the students.
To help learn more about teaching, I attended an Effective Teaching Workshop in 1993, and in 1995 I participated in a Cooperative Learning Seminar. I also have read several books and newsletters covering all aspects of the teaching process.
Here are some of the changes I have recently incorporated into my classes:

- better organization and more complete syllabi
- use of the World Wide Web to provide more information and communication, with class handouts available in Postscript and PDF formats
- more discussion and less lecturing in lower division classes
- more group work in class, and group work on some homework assignments
- more use of visual materials: slides and computer demonstrations
- more short quizzes in lower level classes
- more discussion in higher level theory classes, including class problem-solving and theorem-proving
- providing more reference sources, including web-based instruction
- allowing rewrites of homework in higher level theory classes
- obtaining more feedback from students: feedback forms and mid-semester conferences
- assigning interesting extra credit problems, mostly to stimulate the better students and to help students improve their grade if they had a poor performance on an earlier exam

In particular, I have been trying to consciously slow down and not try to cover so much material in class. I want to do a better job covering the most important topics rather than a poor job covering all the topics. I can leave more material for the students to learn on their own, with my guidance and direction.
In the future, I will continue to try to find better methods in class for determining if the students really understand the current topic. I will also experiment with more variety of methods of disseminating class materials, such as with interactive Mathematica or Matlab notebooks, or interactive web-based materials using HTML or PDF files. Finally, I will continue to try to find ways to improve the role of exams in the learning process. I would like to make them more of a learning tool rather than just a method of judgment.
I also have several projects in mind for specific courses:
I am currently teaching Math 317 (Linear Algebra) with the help of the ATLAST materials and other lab exercises and projects which use Matlab to explore the concepts of linear algebra.
I also would like to teach Math 365 (Complex Variables) with more use of technology, interactive materials, and applications.
I am learning about Artificial Life techniques both for research and for possibly teaching the Artificial Life course next year.
Finally, for a number of years I have been interested in teaching an experimental 400-level course in Fourier Analysis, using Körner's book. I hope to be able to offer such a course in 1999-2000.

7. Other Teaching-Related Activities

Invited Talks:
"Calculus Reform at Iowa State University," Humboldt State Conference on Calculus Reform, Humboldt State University, California, August 18, 1991
"Calculus Reform at Iowa State University," Fall 1991 meeting of the Iowa Mathematical Association of Two-Year Colleges, North Iowa Area Community College, November 15, 1991

Conferences and Seminars:
Effective Teaching Workshop, Iowa State University, September 1993
Project LEARN seminar, Iowa State University, Fall 1995
Vision 2020 Workshop for Teachers of Collegiate Level Mathematics, Iowa State University, February 1997

Curriculum Development and Support:
Developed projects for use in computer-enhanced calculus sections, 1989-94 (in association with E. Johnston's NSF grant for calculus development)
System Administrator for the Mathematics Computer Lab, Department of Mathematics, Iowa State University, 1989-present

Grants:
Wrote successful Project Vincent grant proposal for ethernet cards and connections for faculty to improve the department's ability to perform its teaching mission, 1993
Co-wrote (with Elgin Johnston) successful grant proposals to the Liberal Arts and Sciences Computer Advisory Committee and the University Computer Advisory Committee for funds for the Mathematics Computer Lab, 1994-95, 1995-96, 1997-98
Co-wrote (with Elgin Johnston) successful grant proposals to the University Computer Advisory Committee for funds for the Mathematics Computer Lab, 1994-95, 1995-96
Co-wrote (with Elgin Johnston) a grant proposal for a Miller Faculty Fellowship for designing a new calculus sequence, 1997-98
Co-wrote (with Elgin Johnston) a grant proposal to the Liberal Arts and Sciences Computer Advisory Committee for funds for the Mathematics Computer Lab, 1998-99 (pending)
Co-wrote (with Elgin Johnston) a grant proposal to the University Computer Advisory Committee for funds for the Mathematics Computer Lab, 1998-99 (pending)

Appendices

The appendices include the following materials, but they are available in paper form only:

Appendix A: Sample course syllabi
Appendix B: Sample assignments
Appendix C: Sample exams
Appendix D: Sample in-class exercises and demonstrations
Appendix E: Recent class experiences
Appendix F: Student evaluations and comments

Appendix D

Electronic Teaching Portfolio, examples

http://www.electronicportfolios.com/

http://www.coe.iup.edu/njyost/portfolios/samples.html

http://www.coe.ilstu.edu/jabraun/braun/professional/

Teaching Portfolio, examples

http://www.msu.edu/user/costabil/academic/portfolio/port_contents.htm

http://www.physics.uci.edu/~jeff/teach.html

http://www.ags.uci.edu/~cfaustin/

http://www.mech.uwa.edu.au/NWS/NWS_Teaching.html

These links were checked in June 2005