PERCEPTIONS OF PHYSICAL THERAPY GRADUATES' READINESS FOR PROFESSIONAL ACTIVITIES, BY THE GRADUATES, THEIR SUPERVISORS, AND THEIR FACULTY.

by

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Abstract

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This study set out to identify strengths and weaknesses of new graduates from Physical Therapy Programs, and to identify differences in the response patterns of respondent groups. A mail survey was conducted of: two cohorts of graduates from four Physical Therapy Programs; their direct supervisors, and physical therapy faculty members at the four universities. Quantitative data were combined into scales, subjected to a Principal Components Analysis and then to an Analysis of Variance. Short answer question data were grouped according to topics; then counts and percentages of the number of times topics were raised were calculated.

Three comparisons were made: 1) By respondent group (faculty members, graduates and supervisors); 2) By year of graduation; and 3) By university.

While the three respondent groups all differ in their rating of the graduates' strengths, the ranking of top strengths is similar among all the groups. Areas identified as strengths were: Interpersonal and Communication Skills and Rapport, Enthusiasm, Problem-solving Skills, Evidence-based Practice, Knowledge Base, Musculoskeletal Clinical Specialty, and Lifelong

Learning. Most weaknesses were listed by few respondents and there was little agreement among the groups. Two areas stood out as being weaker than optimum in all graduates: Manual Therapy and Business Skills. Graduates consistently rate themselves lower than either faculty members or clinical supervisors do and appear to be "up to speed" after 6 – 12 months of work.

The 1994 graduates listed more weaknesses than the 1992 graduates; however, the differences were generally not significant. Supervisors distinguished between the two cohorts only on the Ethics Scale, where they gave more recent graduates a higher rating.

Some differences were noted among groups of graduates from the four different universities: each university had at least one area of greater strength relative to the other programs.

The main recommendations are to increase: 1) clinical practice hours; 2) coverage of Manual Therapy Skills; and 3) coverage of Business Skills. Follow-up evaluations are recommended, to see if graduate performance and confidence have changed in the desired direction and to add to the literature on the effect of curriculum changes on long term student outcomes.

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Chapter 1 – Introduction

Health care is moving in new directions in response to the changing needs of our society. Examples of some of these changes are: earlier discharge from hospital; greater emphasis on outpatient or day-surgery treatments, with the resulting need for more care in the home; an aging population that expects to remain active and independent, yet has an increased need for health services; better health care, leading to higher survival rates of clients with greater levels of residual problems; greater emphasis on preventive health-care services; changing, more complex, equipment that affects how health care is practiced and what skills health-care practitioners need to have; and, program-wide shifts that emphasize accountability and the evaluation of the outcomes of care, as well as focussing more attention on functional status and quality of life (Schmoll, 1989; Verrier, 1995; Wood-Dauphinée, 1997). These changes mean that practitioners need to be independent learners who can keep up with and continually adapt to the new situations.

The changes listed above affect all health-care providers. There are additional pressures on physical therapists (PTs):

(1) There is a push towards conducting more research, both basic science research, and applied clinical research (Schmoll, 1989). Basic science research is needed to explain why various techniques are shown empirically to be useful, and helps support the practice of physical therapy (PT). Applied research is needed to identify beneficial techniques and to improve on them, to develop new therapeutic

strategies, and to identify techniques that are of no use and can safely be dropped from the PT's repertoire of treatment methods.

(2) Recent changes in legislation give the public direct access to PTs (American Physical Therapy Association, 1987; American Physical Therapy Association, 1992; Cleather, 1995; Dumholdt, Clawson, Flesch, & Taylor, 1991; Ontario Government, 1994). As of the end of 1997, eight provinces had granted PTs the right to assess and treat without medical referrals, and new legislation was pending in the other two (Andersen, 1998; Canadian Physiotherapy Association, 1997; Landry, 1998). Direct access changes what is expected of PTs. They must not only know how to assess and treat patients but must also be able to differentiate between conditions which are appropriate for them to treat and those which must be referred to a physician. This increased autonomy is accompanied by increased responsibility.

(3) Physical Therapists are moving into new settings and assuming new roles in private practice and related arrangements (Verrier, 1995). In the past therapists were employed by publicly funded organizations, such as hospitals and home-care organizations. Hospitals have been downsizing and in some cases have begun out-sourcing certain services, such as outpatient care. Clinics are proliferating and even home-care services have changed so that they now work through contractual relationships with independent professionals. The use of trained Physical Therapy Assistants (PTAs) has increased, placing PTs in a supervisory position; something new for most therapists.

(4) There is a test of entry-level competency after graduation. Prior to 1994 there was no licensure examination in any province. The Physiotherapy National Examination (PNE) was instituted in 1994 in Ontario and Prince Edward Island. Alberta and British Columbia added the PNE to the requirements for licensure in 1997 (Beer, 1995; Maloney, 1997; Millette, 1995; Turner, 1997).

The rapid changes in health care, including changes in PT roles and PT autonomy, mean educational programs must change as well and adapt to current needs (Marriner, Langford, & Goodwin, 1980; Matthews, 1989). Continuous monitoring of new requirements in the PT job market, as well as projected changes in the health care sector, is an important way to ensure the continuing relevancy of the PT curriculum, and to allow for changes as needed. To this end, asking graduates of Physical Therapy Programs whether they were adequately educated for their current jobs would be of value. A survey of recent graduates would allow a comparison of the demands of the work environment as perceived by the graduates, and the needs of the work environment as perceived by the faculty members (Mitchell & Thompson, 1985). Another, perhaps more practical, reason for soliciting opinions from the graduates has to do with accreditation standards. The Canadian Physical Therapy Programs have changed their accreditation from the Canadian Physiotherapy Association (CPA) to a two-part process. The first part, a screen by the Accreditation Council of Canadian Physical Therapy Academic Programs, is followed by a detailed process overseen by the Commission on Accreditation in Physical Therapy Education (CAPTE), the accreditation body in the United States. One of their requirements is monitoring the performance of graduates. This monitoring may take the form of surveys (Commission on Accreditation in Physical Therapy Education, 1991 p. B-29). Including

graduate surveys in accreditation is not unique to PT; such surveys are included in other professions as well, such as public health, nursing, occupational safety, medicine and education (for example, see Clemmer & Bertrand, 1980; Delaney, 1995; O'Neill, 1986; Soule, 1993; Woodward, 1981).

Evaluation vs. Research

This study has been conducted as a research project rather than an evaluation. The distinction between research and evaluation may be hazy; however, Worthen and Saunders use a number of criteria to distinguish between research and evaluation (Worthen & Sanders, 1973 p.26-34). By their criteria, this project has been a research project in that it: was conducted to satisfy the researcher's curiosity; used questions established by the individual researcher; sought conclusions regarding preparation of new graduates for their initial work experiences; has generalizability to different health profession programs; and looked for relationships between the curriculum and the graduates' strengths and weaknesses. At the same time, it has been an evaluation project in that: there was input from faculty members during focus group interviews in which they participated and the questionnaire review process; results will go back to faculty members, who may base decisions for curriculum changes on the results; it has addressed a question of value (What are the strengths and weaknesses of new graduates? And through this first question has also asked; Are new graduates ready to take on professional activities?), and it has described the perceptions of the respondent groups.

When a Program Evaluation is commissioned by a particular organization, one criterion for a well done project is that immediate use will be made of the conclusions (Scriven, 1991). It

is generally not expected that results of research projects will be utilized immediately. Yet Scriven asserts that trying to differentiate between research and evaluation is misguided. Just as "testing is an essential part of teaching," so "practical evaluation is an essential part of evaluation research, and research is an essential part of practical evaluation" (Scriven, 1991 p. 143). One expectation regarding research is that results will be generalizable but according to Scriven, generalizability should also be part of every program evaluation.

Again, one major difference between an in-house evaluation project and a research project is the degree to which the findings are generalizable, according to Stake (1969). Because the scope of this research included four PT programs, it has produced results that may be generalizable to other Physical Therapy Programs. Some of the results relating to the effect of curriculum on graduate outcomes may also be generalizable to other health professions. A tool has been developed that may be of use to other programs in conducting their own evaluation studies. In keeping with Scriven's ideas, the results have also led to practical recommendations for the participating Physical Therapy Programs.

Research Questions

This study is exploratory. It investigates perceptions of physical therapy graduates' readiness for work. The study collected data from graduates, their clinical supervisors, and faculty members to help answer the following questions:

1. In terms of their current job requirements, which functions, skills, and areas of activity and knowledge do physical therapy graduates report as being their strengths and their weaknesses?

2. Which functions, skills, and areas of activity and knowledge do the physical therapy faculty report as being the strengths and weaknesses of new graduates of their own program?
3. Which functions, skills, and areas of activity and knowledge do supervisors report as being the strengths and weaknesses of new graduates?
4. What are the differences among what the respondent groups (faculty, graduates and supervisors, two cohorts, and four universities) report as being the strengths and weaknesses of the new graduates?

Contribution to the Literature

Research topics that have been identified as relating to curriculum evaluation in medical programs seem just as relevant to curriculum research within the physical therapy profession. Key questions include (adapted from Spooner et al., 1986a p. 134-135): 1) Do different curricula affect student / graduate performance? 2) Do different curricula lead to different student / graduate outcomes or characteristics? 3) What is the congruence amongst students / graduates and teachers in their perceptions of a given curriculum? and 4) Do different curriculum approaches affect how well students / graduates communicate?

Some of these questions are addressed directly in this study by including more than one educational program, thereby comparing the products of different curricula, and by including faculty and supervisors in the study as well as graduates. The last question in the list is addressed indirectly by having questions on communication and interpersonal skills included in the questionnaire.

A search of the literature was conducted to see if studies similar to the one conducted had been reported. Medline (a database of the medical and health professions literature), CINAHL (Cumulative Index to Nursing and Allied Health Literature) and ERIC (Educational Resources Information Centre) were searched without turning up any similar studies. Approximately 10 years of publications of the journals Physiotherapy Canada and Physical Therapy were scanned to see if any relevant articles had been missed in the computer search and none were found. In 1994, in response to an inquiry, a representative of CAPTE reported that at that time no studies of this type were known to the representative. A similar inquiry was made in October 1998 and again a representative of the American Physical Therapy Association (APTA) reported that there were no known studies of this type (comparing universities, comparing cohorts of graduates, comparing faculty responses with those of graduates and supervisors) (Crawford, 1998).

This study contributes to the literature in three areas: 1) It contributes to the literature on program evaluation in considering the effect of different curricula on the functioning of graduates in the workplace; 2) It will have an impact on the profession in that it provides a questionnaire that is not specific to one university and will then be available to be used in follow up studies at other institutions; and 3) It will have an impact on the individual PT programs by providing them with a detailed look at how their graduates are functioning in the workplace.

To expand on the first point, this is the first large-scale follow-up of physical therapy graduates that asks for their own evaluation of their readiness for professional life, detailing many of the clinical skills and competencies expected of therapists in the workplace. Small-scale surveys have asked graduates for their evaluation of individual programs; however, there is nothing in the literature to indicate that PT graduates have been asked how well they were

prepared for their roles in their work settings. Not only does this project address the graduates' evaluation of their performance, it offers their clinical supervisors and faculty members a chance to evaluate those same graduates. A three-way survey has rarely been performed in connection with any professional program, and none has been reported previously in the PT literature. As well, two cohorts are surveyed simultaneously and their responses compared. A comparison of this sort has not been reported in the PT literature. Finally, this is the first survey that includes more than one Physical Therapy Program and as such will add to the literature on the effects of different curricula on the overall outcomes of students in a professional program.

To summarize, this study is original in that no one has: 1) considered the effects of different curricula on the readiness of physical therapy graduates for the workplace; 2) attempted to develop a questionnaire that might be used by more than one educational program to evaluate graduate performance in the workplace; or 3) conducted a multi-university survey that includes graduates, their supervisors, and faculty at the participating universities, in an effort to identify strengths and weaknesses of graduates.

Organization of the Thesis

Chapter 2 reviews pertinent literature on alumni research, particularly surveys of various stakeholder groups, and the use of the resulting information to inform curricular revision. Chapter 3 describes the methodology used in developing and using the questionnaire, followed by analysis of the data. Chapter 4 presents the results of the quantitative data analysis and Chapter 5 the results of the analysis of the short answer questions. Discussion is presented in Chapter 6, while conclusions and implications for the profession are presented in Chapter 7.

Chapter 2 – Literature Review

This chapter will begin with a review of the literature pertaining to surveys of health profession graduates, the graduates' supervisors and faculty members. To put the use of survey research into perspective, an overview of the reasons to use surveys of these stakeholders is given here. The literature review then goes on to provide a broad context by describing the use of general surveys that investigate the employment status, salary, further education, or broad educational goals of university graduates. This is followed by a discussion of the best time to survey graduates (immediately after graduation or some years later). Then come sections covering the types of comparisons made in this thesis: (1) surveys of health professionals; and (2) surveys that include various stakeholders such as: graduates and faculty members; graduates and their respective supervisors; graduates, supervisors and faculty members; and (3) surveys that include more than one educational program.

Neither the Canadian nor the American Physical Therapy literature contains reports of the use of these types of surveys. While an individual Physical Therapy Program may have attempted something that is similar in nature, it has not been reported in the professional literature (Crawford, 1998). It was outside the scope of this research to conduct a survey of every Canadian and American program to ascertain if a multi-university, multi-group survey had been conducted within that program. A few questionnaires were obtained for review, but these were local in nature, referring to specific university courses rather than taking a global look at

preparation of graduates for the work environment. Thus, it appears that this is a new approach to the assessment of recent graduates.

Since there were no published reports of the use of these types of surveys in the physical therapy literature, the majority of the articles come from the medical education literature. Each health profession has certain issues that are unique to that profession (such as specific skill sets). At the same time, however, many issues are generic (for example, communication and interpersonal skills, basic and clinical sciences, and instructional format — lectures or small group learning). The trend in stakeholder opinions in these areas is important to discussions in the context of physical therapy (for example, do graduates and supervisors generally agree on strengths and weaknesses of the graduates?). In spite of the difficulties inherent in generalizing from the medical profession to physical therapy, evidence from the medical education literature will provide a starting point for discussion of the relevant issues.

Curriculum Evaluation

Alumni research is part of the larger discipline of Evaluation Research, more specifically in the area of Program Evaluation. The three most active sub-areas of Program Evaluation are education, health, and criminal justice (law enforcement activities) (Scriven, 1991).

Discussion of curriculum evaluation is recorded as far back as 1897, with a study on the use of spelling bees (Scriven, 1991, p. 285). Tyler (1949) presented the idea that evaluation is the process of determining whether the stated curriculum objectives are being met. In the decades since, others have presented various models for conducting curriculum evaluations. Models

presented by different authors are not mutually exclusive; the study presented here includes elements of models presented by both Scriven and Stufflebeam.

Scriven (1967) examined three connected key areas: 1) the match between goals and course content; 2) the match between goals and exam content; and 3) the match between course content and exam content. While Scriven was focused on a single course, these three questions can easily be adapted to evaluation of the curriculum of a health professional program, as follows: 1) the match between program goals the program content; 2) the match between program goals and professional activity needs of the profession; 3) the match between program content and professional activity needs of the profession.

This research project does not address the first or third comparison, but will assess the second, how well the program goals match the needs of the profession. One of the major goals of an education program for a health profession is to graduate students who are ready to take on professional roles and activities. By asking the graduates and other stakeholders to identify graduates' strengths and weaknesses, it should be possible to evaluate the match between the goal (a competent entry-level practitioner) and the ability of graduates to carry out activities required of them during their first few years in the work force. Students will be evaluating more than the explicit curriculum (eg. basic and clinical sciences); they will also be evaluating the implicit curriculum (eg. professional conduct).

Along a similar line, this research fits into the Product Evaluation found in Stufflebeam's CIPP (Context, Input, Process, Product) evaluation model (Worthen & Sanders, 1973, p. 139). Product Evaluation as described by Stufflebeam relates outcome information (how well graduates are managing in their work settings) to program objectives (to graduate competent practitioners).

Alumni Research

The Commission of Inquiry on Canadian University Education (Smith, 1991) and the subsequent AUCC (Association of Universities and Colleges in Canada) Task Force Report, which examined the report of The Commission (AUCC Task Force, 1992), both agree that surveys of students, graduates and employers are necessary to inform curriculum reviews and as performance indicators. The Commission found that few universities contact employers for surveys, although the idea of doing so is endorsed. Problems related to conducting this type of research identified by The Commission and also Anisef & Anisef (1991) include: the availability of both funding and human resources, resistance of faculty, and the great variety of employers. The Commission stated that "**research into education generally and into higher education in particular is not highly regarded on university campuses** in Canada" (Smith, 1991, p 14, emphasis in the original). This would explain why graduate opinion has only rarely been used to evaluate curricula, as has been noted in the past (Green & Stone, 1977; Paiva, 1979). This situation is slow to change, as shown by a study of accreditation and assessment in professional schools which reported that "at the six schools ... studied, following students into professional practice was rare" (Dinham & Evans, 1991).

It is apparent that not much has changed in the past eight years (since Dinham 1991) in medical education, as Guilbert (1998) claims that "Until now, nothing or almost nothing, has been done to evaluate the quality of educational programmes. This situation is accepted as a mere historical reality by a conservative milieu not specially prone to put itself spontaneously in question." Guilbert points out that one of the obstacles to program evaluation is the gap between what educational specialists and researchers in medical education say and what the teaching staff

believe. It is noteworthy that the students in Guilbert's study agreed that evaluation is useful to identify the weak points in a program and said it would be best to collect data on a curriculum before making curricular changes. Guilbert points out that this is rarely done and that of the three Swiss medical schools which started reform processes in the fall of 1995, none had conducted pre-evaluations.

It appears that many PT programs across Canada have recently completed, are currently entering, or plan to enter a period of curriculum change. Adopting the CAPTE accreditation process means that PT programs will not be accredited after 2002 unless they provide Masters entry-level degrees. Since none of the Canadian programs are currently at the Masters level, considerable evolution of the curricula can be expected over the next 10 years.

Alumni research can provide many institutional benefits. As reported by the National Centre for Higher Education Management Systems (National Centre for Higher Education Management Systems, 1981, as reported in Moden & Williford, 1988) this type of research is valuable in that it provides: information to academic planners about what happens after graduation (which can then be used in making decisions about curriculum, faculty roles, and teaching methods); evidence of problems in the curriculum; guidance as to what is needed in the way of student services; information about alumni that may be of public relations value; and, as an outcome of all of the above, information that will be useful in resource allocation and institutional planning.

Modern and Williford (1988) also outline several other, more specific, contributions that alumni research might make. Results of such research could be useful in predicting continuing education needs. Government funding could be enhanced by research that documented the

success of graduates. This view is also noted by Public Affairs Management (Public Affairs Management Inc., 1991), who quote one government official as stating that "Performance measures, such as the quality of the educated work force that is produced, would go a long way toward improving universities' case with government." Modern and Williford (1988) go on to say that in time, the results, and the process itself, could be used for accreditation review and self-study. Evaluation of the curricular options (such as the elective system), or a decision to develop a new program, could be based on alumni surveys. Alumni opinion could also be used to assist in developing an awards program; for example, to reward faculty for teaching excellence. And, finally, specific strengths and weaknesses of the graduates (such as weak writing skills) could be identified.

Indeed, the Association of American Colleges supports the use of alumni questionnaires as a means of feedback into the educational experience (Association of American Colleges, 1988, p.54). "As students progress through college and into their post-graduate lives, the perceived value of their college experience and its general education component will evolve. By use of questionnaires and representative interviews ... some time after graduation, the changing perceptions and experiences of the students can be assessed."

A study of family practice physicians (Reznick, Brewer, Wesley, Spencer, & Folse, 1988) seems to confirm this opinion. Graduates of family practice residencies were asked whether, during their clerkship and residency periods, there was enough, too much or too little time spent on: surgical specialties (general surgery, neurosurgery, etc.) and in the various locations of a surgery department (operating room, outpatient department, emergency room, etc.). They were also asked to rate their ability to perform 20 surgical procedures likely to be required of a family

physician. Of 342 family physicians randomly selected from the American Academy of Family Physicians Membership Directory, 335 returned their questionnaires. It is significant that of the 20 surgical procedures listed, over 40% of the respondents said they were "moderately unprepared" or "totally unprepared" to perform seven procedures. This type of information would not be immediately obvious to students or residents, who might not be totally aware of the task requirements of their future practice.

This assumption, that the graduate is better able to judge the program after he/she has left school, was also pointed out by Crook (1982), and Clark (Clark, Hartnett, & Bairt, 1976, as quoted in Whipple & Muflo, 1982) reported "that recent alumni have a better perspective about the procedures, requirements and contents of a program than do students, and that they tend to be more objective than faculty members." Delaney (1995) states that one of the most important findings of her study of graduates of teacher education was that graduates can provide valuable feedback with respect to challenges they face in their early professional careers and that they can offer recommendations as to how programs can address these challenges.

While it is clear that alumni surveys are not conducted widely, there have been a number of alumni surveys related to professional programs (see, for example: Allen, 1985; Annis & Rice, 1992; Clemmer & Bertrand, 1980; Cohen, 1992; Mitchell & Thompson, 1985; Paiva, 1979; Paiva, 1981; Reznick et al., 1988; Soule, 1993; Woodward & Ferrier, 1982; Woodward & Ferrier, 1983). No studies of physical therapy graduates were found in the literature. Despite the lack of published material related specifically to PT, trends identified in the literature on health-related educational programs and medical education may suggest some areas which might be of concern in PT. While the specifics dealt with in each profession are different, some of the topics identified

in the medical education literature apply to all health professions, for instance, problem-solving, research techniques, preventive care and clinical skills. Reviewing the medical education literature can therefore lead to identification of trends that may be found as well in a study of physical therapy graduates.

General Graduate Surveys

Many surveys have focussed on following the career paths of graduates. These types of studies address some of the following topics: employment status (full or part time), relevance of the degree to current employment, salary, further education (a second undergraduate degree, a graduate school program, a community college program), job hunting process, and length of time to completion (see: Archer, 1986; Rennie, 1981). While such surveys provide information to universities and government agencies regarding the post graduation career courses for university graduates, they do not provide useful information for curriculum evaluation, nor do they inform particular departments about areas that may need changing.

Over the past 20 years, Statistics Canada has conducted six surveys of this nature (Clark, 1993). The 1992 survey of 1990 graduates was the first national survey to ask graduates how satisfied they were with their schooling (Clark, 1994). Only four areas were addressed in that survey: independent thinking skills, decision-making skills, good writing skills, and good speaking skills. Of these four, thinking skills scored the highest, decision-making second, writing third and speaking skills last. A wide variation was noted between disciplines for writing and speaking skills, with much less variation for thinking and decision-making skills. The health professions

rated their programs slightly above average in decision-making and below average in writing skills.

All American university baccalaureate programs are expected to include certain basic areas. The Association of American Colleges (AAC) has outlined nine experiences essential to a baccalaureate education (Association of American Colleges, 1988). These areas are: 1) inquiry, abstract logical thinking, critical analysis; 2) literacy (writing, reading, speaking and listening); 3) understanding numerical data; 4) historical consciousness (both an awareness of history in general and an awareness of the history of one's major area of study); 5) science; 6) values; 7) art; 8) international and multicultural experiences; and 9) a study in depth.

With PT's current status as an undergraduate degree, all but one of these points would relate to the PT educational programs. 1) Logical thinking and critical analysis are essential in evidence-based practice, a major focus of current educational programs and health care in general. 2) The ability to read the literature, to write research proposals or materials to be published for the benefit of specific clients, and to communicate with clients, the public and other professionals is an important aspect of the PT's professional life, and requires a high level of literacy. 3) To evaluate research articles, a clear understanding of numerical data is needed. 4) Understanding where PT stands within the health program, how it got there, and how this is changing, contributes to a historical perspective on the profession. 5) The basic and clinical sciences form the foundation of professional knowledge. 6) Dealing with ethical situations in practice involves each therapist's value system. It is difficult to deal with clients' situations without bias unless one has an explicit understanding of one's own values. 7) Art is a more esoteric subject and does not

relate directly to PT practice. 8) Understanding multicultural issues is critical to treating clients with many differing backgrounds. 9) Finally, the field of PT is the study in depth.

While there are differences between the American and Canadian higher education systems, Smith (1991) referred to similar lists of goals for higher education made by Bok and Gilbert (Bok, 1986; Gilbert, 1989). Bok is quoted as listing the most common aims as: an ample store of knowledge both in depth and breadth, the ability to communicate, competence in quantitative skills, familiarity with a foreign language, the capacity to think clearly and critically, becoming acquainted with methods of inquiry, and an understanding of nature, society and other cultures (Bok, 1986 ; in Smith, 1991, p. 67). Gilbert is quoted as stating that the basic aim of higher education is: "reading and communication skills, thinking and reasoning skills, critical intellectual and analytical skills, quantitative or computational skills, substantive in-depth knowledge in a field of study, an appreciation of science and its limitations, historical consciousness, acquaintance with literature and the arts, an understanding of moral and ethical choices, a sense of wider international and cultural contexts, and sensitivity, creativity, wisdom and integrity" (Gilbert, 1989; in Smith, 1991, p. 66).

A study attempting to assess generic areas was carried out by Moden & Williford (1988). They surveyed graduates who had been out of school for five years. Since the subjects were not necessarily in professional fields, the focus of the study leaned toward a liberal arts education. The first section of the questionnaire collected data on the job situation, including employment status, salary, job satisfaction, responsibilities, expectations, relevance of educational experience to employment, and problems in seeking employment. Another section was devoted to the competencies needed for success and asked graduates if the specified competencies were indeed

needed and whether or not they had been developed in school. The list of competencies included the ability to: think analytically; apply knowledge from the major field to new problems; acquire new skills and understanding; write well; communicate orally; evaluate and choose between alternative courses of action; formulate original ideas and solutions; convey meaning through artistic and creative expression; cope with complex moral and ethical issues; place current problems in historical, cultural and philosophical perspective; use the political process; organize and supervise the work of others; use the computer as an analytical tool; and be sensitive to the feelings and perceptions of others.

The next section of the questionnaire asked graduates about their satisfaction with the undergraduate program. They rated the program on relevance to their career goals, academic advising (such as advising students which courses they should take to balance their program), inspiration and encouragement, level of rigour and scholarship, interaction with faculty, quality of instruction, and career planning and placement associated with their majors. Graduates were also asked whether they had completed any postgraduate courses or any other degrees. In the last four years of administration reported, each of eight academic undergraduate colleges at the university developed a section which contained college-specific questions. This section might include items on student services and non-major course requirements (arts and sciences), teaching and advising (business administration), employment opportunities (fine arts) or participation in professional organization, continuing education and computer usage (health and human services).

The entire population of the classes was surveyed and detailed reports were then provided to each academic unit, to be used for program evaluation and review. Reports were also presented to the Dean's Council and incorporated into decision making at the institutional level.

Some of the changes that occurred included: faculty awards (arts and science), introducing a program to bring executives onto campus and an increase in written assignments (business administration), interpersonal communication training (engineering program), and developing appropriate continuing education programs (health and human services).

As the AAC clearly states: "...students of professional fields ... must learn critical analysis and the capacity to make decisions in uncertain settings with insufficient data; they must gain the ability to write and speak clearly, sometimes on life-or-death questions, to clients, employees, and professional communities; their future practice must be informed by constant awareness of the environmental and societal impact — human costs vs. political benefits, aesthetic enhancement or debasement — of the work to which they are committing their lives" (Association of American Colleges, 1985 p.30).

Addressing the topics listed by the AAC, Bok (1986) and Gilbert (1989), is clearly important, yet as Smith goes on to say "the commission believes that the goals are admirable but cannot possibly be achieved, be measured, or be applicable to all students. Still, the key issues are worthy of consideration and debate" (1991, p. 67). A balance must be found between addressing these broad goals of a baccalaureate education and keeping a focus that is narrow enough to capture elements unique to the profession, such as clinical skills. The addition of a department-specific section on a university-wide alumni survey could address the need to assess the effect of the educational program on the graduates, in terms of both the broad goals of post-secondary education and the more discrete skills expected of a professional in that field.

The next sections of this chapter will review the literature pertaining to graduate surveys, including some that took in other stakeholder groups (faculty or supervisors). As a group, these

studies were conducted well. A few failed to mention follow up procedures, but most carried out one to three follow up contacts to the study groups (either phone calls or mailings); one study mentioned "intensive follow up procedures." Response rates were generally quite good, ranging from 47% to over 80%. Questionnaire content was developed with input from more than one source, including: the literature, faculty suggestions, departmental objectives for the program involved, institutional objectives for the study, and occasionally, interviews with relevant stakeholders.

Timing of Surveys

A question commonly raised about alumni surveys is: how many years after graduation is the best time to survey graduates? Indirectly, Allen (1985) addressed this issue. His study surveyed all the graduates of a family practice residency at one hospital in 1980 and 1982. The 253-item form focussed on behavioural sciences. Twenty-four items regarding the behavioural sciences were rated on a three-point scale as follows: yes, the item was relevant; maybe the item was relevant; no, the item was not relevant. Certain items were also rated on a five-point scale to discover how qualified the graduate felt to perform the specified techniques. Fourteen subdisciplines were identified and the graduates were asked how adequate the training was in these areas (too much training, adequate training, too little training). It is noteworthy that the responses were highly consistent across the two-year interval. Eighty-six percent of the items concerning adequacy of training yielded consistent results, suggesting that the graduates' opinions on this subject do not change with subsequent education or experience. Allen concluded from this

result that limiting surveys to one graduating class, rather than repeated sampling of several cohorts of students from year to year, would still yield reliable results.

In a study specifically designed to address the question of whether graduates' opinions change over time (Crook et al., 1982), medical school and nursing school graduates were surveyed on more than one occasion and the results compared. The medical school graduates were surveyed at exit and again either two or five years later. Response rates for the medical graduates were not mentioned. The authors stated that for an item to be considered a strength it had to be endorsed by at least 50% of the class and a deficiency had to be listed by at least 30% of the class. The later results from these graduates were consistent with their own responses on the exit surveys, and the results of both cohorts were similar to each other as well. The later results from these graduates were consistent with their own responses on the exit surveys, and the results of both cohorts were similar to each other as well.

The nursing school graduates were surveyed six, eighteen and thirty months after graduation. Response rates for the nursing classes ranged from 47% to 83%. No changes were found in their rating of the program features, strengths and weaknesses, skill areas or learning/teaching. Based on these results with both the medical and nursing graduates, the authors concluded that "there appears to be no appreciable benefit to be gained by gathering program feedback information after program completion".

While Lederman (Lederman, 1990) used Focus Group Interviews (FGI) to collect information on graduates, rather than a mail questionnaire, she had similar results regarding the stability of the responses. Lederman collected information on present employment, critical incidents, and suggestions for change from graduates from different time periods (1972-1981,

1982-1984, 1985-1987). In spite of the fact that major program changes had occurred between some of these time periods, the groups cited similar strengths and weaknesses in the curriculum.

McMaster Medical School surveys graduates regularly (Woodward & Ferrier, 1982; Woodward & Ferrier, 1983). In one survey (Woodward & Ferrier, 1982), graduates who had been working for either two or five years were asked: "Which of the following aspects of your undergraduate medical education do you now think have been strengths in your overall medical training and experience?", and "Which of the following aspects of your undergraduate medical education do you now think were major program deficiencies?" The identical options were available as answers to both questions (Appendix 1). The options were developed by asking graduates open-ended questions regarding medical education.

Eight of the 17 features were considered strengths of the program by the graduates surveyed. The top four features were self-directed learning, early patient contact, independent study, and small group tutorials; the next four were problem-based learning, flexibility of the program, availability of learning resources, and electives.

McMaster runs a problem-based learning (PBL) curriculum. The program is built around small group learning, fostering self-directed learning and independent study, and included a plan for early patient contact. It is not surprising that the main strength of the program has been identified as those features; this provides feedback to the curricular developers that they provided a positive learning environment that was appreciated by the graduates.

Some differences were noted between more and less recent graduates. Those who had graduated five years earlier were significantly more likely to report faculty commitment as a strength than those surveyed two years after graduation. Those surveyed two years after

graduation were more likely to mention electives as a strength. Some differences were noted which correlated with the graduates' pre-medical school education: graduates whose pre-medical background was not traditional were more likely to favour the mix of students (male/female ratio, cultural background of students) and to support faculty commitment and clinical teaching. No differences were noted relating to the gender or medical specialization of the graduate.

Graduates two years out of school were more likely to report deficiencies than those out for five years. The three areas most commonly reported as deficiencies were: lack of precise definition of core material, anxiety level created, and evaluation system used. Four other areas were mentioned as deficiencies: clinical teaching received, faculty commitment, self-assessment/evaluation, and faculty advisor. It should be noted, however, that although these latter four areas were mentioned as deficiencies, they were mentioned more often as strengths.

In summary, some researchers have found no difference between responses of groups of graduates who entered the work force up to two years apart, while others noted some differences between those who had been working for only two years and those who had been working for five years.

Focussed Graduate Surveys

As mentioned earlier, there have been few studies in the health professions which followed graduates into the workplace. A similar situation exists in other academic programs (Ralston, 1978). Ralston (1978) surveyed graduates who had completed a degree in sociology between 1971 and 1977 at a university in the Maritimes. A questionnaire was mailed to 267 graduates with a 47% response rate. The questionnaire set out to discuss what type of jobs sociology

graduates obtain after graduation, where they get jobs, and what factors influence the job outcomes. In order to elicit feedback on how the program contributed to their work and / or life experience, graduates were asked open-ended questions. Many comments expanded on the graduates' perceptions of how the program had helped them. Open-ended responses were coded into five categories: 1) broad perspective on society; 2) understanding of people and life; 3) skills in research, problem definitions, and analysis; 4) direct job preparation; 5) yes it helped but no reasons given. A few examples of their comments were that the program "opened my mind," "broadened my perspective"; improved "interpersonal skills" and fostered an "ability to write well and analyze situations"; and, it "helped create understanding that there is more than meets the eye; not to make 'moral' judgements." This type of information can be valuable feedback to the faculty, yet would not have been apparent from quantitative ratings scales. The majority of the graduates stated that if they were to choose their undergraduate degree again they would still choose sociology. Their main reasons were that they enjoyed the topic, they were still interested in sociology, they found it a challenging area, the job relevance was good and it broadened their social awareness.

In a survey at McMaster (Woodward & Ferrier, 1983), the first five years of graduates from the then-new medical program were asked a number of questions, including how well they were prepared in 20 knowledge/skill areas (well-prepared, prepared, partially prepared or unprepared). The same graduates were asked how they perceived their own knowledge as compared to that of graduates from other schools (much better prepared, better prepared, equally prepared, less well-prepared, much less well-prepared). They were also asked to evaluate the emphasis the curriculum placed on the 20 topic areas (more emphasis needed, adequate emphasis,

overemphasized). (The topics are outlined in Appendix 1.) The first three graduated classes were surveyed five years after graduation while the next three classes were surveyed two years after graduation. All doctors in the cohorts were mailed a questionnaire. Of the 359 students in the study population, 89% responded. Response rates varied across years from a low of 83% to a high of 100%.

More than 30% of the respondents felt that "dealing with social and emotional problems of patients" was overemphasized. Eleven areas were deemed have received appropriate emphasis and eight areas were judged to need greater emphasis. In four of the areas the graduates saw as needing of greater emphasis (preventive care, public health information, diagnostic skills and practice management skills), more than three-quarters of the respondents still reported that they were better prepared than graduates of other medical schools. Overall, 89% of the respondents described their preparation as equal to or better than that of graduates of other medical schools.

The American Association of Medical Colleges (AAMC) surveyed all senior medical students in 1983 to ascertain their career plans and collect information that could be used in curriculum evaluation (Thomae-Forgues, Dial, & Boerner, 1983). Just over 65% of the more than 700,000 students surveyed returned the questionnaires. The students were asked to rate the amount of curriculum time devoted to specified areas as "inadequate, appropriate, or excessive." (Areas covered in the questionnaire are listed in Appendix 1.) Most items were rated by some graduates as having slightly less time than appropriate assigned to them. The areas rated as being most in need of more time were: research techniques, preventive care, nutrition, cost control, and practice management skills. In all health care settings, practice management skills and cost control are important issues because of changes brought about by the current trend to downsizing

and running efficient and productive departments and clinics. Research techniques are particularly relevant at present because efforts to increase the number of therapists, both clinical and academic, who are involved in research programs is a major focus for the PT profession at this time.

Newer, innovative curricula, tend to be more proactive in self-evaluation. Created in 1974, Ben Gurion University (BGU) in Israel has conducted surveys of graduates and department heads in an effort to evaluate the curriculum (Friedberg & Glick, 1996; Friedberg & Glick, 1997a; Friedberg & Glick, 1997b). One report looked at graduates' opinions of one aspect of the curriculum: early clinical exposure (Friedberg & Glick, 1997b). A 41-item questionnaire was mailed to all graduates of the 2nd, 6th and 10th years of the medical program (n=117), with a 58% response rate. Areas of difference were noted between the years surveyed in their ratings of epidemiology / statistics and family medicine; however, the paper did not detail the differences observed. The major positive aspects of early clinical exposure were identified as: improving the students' approach to patient and communication skills; and decreasing stress when entering the clinical years. It was also reported separately (Friedberg & Glick, 1997a) that 84% of the graduates indicated that early clinical exposure helped them learn the principles of the medical interview. Communication is very important in any health profession, so it is important to document any activities that improve skills in this area.

The second report (Friedberg & Glick, 1997a) outlined other feedback from the questionnaire as well. Graduates requested more time on many basic science topics (physiology, immunology, genetics, and molecular biology) as well as on epidemiology and statistics. Graduates pointed out the importance of epidemiology and statistics to appropriate evaluation of

the literature. Other areas mentioned were medical ethics, economics and medical informatics, which the authors point out have been noted as problem areas in the literature for other medical programs as well. Overall the respondents felt better prepared in the clinical than the basic sciences, and many said there was little integration of basic science during the clinical years.

As mentioned by Guilbert (Guilbert, 1998), conducting an evaluation prior to a curriculum change makes it possible to later determine the effect of the change. Prideaux and his colleagues (Prideaux, Henry-Edwards, & Marshall, 1997) did just that. A curriculum reform project was undertaken between 1990 and 1993 at Flinders University in South Australia. A questionnaire was developed and sent to all graduates since inception of the medical program (1979), and interviews and surveys were conducted with all staff and students in 1991. In all, a 58% response rate to the questionnaires was obtained.

There were four main changes to the curriculum: 1) teaching of general surgical principles took place regardless of the surgical unit; 2) problem-solving tutorials were added on 32 common surgical conditions; 3) there was a decrease in operating room time and an increase in time spent on pre- and post-operative management on the wards; and 4) minor skills and procedures students must learn were defined. In 1995 the first graduates of the new curriculum went into internship. All of these interns (n=56) were sent the questionnaire, with a 61% response rate. The questionnaire asked about differences in the perceived importance of selected knowledge areas and skills and whether the graduates were effectively prepared in these areas. Semi-structured interviews were also conducted with 27 locally placed interns.

Four specific areas (common conditions, pre- and post-operative care, simple procedures and complex procedures) and three large components (overall course, surgical components,

general principles) of the program are reported by Prideaux (1997); changes were noted between the pre- and post-curriculum-change responses in all items. Graduates' ratings of the overall course, the surgical components, and the general principles all went up from 1991 to 1995. The effective preparation mean for two of the four detailed components was also raised. Whereas, in 1991, three of the four detailed components showed significant differences between graduates' ratings of their importance and graduates' ratings of how well prepared they were in the areas (importance being rated higher than preparation), in 1995 only one area showed a significant difference between importance and preparation ratings.

From these studies we see that it is possible to survey graduates and obtain information that is useful in curriculum revisions. The final study shows a good example of an evaluation plan put in place to assess the effects of curriculum change. Positive changes were noted in the direction desired and information was gathered that led to plans for further changes to improve on the one area still deemed to be problematic.

Surveys of Graduates and Faculty

A second type of study compared alumni opinions with faculty opinions. A master's degree program in public health was evaluated by conducting a survey of both alumni and faculty (Clemmer & Bertrand, 1980). The faculty were asked "How important is it that your students have the ability to perform the following activities by the time they graduate from your program?" The alumni were asked to "rate each activity as to its importance in meeting the demands of your job." A list of forty-four activities was included in the survey. The list of activities was derived from a number of sources, including curriculum committees, curriculum planning documents, and

dissertations. No areas were rated as being more important by the alumni than by the faculty, but the reverse was true: faculty gave some items more importance than alumni did. These areas were: assessing the effectiveness of existing health services in meeting community health needs; using available resources to influence legislative decisions; identifying sources of funding and seeking funding; using cost-benefit and cost-effectiveness analysis; understanding the use of computers for data storage, retrieval and analysis; and defining and applying various indices for measuring the level of well-being and illness in the community.

Areas seen as having such importance by the faculty appear to represent a global view of the health sector. With the ongoing changes in the health-care sector, particularly related to curtailing costs, it is critical that all health professionals be aware of and recognize the importance of the areas listed above, as they apply to their particular profession. This would be equally true in the fields of public health and PT. While the topics might be phrased differently (eg. "evidence-based practice" rather than "effectiveness of existing health services;" or "being awarded research grants" rather than "seeking funding;" or "research skills" rather than "the use of computers for data storage and analysis") PT graduates should be aware of these areas and understand their significance to the profession.

Finding that faculty rate certain areas as more important than graduates do could indicate that there is a discrepancy between the perception of faculty as to what is required by therapists in work situations, and what the PTs in the work situations feel is required. This discrepancy could indicate a mismatch between the curriculum and the actual work requirements. Another view could be that the new graduates, who generally enter the profession in a clinical position, have a

narrow view of both the profession and their professional roles. Either situation could be addressed through curricular modifications.

A recent study Guilbert conducted (1998) compared the opinions of students and teachers concerning Swiss medical programs. Students were surveyed using a 39-item questionnaire. The seven themes in the questionnaire were: community-oriented education, professional profile, learner-centred education, teachers' educational competence, coveritis (overloading the curriculum with facts), problem-based learning, and programme evaluation. Semi-structured interviews were conducted with faculty from the higher levels of the academic hierarchy from Swiss universities, and a review of the literature identified the position taken by medical educators.

One of the interesting findings of this study was that all groups agreed that a profile of the jobs a physician performs would be useful for both curriculum development and evaluation. This profile would include several areas: curative, health education, preventive, research, collaboration within the health team, collaboration with community development, training other health personnel, management. While there was agreement that the profile should be better defined, most of the jobs are not assessed by the Federal Board of Medical Examiners (the examination organization in Switzerland).

The Clemmer & Bertrand study (1980) found that faculty and alumni have different opinions concerning the importance of specific activities to graduates' jobs. Yet Guilbert (1998) found that both students and faculty do agree that clearly specifying the requirements of a physicians' job would be useful for both teaching and evaluation purposes.

Comparing the responses of faculty and graduates provides useful information in two ways. First, it may highlight misperceptions of new graduates as to what they should expect in their first jobs. Second, discrepancies between graduate and faculty responses may indicate that faculty are out of touch with what is actually occurring in the workplace. The first problem can be addressed within the educational program. Dealing with the second issue might require increasing contact between faculty and the work settings. Another possibility would be to have graduates take a very job-specific approach to evaluating their curriculum, attempting to ascertain whether their program prepared them for their current job. Faculty might be taking a more global approach in attempting to prepare graduates not just for their first job upon graduation, but also for future jobs in different roles within the profession. This type of information is also useful feedback for the educational program, as it would make it clear that students are not fully informed about both the job types and the roles undertaken by members of their profession.

Surveys of Graduates and Supervisors

Graduate questionnaires, or paired graduate-and-faculty questionnaires, provide a perspective on the curriculum that is academically focused. A third approach is to include a survey of the graduates' supervisors for ascertaining their opinions on the graduate's preparation for work. This approach brings the expectations of the workplace into curriculum evaluation. A balance must be struck between the preparation of students for employment and the broader goals of a baccalaureate education, not all of which translate directly into discrete skills related to a particular job.

Annis and Rice (1992) looked at graduate / supervisor surveys in an economics and business department. The surveys were set out to gather suggestions from graduates and supervisors for improving the department and to assess the image and standing of the department in relationship to its competitors. Three surveys were conducted using graduates of 10-15 years, recent graduates of 1-5 years, and the supervisors of the recent graduates located in the United States. (The cost of postage was the reason supervisors in other countries were not contacted.) Response rates were quite good: 68.4% of older graduates and 52.9% of recent graduates responded; 39.2% of the recent graduates said their supervisors could be contacted; and 70.9% of those supervisors responded. The questionnaire was developed to discover whether graduates and supervisors felt that departmental goals were important in the "real world" and how well the department had prepared the graduates. Rating scales were used to evaluate the preparedness of graduates in terms of 34 qualities, in addition to which the questionnaire made use of open-ended questions to elicit suggestions for improvement.

Annis found that the recent graduates showed more consensus in their impressions than either the older graduates or the supervisors. In all areas, the older graduates said they were more inadequately prepared than did the recent graduates. There were some areas where a large difference (defined as 10% or greater) was found between the recent and the older graduates. These areas included values (healthy balance of work, family, leisure, worship), knowledge (management frameworks, concepts & terminology of marketing, knowledge for long-term career flexibility), and skills (computer work, interpersonal communication, public speaking, leading co-workers in analysis and decision-making, adjusting to new job demands, multitasking, and planning projects). In spite of the differences in what the graduates reported, supervisors thought

that overall the recent graduates were adequately prepared. The areas for which supervisors mentioned inadequate preparation of graduates most often were public speaking and written communication. Recent graduates were the group most likely to have usable suggestions for department improvement.

Results of the study were used in three ways. 1) They were used in developing a strategic plan for the department. 2) They were presented to the Business Advisory Council, which keeps the department in touch with the current business world. 3) They were distributed to all department members to persuade them of the need for change.

Within the nursing profession, O'Neill (1986) described a curriculum evaluation that included surveys of both graduates and employers. Graduates were contacted at three- and fifteen-month intervals following licensure. Items for the survey were developed to reflect each terminal objective of the program. Graduates were asked to rank themselves on the frequency with which they exhibited the listed behaviours. The employer questionnaire asked for an evaluation of the graduate's attainment of each terminal objective and again queried on the frequency of specific behaviours. Feedback from the evaluation resulted in the discontinuation of certain clinical placement agencies and feedback to others regarding the positive environment they provided for teaching / learning. It was discovered that some objectives were not attainable at the level where they were placed, so changes were made to ensure that the objectives were reasonable for the level of the student. A further finding was that content was not always appropriate to meeting certain objectives, so efforts were begun to better synchronize the set objectives and course content.

Moving to the medical profession, Paiva conducted two studies that compared supervisor and resident self-ratings (1979; 1981). For the first study, (Paiva, 1979) a task analysis was performed, which identified 13 traits dealing with clinical skills, cognitive variables and non-cognitive attributes. These traits were: history, physical, identification of problems, diagnostic approach, management, fund of knowledge, independent learning habits, relationship with patients & family, relationship with medical personnel, reliability and dependability, responsibility, emotional stability, and technical skills. Each trait was defined operationally and two to four descriptors were developed. Four broader items representing more comprehensive ratings were added: competence in medicine; competence in specialty; overall competence; comparison with other house staff. A final item was added to the supervisor's questionnaire: desirability as personal physician. A 10-point scale from outstanding to unsatisfactory was used.

The two supervisors who were most familiar with each resident completed a form, rating the residents on how they compared to the "ideal" first year resident. The overall return rate was 83% for self-evaluations and 95% for supervisor evaluations for the graduates of 1975 to 1977 from one medical program. With such high return rates the results of this study would be truly representative of the population of residents. As well as completing the rating scales, both graduates and supervisors provided extensive comments throughout the evaluation form. These allowed for content analysis and identification of trends related to strengths and weaknesses.

What is of note in the results of this study is that the supervisors' ratings were higher than the graduates' self-ratings on most variables (the exceptions being history-taking and relationships with patients) and that the supervisor ratings did not indicate differences among the classes.

While the results of the comments provided by respondents were not presented in this paper, they were provided in a report to the faculty annually.

In the second study (Paiva, 1981), also a residency follow-up with very high response rates, it was again found that supervisors' ratings were higher than graduates' self-ratings in the areas of patient management, knowledge and overall competence in medicine. Paiva also noted that the graduates tended to differentiate the quality of their performance on a variable-by-variable basis, while the supervisors seemed to see through a halo effect.

This trend of graduates giving themselves lower ratings than their supervisors is also found in other studies of medical interns (Woodward, 1981) and in comparisons of student and instructor evaluations (Cochran & Spears, 1980). In a study of dietetic students (Cochran & Spears, 1980), students gave themselves lower evaluations of their performance in all categories than did their supervisors. This study is only partially relevant to the current discussion, because the students were at an early stage of their training (first term) and had not yet had contact with clients. By the third comparison period, late in the second year of the program, agreement had increased between student and instructor ratings as the ability of the students to rate themselves improved.

Woodward (Woodward, 1981) had both graduates and their clinical supervisors assess the graduates' performance in the fall and spring of their internship year. As well as finding that students rated themselves lower than their supervisors did, she also found, as did Paiva (1981), that supervisors' ratings in the eight areas of competence were highly intercorrelated, suggesting a halo effect, while the self-ratings did not show the same high intercorrelations. It has been noted elsewhere that supervisor ratings may show a halo effect (Wakefield, 1985). Other studies which

found that graduates rated themselves lower than faculty are Stuart (1980), Arnold (1985), and Arnold (1981). Similar results, where students rated themselves lower than peer ratings, were found by Linn, Arosgui, & Zeppa (1975). Boud and Falchikov (1989) noted that early studies (1930's - 1970's) showed a tendency for students to overrate themselves, while in the more recent studies students were seen to be underrating themselves. Boud and Falchikov also noted that all four studies involving the medical field showed students underrating themselves.

Summarizing studies where both graduates and supervisors are surveyed seems to show a trend in graduates giving themselves lower ratings than the supervisors do. One possible explanation for this is that supervisor ratings are showing a halo effect, with ratings for different skills or areas of competence being highly interrelated. Other possibilities are that graduates either lack confidence in their abilities, are not attuned to what level of proficiency is expected of them, or are poor at self-evaluation.

Multiprogram surveys

While many studies have looked at graduate outcomes, and some have compared graduate and supervisor opinions, few studies have considered outcomes from similar programs at different institutions. One such study (Allen, Armstrong, & Gutierrez, 1990) was carried out in the California State University system psychology programs. This survey was extensive in that it included eight campuses, each of which ran an independent psychology program. Respondents were asked to rate various aspects of program quality, as well as the contribution of the major to student development. The researchers found significant differences between alumni and faculty responses. From the faculty's perspective, alumni overestimated how much they learned. From

the alumni's perspective, faculty overestimated the quality of the program. In spite of the fact that each of the eight campuses ran independent programs, the majority of the campuses showed identical patterns of alumni / faculty mean differences and agreement between alumni and faculty on the relative attainment of student learning. The authors suggested that in view of the agreement over eight campuses, the results were generalizable to other university psychology programs.

In another study of this type, Arnold (Arnold, Xu, Epstein, & Jones, 1996) invited 13 institutions that awarded a combined baccalaureate-MD degree to collaborate in an evaluation study; eight participated. From the eight university programs, 1183 physicians had graduated and 68% responded to the questionnaire. The major difference among the programs was that some were six years long and some ran eight years. There were differences among the programs noted in the amount of time graduates spent in teaching activities (higher for seven and eight year program graduates), location in clinical settings (higher for 6-year program graduates); and overall preparation (6-year graduates indicating better preparation). Graduates rated their preparation in relationship and professional skills at the same level regardless of program type. There were no differences in practice patterns (e.g. time spent on patient care, research, administration). Overall, relatively few differences were associated with the length of program.

The study by Allen (1990) stated that each university program was run independently, but made no comment on the format of the program (innovative versus traditional). In the health professions, newer programs often adopt innovative techniques such as PBL. Arnold (1996) stated that the programs in his study were differentiated by length, but mentioned no other differences. Some studies have specifically looked for differences that could be attributed to the

type of curriculum being used. Hill et al. (1998) surveyed interns who had graduated from three different medical schools in Australia, one of which ran a PBL curriculum. All of the PBL graduates were surveyed and 50% of the graduates of the two larger traditional schools. Surveys were mailed to graduates six months into their internship year. Response rates were 78% from the PBL program graduates and 52% from the traditional school graduates. Overall, the graduates felt reasonably prepared for internship. The PBL graduates scored themselves higher on interpersonal skills, collaboration with health care workers, prevention, holistic care, and self-directed learning, but equal in patient management and science knowledge. Since only the graduates were surveyed, there is no confirmation from a second source that there actually is a difference between the graduates; only the self-reports are available. Since PBL programs often stress certain skills, it is not unreasonable to expect that graduates will mention strengths in those areas.

From another study there is some evidence that PBL graduates may indeed be different in the areas of communication skills and self-directed behaviours. Rolfe and colleagues (1995; 1994) compared the opinions of supervisors about interns' abilities.. Like the Hill study (1998), Rolfe included interns from all three medical programs in Australia. Over 98% of the graduates were included in the study. Interns were evaluated five times over their internship year, using a form that included 14 competencies, covering both clinical and professional abilities. Competencies included: clinical clerking, diagnostic skill, clinical judgements, procedural skills, approach to management, understanding of basic mechanisms, communication skills, relationships with patients & family, relationships with other professionals, self-directed learning, reliability & dependability, initiative, enthusiasm, teaching, and motivation & abilities. Of the 499 interns in

the study year (1992), one form was obtained for 486 (97.2%). A total of 1779 forms (73.2% of the potential maximum) were received.

One paper examined the data on 13 of the competencies (Rolfe et al., 1995), and found significant differences related to institution, age and gender. After controlling for age and gender, there was still a significant difference: the graduates of the PBL curriculum were rated by their supervisors as significantly better in self-directed learning, reliability & dependability, relationships with patients & families, and relationships with other professionals. While the results were statistically significant, the differences were small, ratings being 0.1 to 0.3 higher for the PBL graduates on a 7-point scale for these four competencies. The second paper (Rolfe & Pearson, 1994) looked at only the communication skills, and again found that the graduates of the PBL curriculum were rated more favourably by their supervisors.

Other universities with innovative curricula have also made efforts to compare their graduates with those from more traditional programs. Ben Gurion University (BGU) has used a multifaceted evaluation program to evaluate their curriculum (Margolis et al., 1997). Outcome measures examined included: grades on an external examination (ECFMG, Education Commission for Foreign Medical Graduates, an American Organization that tests medical graduates seeking to enter the United States as medical interns); national subject exams in medicine, paediatrics and surgery; role-playing patient examinations; questionnaires to clinical department chairpersons; questionnaires to graduates; and calculating the percentage of graduates practicing in primary care specialties. This paper did not outline response rates to their surveys.

Results from this study indicated that the BGU graduates scored lower on the ECFMG basic science exam (with a mean of 74.5 compared to 76.6, 76.1 and 72.5 for the three other

Israeli medical schools, all standard deviations being in a similar range of 6.3 to 7.4) and higher on the national paediatrics and surgery exams than graduates of some other Israeli medical programs (there was at most a difference of four points in the means, with standard deviations ranging from 6 to 9). These differences were significant; however, the authors questioned whether they were meaningful, since the differences were small in magnitude. It should also be noted that with the large standard deviations there would have been considerable overlap in the scores of graduates from the four programs.

Differences in other outcome measures included the BGU graduates scoring higher in the role-playing exams and unsolicited observations by the standardized patients that the BGU graduates behaved more like physicians than other graduates did. Overall, graduates had positive impressions of the BGU curriculum.

Clinical department chairpersons tended to view the BGU graduates at least as positively as those from other schools. Details of the department heads' opinions have been reported in more detail elsewhere (Friedberg & Glick, 1997a). Friedberg & Glick sent a 25-item questionnaire to 221 department heads and obtained a 64% response rate. Of the responding department heads, 74% thought graduates of BGU were equivalent to graduates of other universities, and 23% thought they were better.

Areas listed as strengths were interpersonal skills and teamwork, listed by 74% and 49% of department heads respectively. The admission process at BGU emphasizes personal qualities and de-emphasizes academic achievement. There is also an emphasis in the curriculum on communication skills, attitudes and teamwork.

The only area where over 5% of respondents rated BGU graduates lower than others was in the basic sciences, mentioned by 21% of department heads. The authors point out that at BGU there is no minimum science entry requirement, unlike other universities where specific science courses are stipulated as prerequisites, and overall academic requirements are lower at BGU. The authors further point out that the school program emphasizes both clinical and behavioural sciences more than the basic sciences. Lower admission requirements and less focus on the basic sciences may be the reasons that graduates are rated less highly in the basic sciences knowledge area.

These authors mention, as did the authors of the previous study, that the significance of their findings (lower scores on tests of basic science knowledge, stronger interpersonal and teamwork skills) to the practice of medicine is not clear.

Finland opened two new innovative medical schools starting in 1972 (Isokoski et al., 1997). The new schools set up community-based and primary-care-oriented programs. A recent study set out to find out how doctors who graduated from different universities in Finland evaluated their medical programs. The population of the study included the 5208 medical doctors who were registered to work between 1977 and 1988. A questionnaire was sent to half of these doctors, chosen randomly; the response rate was 66%. Graduates were asked to evaluate how well they thought their medical education corresponded with their present job and if they were satisfied with their training. The questionnaire included a list of certain items in a physician's job and graduates were asked whether they thought they had received enough education in these areas.

While all graduates were equally satisfied with their training for hospital work, a higher proportion of graduates from the new schools felt their training corresponded with their job ($p<0.001$), and only graduates from the new schools were satisfied with their training in primary health care (the reader was referred to two figures for the actual numbers but the figures were not printed in the conference proceedings). The graduates of the newer programs gave better marks to their curricula for a large number of items, while the older universities scored better on research. While these results are interesting in that they indicate differences between innovative programs that use small group learning to a greater extent than more traditional programs, they do not preclude a traditional university showing high ratings on training in primary care, if it chooses to focus on that area. The decision of *what* to teach is separate from the decision of *how* to present the content.

In Canada, Lewkonia and colleagues (Lewkonia, Baumber, Gupta, & Walji, 1997) conducted another comparative study of one PBL and one traditional medical program, both in Alberta. A questionnaire designed by a multi-disciplinary group was mailed to the graduates of the 1986 — 1991 classes. The questionnaire covered demographics, medical career paths, qualitative and quantitative curriculum feedback and the graduate's role in the health care system. High response rates were obtained (62.5% from the traditional program and 79% from the PBL program).

Neither group was enthusiastic about passive learning techniques (such as lectures) and both indicated that they wanted more active learning processes. The PBL graduates also indicated that they wanted more basic science and general clinical instruction. Similar responses were seen concerning rationing of expensive medical procedures, desirability of compulsory

recertification, opinions about non-medical health workers, sources of stress during medical school, career paths and future plans regarding retirement. As with the BGU study mentioned above in discussing levels of basic science knowledge, the authors pointed out here that there were different admission requirements between the programs which might be one cause of the perception by the PBL graduates that they were weaker in the area of basic sciences. At the same time, the differences between the two cohorts were substantial and the authors state that it is unlikely that all the variance can be attributed back to admission factors. Study results were fed back into curriculum revisions at both types of programs.

In summary, multiprogram surveys are being conducted more often in recent years, usually in an attempt to identify differences between traditional and innovative programs. Surveys that focus on one type of curriculum show few differences among graduates of the different programs. Surveys that focus on PBL versus traditional curricula show some differences, with graduates of the PBL programs being rated higher in the areas of self-directed learning, interpersonal relationships and clinical skills, but lower in basic sciences.

Surveys of Graduates, Faculty and Supervisors

Only one study was found that included all three groups: graduates, faculty and supervisors. An extensive use of an alumni survey as a tool for curriculum evaluation was reported by Soule (1993). In his dissertation, he describes a three-pronged survey. Faculty, graduates, and the graduates' supervisors (employers), were asked to report what they perceived as the strengths and weaknesses of a safety sciences curriculum at one university. All graduates over the 20-year history of the program were included in the survey. Six hundred and two

graduates were surveyed; 246 responded. One hundred and eight questionnaires were returned by employers of the graduates. All six active faculty members returned completed instruments. This three-pronged approach allowed the researcher to compare responses from the three groups and offered an opportunity to identify discrepancies between what faculty felt was important for the job and what graduates reported needing in their employment situations. While the results of this particular study are not relevant to this discussion, the concept of collecting information from more than one source is an important one.

Summary

Various educational reports, as well as individual researchers, have suggested that it would be useful to use graduate opinion in curriculum evaluation. There is a presumption that graduates are better able to judge a program after spending time in the workforce, as they will have gained a better understanding of how their education prepared them for the demands of their jobs. Many surveys are conducted which ask graduates about career paths. Fewer address skills expected of all baccalaureate graduates. Fewer yet address specific professional skills, or compare responses from more than one university, and it is rare indeed to triangulate by asking the opinions of graduates, their supervisors, and faculty.

Differences in opinions among respondent groups have been reported in studies covering more than one cohort of students or surveying the same graduates at different points after graduation. Few differences among graduates from different educational programs have been noted except where one program was significantly different in format from the others, and even in

those cases the authors suggested that admission requirements might account for some, though not all, of the variance in performance.

It appears that few curriculum evaluations have made use of opinions from multiple stakeholder groups in an effort to ascertain the strengths and weaknesses of specific university programs. Nor have comparisons been done among similar programs at different universities in an effort to uncover differences in the strengths and weaknesses of graduates that might be attributed back to the specific curricula.

Based on this literature review, it would be appropriate to conduct a study that collected the opinions of multiple stakeholders (graduates, supervisors and faculty members). With this data it would be possible to make comparisons of the respondent groups' opinions and therefore have confirmation regarding the strengths and weaknesses of the graduates. Using samples from more than one university would allow for some comparisons of the effect of different curricula on the graduates in terms of their preparation for professional practice. Finally, selecting two cohorts of graduates would permit the replication of other studies' findings in the physical therapy field (i.e. few differences between graduates of different cohorts).

Chapter 3 – Methodology

The purpose of this study was to investigate what various stakeholder groups reported as the strengths and weaknesses of the graduates and compare the responses of the respondent groups. This chapter starts with a review of the study questions. It then continues with a description of how the study groups were chosen for inclusion in the study, how the questionnaire was developed and the what procedures were used. The chapter concludes with a description of the analysis used for both the quantitative data and the responses to the short answer questions.

Review of the Study Questions

This study used a mail questionnaire to collect data from graduates, faculty, and the graduates' supervisors at work, to help answer the following questions:

1. In terms of their current job requirements, which areas of activity, function, skills and knowledge do physical therapy graduates report as being their strengths and their weaknesses?
2. What areas of activity, function, skills and knowledge do the physical therapy faculty report as being the strengths and weaknesses of new graduates of their own program?
3. What areas of activity, function, skills and knowledge do supervisors report as being the strengths and weaknesses of new graduates?

4. What are the differences among what the respondent groups (faculty, graduates and supervisors, two cohorts, and four universities) report as being the strengths and weaknesses of the new graduates?

Selection of the Study Group

Physical Therapy Programs tend to be small, with class sizes of 30 to 65 students. Keeping in mind that the expected response rate from alumni surveys of different types is generally 50% or less, including more than one cohort of students from the smaller programs was necessary to ensure adequate numbers for analysis. At the same time, the costs associated with the mailing of questionnaires meant taking a large multi-year sample was not possible, so it was decided to take a two year sample of graduates.

Limiting the study to a single province provided some benefits in terms of accessibility of all the programs to the researcher but limits somewhat the generalizability of the results. Four of the programs in Ontario were approached for this study. The fifth program was not included in the study because it is conducted in French and including it would have entailed considerable expense related to translation of the questionnaires. This sample of convenience, of four universities, is taken from the most populous province in Canada (in fact, one of only two provinces that have more than one Physical Therapy Program), and includes four of the thirteen Canadian Physical Therapy Programs. In 1991 there were approximately 648 physical therapists graduating across Canada (Canadian Physiotherapy Association and Directors of Physiotherapy Education Programs, 1991), so the sample chosen for this study was anticipated to be just under 30% of the national graduates.

Since the questionnaire was to focus on the early period of work after graduation, recent graduates were desired. It was assumed that recent graduates would have good recall of their time in school and the impact of their education on their ability to deal with their first jobs. At the same time, the graduates must have been working long enough to have a reasonable perspective on their job and the demands of the workplace and be past the very early adjustment period which can be expected of any new graduate. The timing of the study lent itself to a mail-out in the early part of 1996. Since one of the programs in Ontario graduates their students in November, it was felt that these graduates would have had little time to work by the first few months of the next year. For this reason, the first year of graduates chosen to be included in the survey were from 1994. Most of these graduates had had the opportunity to work from June or November 1994 to February 1996 (from one and a half to close to two years) prior to receiving the questionnaires.

Two cohorts of graduates were required. To retain the "new graduate" focus, it was decided to limit the study to those who had been out of school for no more than five years[1]. This decision was made after discussion with a few faculty and clinical supervisors known to the author, who all reported that they considered someone to be a "new graduate" for approximately five years. All of the programs reported some changes in their curriculum, or changes in the focus of some courses, during the few years preceding this survey. Using two cohorts of students further apart than one year would allow for some consideration of a larger issue: the effect of curriculum changes on the graduates. For these reasons, the other year included in the survey

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[1]Other researchers have similarly considered graduates of no more than five years to be "recent" graduates. For example Moden and Williford, (1988), Crook (1982), Woodward (1982) and Woodward (1983).

were 1992 graduates. There was thus a two-year difference between the two cohorts of graduates and both cohorts had been out of school for under 5 years.

Since the literature reports problems with the accuracy and validity of self-reports, verifying information gained from graduates would be an important aid to ascertaining their true strengths and weaknesses. For this reason, both supervisor and faculty opinions were solicited. Each of the supervisors of the graduates participating in the survey was asked to evaluate the particular graduate who contacted him or her (as outlined in more detail below under mail out procedures). Faculty were asked to give an opinion on new graduates in a more general sense, not tying their responses to particular individuals.

Questionnaire Usage

Questionnaires have been used extensively in educational research (Fugua, Hartmen, & Brown, 1982). Various advantages of mail survey use have been identified by a number of authors (Berdie & Anderson, 1974; Galpin, 1987; Moser, 1958). A large number of respondents can be reached at a relatively low cost and respondents spread out over a large geographic area can be reached with equal ease. All respondents are asked the same questions. Respondents can complete the questionnaire when not pressed for time, enabling them to provide thoughtful, well-considered responses.

The major disadvantage of questionnaires is the low response rate. Babbie (1973) stated that a 50% response rate is adequate, 60% is good and 70% is very good; however, he did admit that these were only rough guides and that he had no statistical basis for these numbers. Berdie and Anderson (1974) felt that a 90% response rate was desirable and Longworth (1953) wrote

that a 50% return rate was necessary or the validity of the tool would be decreased. Recent theses that used a mailed survey methodology obtained response rates ranging from 40.9% (Soule, 1993), 52% (Smith & Bers, 1987), and 57% (Cohen, 1992) to a high of 69% (Hilliard, 1994). Follow up procedures varied. Soule did not include any follow-up procedures; Cohen included a phone call reminder followed by a second mailing of the questionnaire; and Hilliard used two follow up mailings, one of which included another copy of the questionnaire. A study by Smith & Ber used different levels of follow up for different groups and found that two follow-ups gave them their highest response rate: 52%.

Other limitations on the usefulness of questionnaires have been identified by various authors (Berdie & Anderson, 1974; Galpin, 1987; Moser, 1958). The respondent can peruse the entire questionnaire before answering, so items found later in the questionnaire may affect responses to earlier questions. A respondent can change any answer before returning the questionnaire. Complex questions or specific wording may be misinterpreted by respondents, nor is there any opportunity for respondents to clarify their answers. It has been suggested that health professionals, who are used to "hard" research, may view the questionnaires as "soft" and unscientific (Deutscher, 1956). Sudman (1985) noted that professionals are busy and may feel that their time would be better spent on other tasks, especially if the value of the survey is not clear to them. Professionals may also be concerned about confidentiality.

Since it is always possible that non-respondents will differ from respondents in significant ways, maximizing the response rate is desirable in order to minimize any non response bias (Moser, 1958). Some researchers have found that efforts to make clear to the respondent the social utility of the research and to emphasize the role of the respondent in the research both work

to maximize the response rate (Champion & Sear, 1969; Linsky, 1975; Slocum, Empey, & Swanson, 1956). Other suggestions for maximizing the response rate are to personalize the questionnaires by using hand signatures, postage stamps with pictures rather than a postage meter or plain postage stamps, self addressed stamped envelopes, and making three follow-ups (Dillman, Christenson, Carpenter, & Brooks, 1974). The use of three follow-ups has been supported by other authors as well (Futrell & Lamb, 1981; Herbelein & Baumgartner, 1978).

Completion of the questionnaire is an important area. Dillman et al (Dillman et al., 1974) looked at items with high non-response rates and found that those items had a lower relationship with the survey objectives or had poor or unclear directions which led to confusion on the part of respondents. It is important to design a questionnaire that will be as easy as possible for a respondent to complete. Summerhill and colleagues (Summerhill, Taylor, Israel, & Sweat, 1987) asked respondents directly which factors influenced them to return questionnaires and respondents agreed that question wording was important. It has also been shown that increasing the relevance of the questionnaire to the sample population increased the response rate (Herbelein & Baumgartner, 1978). A number of authors have outlined details of question construction and questionnaire design (Babbie, 1973; Berdie & Anderson, 1974; Boser, 1990; Boser & Clark, 1990; Clark & Boser, 1989; Converse & Presser, 1986; Moser, 1958; Nixon, 1954; Payne, 1951; Spitzer, 1979; Sudman, 1985). These texts were reviewed to ensure that question development would elicit the anticipated responses, encourage completion of all sections of the questionnaire, and enhance the response rate. In addition, advice on questionnaire construction was sought from educators at the Ontario Institute for Studies in Education and the University of Toronto.

Development of the Questionnaire

This research project was presented at a meeting which was attended by the Chair of each Physical Therapy Program, or their representative, from all four English-language programs in Ontario. This meeting took place in the spring of 1995. In addition, each Chair was contacted to discuss the project. One university asked for a presentation to the Education Committee explaining the research and this was done. The Chair from each of the four universities' programs agreed to participate in this research. Following the discussion with the Chairs of each of the Departments, a letter of confirmation was sent to the participating universities. A copy of this letter can be found in Appendix 2.

To help develop the questionnaire, Focus Group Interviews (FGIs) were conducted at each of the four universities involved. In a focus group, a small group of people possessing certain characteristics provide data of a qualitative nature in a focussed discussion (i.e. where topics are pre-determined and sequenced) (Krueger, 1988). Lederman (1990 p.118) lists five assumptions that underlie the use of FGIs as a method of collecting data. These are: "(1) That people are a valuable source of information, including information about themselves; (2) That people can report on and about themselves, and that they are articulate enough to put into words their thoughts, feelings and behaviours; (3) That people need help in 'mining' that information, a role served by the interviewer, or researcher, who 'focuses' the interview in the focus group interview; (4) That the dynamics of the group can be used to surface genuine information rather than creating a 'group think' phenomenon; and (5) That the interview of the group is superior to the interview of an individual." In summary, it is reasonable to ask relevant stakeholders their opinions about a topic (in this case, the strengths and weaknesses of graduates).

It has been reported by both Krueger (1988) and Katz (1993) that focus groups are useful at the beginning of a project to focus questions for a survey; however, FGIs are not intended to provide representative results, generalizable to a population as a whole (Keegan & Powney, 1987; as quoted in Watts & Ebbutt, 1987). Even so, it seemed that sampling the members of each respondent group for their unique contribution to the topic would be appropriate in this case. Therefore representatives of all three respondent groups were asked for their opinions on the strengths and weaknesses of new graduates and asked what they felt it would be important to investigate more fully in the questionnaire. It was further decided that the information gained by using FGIs would be more valuable than having one-on-one conversations with a sample of respondents at each location.

Lederman states that "Participants are selected because they are a purposive, although not necessarily representative, sampling of a specific population" (Lederman, 1990 p. 117). For this reason, all three respondent groups were sampled at each university, each in a separate FGI, so that a total of twelve FGIs were conducted.

Interviews began with the faculty of the Physical Therapy departments. There were three reasons for this. First, the FGIs gave the faculty members at each university a chance to say what they felt was important to consider in this research and a chance to pinpoint any questions of particular importance to their program. Second, it was felt that offering faculty members an opportunity to participate in the questionnaire development process would help elicit the university's participation in the project as a whole and would encourage the individual faculty members to respond to the questionnaire. The third reason related to Persico & Heanny's observation (1986 p. 12) that participating in an interview "significantly improves the likelihood

that the group will act on the basis of its knowledge." Thus, if recommendations for curriculum revision were developed out of the study results, having contributed input from the beginning would make it more likely that faculty members would seriously consider such recommendations, as they pertained to their particular programs.

At three of the universities the Chair of the Department invited all faculty to attend. At the fourth university, where the author taught and was known to the staff, each faculty member was sent a personal letter of invitation to participate in the FGI. FGIs were also conducted with supervisors of clinical departments and (separately) with recent graduates residing in the area of each participating university. The Chairs of the university departments provided names and phone numbers for clinical supervisors in their respective areas, as well as for a number of recent graduates living nearby. Each of these contacts was invited by phone to participate in the appropriate FGI. The phone calls were followed by letters of invitation. A sample letter can be found in Appendix 3 . In total, twelve FGIs were conducted, three at each participating university.

These FGIs were used to collect preliminary information on the strengths and weaknesses of the graduates and to outline areas which should be explored in detail in the questionnaire. A sample Focus Group Interview Guide is shown in Appendix 4. Areas addressed in the FGIs were: perceived strengths of new graduates; perceived weaknesses of new graduates; areas covered in the educational program that were not being used in the work setting; and finally, participants were asked what they thought should be asked of new graduates in this questionnaire.

Each FGI lasted approximately 1 to 1 ½ hours. The interviews were audiotaped. The audiotapes were transcribed and the transcriptions analyzed to identify topics mentioned. The

frequency with which each topic was discussed was counted. The topics were grouped as patterns developed.

Questions were developed which dealt with the topics that came out of the FGIs. Topics identified in the literature as important to health professionals' education were also included in the questionnaire. Previously used questionnaires were reviewed to identify or confirm topics to be dealt with in the questionnaire. Questionnaires reviewed (other than those already mentioned in the literature review) include: Physical Therapy-Specific Generic Abilities (May, 1992), McMaster Medical School Exit Survey (McMaster Medical School, 1994), Medical Graduate Survey (Clack, 1993), College Miserecordia Survey of Physical Therapy Graduates (Moran, 1994), and Florida State University Survey (Gusler, 1982). Advice was also sought from educators at the University of Toronto. To ensure that all topics were covered, a grid was developed to match topics with corresponding questions. The grids can be seen in Appendix 5 .

Questionnaires included rating scales in which the respondents were asked to rate the graduates on their strength in the different clinical specialties, functions, skills and knowledge. Some topics did not fit into this type of rating scale, so to allow certain topics to be addressed as well as allow for a more detailed description of strengths and weaknesses, a section of open-ended questions was included.

Three parallel questionnaires were developed. While the same topics were addressed in each questionnaire, the specific wording of the questions was adjusted to match each group (i.e., the graduates, the faculty, or the work supervisors of the graduates). With the aim of increasing faculty support for the project, the first draft of the questionnaire was sent to all 25 faculty who had participated in the FGIs, and one faculty member who had expressed an interest in doing so

but was unavailable at the time of the interview, for their review and input. Faculty were asked to return any comments on the questionnaire within a few weeks. Over half of the faculty sent back the questionnaire with comments.

After revisions were carried out, a pilot test of the questionnaires was conducted. Nine clinical supervisors, nineteen graduates, and two faculty were included in the pilot study. The graduates used for the pilot had graduated in either 1991 or 1993. All four universities were represented in the pilot study samples of graduates and supervisors. Two local faculty were asked to review the faculty questionnaire and appropriate questionnaires were mailed to the graduates and clinical supervisors. The cover letter from the pilot study can be found in Appendix 6. No follow-up procedures were used for the pilot study. The responses from the pilot study were examined and questions which appeared to be misinterpreted by the respondents were reworded. The final drafts of the questionnaires are included in Appendix 7.

Mail Out Procedures

The final questionnaires were sent to three groups:

1) Two cohorts each of recent graduates from the four participating Physical Therapy Programs. Graduates from 1992 and 1994 were included in the data collection.
2) Supervisors of the graduates. Graduates were supplied with a separate envelope which contained the supervisor's questionnaire. The graduates were asked to give the envelope to their work supervisor. At the end of the Graduate Questionnaire a space was available for each graduate to indicate his or her consent, and to provide

the name and address of his or her supervisor. This information made it possible to direct follow up mailings to the supervisors.

3) The clinically oriented faculty of the participating programs. These faculty were involved with clinically related courses. Since the questionnaire asked for an assessment of the clinical abilities of the graduates, faculty members whose main responsibility related to basic sciences courses were not included.

Mail out procedures followed recommendations from the literature on details which have been shown to increase response rates. An overview of the literature in this area can be seen in Appendix 8. Each questionnaire was accompanied by two cover letters. The first was a letter of introduction from the Chair of the respective university. The second was from the researcher. Samples of these cover letters can be found in Appendix 9. The cover letters from the Chairs had a generic introduction (Dear Graduate, Dear Supervisor, Dear Faculty), while the cover letters from the researcher were personalized with the name and address of the respondent and were signed individually. For the first mailing of the questionnaire, the letters from the Chairs were printed on letterhead for three of the universities. The fourth university provided one copy of the letter on letterhead and subsequent copies were photocopied. The first follow-up was a letter which mentioned that the questionnaire had been mailed and requesting that it be completed and returned. The second and third follow-ups included copies of the questionnaire and used photocopies of the departmental cover letters. All the cover letters from the researcher were on departmental letterhead (Ontario Institute for Studies in Education, Higher Education Group).

The first mailing and the first follow-up used philatelic stamps. The second and third follow-up mailings went out through the university mailroom and postage was metered. Self-addressed stamped envelopes were included with the questionnaires and in all cases philatelic stamps were used. The only exception to this was the faculty mail, which was sent via Inter-University Transit Service (IUTS). The first follow-up was mailed approximately one week after the questionnaire. The second follow-up was mailed approximately five weeks after the questionnaire and the third follow-up was mailed approximately four weeks after the second follow-up. The original plan had been for the second follow-up to be simply a letter and for the third follow-up to contain another copy of the questionnaire. Early returns were not as high as anticipated (approximately 30%), so this plan was changed and both the second and third follow-up mailings contained a copy of the questionnaire. Copies of the cover letters which accompanied the follow ups can be found in Appendix 10.

On reviewing the early returns, a typographical error was noted in the Graduates' Questionnaire. In Question (7), instead of being asked where they *were* working, they were inadvertently asked where they *thought* new graduates were working. This form of the question belonged in the Faculty Questionnaire. All respondents to the first mailing were subsequently sent a brief letter explaining this error, a copy of the correct question (7), a self-addressed stamped envelope, and were asked to please respond to this final question. No follow-up procedures were carried out to anyone who did not send in this final answer.

Names and addresses of graduates for the years 1992 and 1994 were obtained from the College of Physiotherapists of Ontario and each university provided a list of alumni. When a questionnaire was returned marked "wrong address," attempts were made to find a correct

address. Either the College or the university that had provided the address was contacted. In some cases a new address was obtained and mailings were resumed to the new address.

For the supervisors, once a graduate had indicated on a returned questionnaire that they had given their supervisor the envelope and agreed to the researcher contacting the supervisor, the first follow-up letter was sent. Second and third follow-ups followed the same time intervals as those for the graduates and faculty.

To allow for appropriate follow-up procedures, each questionnaire was numbered. Anonymity of responses was assured to the respondents in the cover letter from the researcher, as well as in the questionnaire itself.

Approximate costs of this study are included in Appendix 11.

Analysis of the Quantitative Data

All quantitative data from the questionnaire were entered into a database and prepared for analysis using the Statistical Package for the Social Sciences (SPSS). Preliminary procedures included calculating means and standard deviations and constructing bar graphs of all variables. Graphs and numerical data were scanned for anomalies. Examples of anomalies included: item values of seven on a scale of one to five; five university rankings when only four were included in the study; and a mean outside the range of the item choices. These were investigated and data entry errors were corrected. This procedure was then repeated and the data examined with an eye to identifying any obvious patterns.

Statistical tests were planned in consultation with a faculty advisor and a number of texts were consulted (Norman & Streiner, 1994, p. 129-148; Norusis, 1993c, p. 47-81; Nunnally & Bernstein, 1994, p. 447-541).

To aid in the identification of patterns within the data and to make the results more explicit and meaningful, it was necessary to reduce the number of variables to be considered. The first step in this process was the development of summated rating scales, based on the same grids that had been used to develop the questionnaires. These scales were content based, the items in each scale addressing a similar topic. Two examples: the Musculoskeletal, Cardiorespiratory and Neurology Treatment Planning Ratings were combined into a Treatment Planning Scale; the Applied Sciences and Basic Sciences Knowledge Scales were combined into a Knowledge Scale. Names of the scales and lists of the items included in each scale can be found in Appendix 12.

The scales included various numbers of items and the individual items had different numerical scores. Items in the large table in the questionnaire, for example, were out of five; however, other items were out of two (for example, yes or no to being a CPA member). To allow for comparison and further analysis, the scales were all rescaled to a maximum score of ten. For example, in the Treatment Planning Scale (consisting of Musculoskeletal, Cardiorespiratory and Neurology Treatment Planning Ratings) each segment was rated out of five on the questionnaire; the resulting total value for the scale was out of 15. Thus, for the graduates, adding these three ratings together resulted in a self-rating for each graduate out of 15. This self-rating was then rescaled to be out of 10 ($x / 15 = y / 10$). All scales were similarly rescaled to be out of 10, so they could be compared with each other.

In some instances, entire sections of the questionnaires were left blank. This occurred most often with the supervisors, in situations where the graduate was working in one setting (most often an out-patient clinic) and the supervisor could not comment on other areas of clinical practice (cardiorespiratory care, for example). For the analyses planned (Principle Components Analysis and Analysis of Variance (ANOVA)), cases with missing values would normally be excluded. Since most respondents left at least a few blanks, if all the incomplete cases had been eliminated from the study there would have been very few left. To solve this problem, the mean value for that group of respondents was substituted for any missing values (Norusis, 1993a; Norusis, 1993b p. 80; Nunnally & Bernstein, 1994 p. 123; SPSS Inc., 1997) (i.e., a missing value for a particular supervisor was filled in with the mean of all supervisors who had completed that item, and similarly for the graduates and faculty). Nunnally and Bernstein suggest that this is a common method of imputation (Nunnally & Bernstein, 1994 p. 123). This procedure made it possible to use all cases in the analysis. With any of the methods that deal with missing data, when the proportion of missing observations is large (as was the case with the Cardiorespiratory sections of the questionnaire) the results must be interpreted with caution. One reason for this is that with this method the variance for each item would be reduced. This could have resulted in more comparisons being statistically significant than might be the case with another method of dealing with missing data.

The mean and standard deviation for each group of respondents, for each scale, were calculated. Finally, Cronbach's alpha reliability coefficient was calculated for each scale (Allen & Yen, 1979, p. 79-80; Norusis, 1993c, p. 147).

The number of summated rating scales obtained by this first step in data reduction was 26. To test for differences between groups of respondents, Analysis of Variance (ANOVA) was planned. Three different comparisons were planned: by respondent category of faculty, graduate or supervisor; by university; and by cohort. Repeating ANOVAs on this many scales for all the combinations of groupings would have been inappropriate, since with that many comparisons some might have been statistically significant by chance alone, so further data reduction was carried out. While there are a number of different approaches to data reduction, it was decided that a reasonable approach would be to group the scales according to their interrelationships. Factor analysis is one way of examining clusters of variables, in this case groupings of scales, in order to identify which variables (scales) correlate more closely with each other than with variables in other clusters, and is regarded as a valuable tool for this purpose (Nunnally & Bernstein, 1994, p. 535). Identifying the clusters of scales would allow for further analysis (ANOVAs) to identify differences among the respondent groups.

This research was exploratory, intended to investigate the strengths and weaknesses of graduates and to determine whether the graduates were ready for professional activities. Since there was no pre-conceived idea of what the results might be, the analysis was data-driven (exploratory), not theory-driven (direct), as described in Nunnally (1994, p. 450).

Several factor analysis methods can be used to identify intercorrelations among the variables and extract factors. In general, the solutions to the different methods are comparable (Norman & Streiner, 1994, p.132). Because PCA is straightforward and is often chosen for exploratory analysis of data (Norman & Streiner, 1994, p. 129) it was the approach chosen to look for interrelationships among the scales.

In order for a sufficient number of cases relative to the number of scales to be included in the PCA all three respondent groups were combined and a single PCA was conducted. This required making the assumption that the factor structure for all three respondent groups was similar.

The factors determined by the PCA showed that three scales were not contributing adequately to the solution. These scales did not correlate well with other scales: Commitment Scale, Leadership Scale and Specialization Scale. The Commitment and Leadership Scales had a moderate correlation with each other but no correlations with other scales. The Specialization Scale did not correlate with any other scale. Since the main purpose of a Principle Components Analysis is to find patterns in the intercorrelations of the scales, scales which do not correlate well with other scales should be considered inappropriate. The Factor Loadings that were produced from this particular analysis were considered. It was noted that the fifth factor found in this solution consisted of simply the Leadership and Commitment Scales. For a factor to be considered it is recommended that at least three items load on that factor (Norman & Streiner, 1994 p.140). As well, this fifth scale did not contain any other items loading on it over 0.3. After some consideration it was decided to remove the Commitment, Leadership and Specialization Scales from the list and repeat the PCA.

A PCA was conducted with the remaining 23 scales and just over 72% of the correlations were over 0.3. All the remaining scales correlated well with numerous other scales in the matrix.

A Varimax Rotation was also used in the analysis. The purpose of this rotation is to minimize the number of scales loading on to each factor, which in turn makes it easier to interpret the factors. Four factors evolved from the PCA. As is recommended, scales with factor loadings

over 0.5 were considered the major scales in each factor. These scales were used to characterize the respective factors (Norusis, 1993c p.69; Nunnally & Bernstein, 1994 p.487).

Certain questionnaire items were included in more than one scale (for example, cardiorespiratory assessment was included in both the Cardiorespiratory Scale and the Assessment Scale). In the principle components analysis, scale groupings led to some items being included in a particular factor within more than one scale. To reduce the potential for these repeated items to cause bias in further analysis, each item in each scale within a factor was listed and any duplication of items was eliminated. The resulting factors were then named, based on the items contained in the respective factors. Factor scores were calculated by adding together the original scores from the listed items and scaling the total to a maximum of ten. Again, the mean and the standard deviation for each group and the Cronbach alpha reliability coefficient for the factors were calculated (Allen & Yen, 1979 p. 79-80; Norusis, 1993c p. 147).

Using the factors derived, ANOVAs were conducted to establish any differences between groups of respondents. As will be discussed later, no differences were noted among the universities in the Treatment Factor. In discussing the preliminary results, one faculty member pointed out that each university is perceived to have certain strengths and weaknesses in its program. This perception is held by faculty members at the universities as well as clinicians who work with graduates of the different universities. This is particularly true in the clinical areas: neurology, cardiorespirology and musculoskeletal treatment. To investigate the possibility of differences among the respondent groups in the clinical areas, post hoc ANOVAs were conducted on certain scales to check for any objective signs of these perceived differences between the universities. All scales which had reliabilities over 0.7 were included in this analysis.

Analysis of the Open Ended Questions

Responses to open ended questions were dealt with in two steps. Questions were dealt with individually, with each respondent group being kept separate from the others. The first step was investigative – to develop appropriate categories for the answers to each question. Answers to a particular question were grouped, with similar responses being grouped together. Regrouping continued until the majority of the answers fell into categories. Titles for all categories of responses were assigned, based on the content of those responses. While there was considerable overlap among the groups, some topics were raised by some groups and not by others; while in other cases, although the topic was similar, it was raised in a different way by different groups, and thus may have been assigned a different title. As an example of this, supervisors tended to say "extremely friendly and easy to talk to," "establishes positive working relationships," or "pleasant approach to patients," while graduates tended to be more direct and say they had "easy rapport with patients." These were both categorized as rapport. Faculty tended to say that graduates had "open minds" and were open "to change and expansion of physical therapy." Supervisors tended to say the graduate was "willing to increase knowledge," had the "ability to pick up skills very quickly" or had a "willingness for self-studying and ongoing education." These were all included under lifelong learning.

In the second step, each answer retained its original identification coding (university, mailing, year, ID#), to allow for future sorting and group comparisons. The original answers were viewed with the titles present and each answer was given the appropriate code for that particular title. Where more than one topic was mentioned in an answer, the answer was copied and both appropriate titles were assigned. As an example, one faculty member wrote "our

graduates are excellent problem solvers and life-long learners. They know what questions to ask where and how to find the information and how to apply it to the situation at hand." This would have been included under problem-solving, lifelong learning, and evidence-based practice.

Once all the coding had been carried out, the data were sorted in a number of ways: all faculty; faculty by university; all graduates; graduates by university; graduates by year of graduation; all supervisors; supervisors by university; and supervisors by year of graduation. Tables were created, showing simple counts and percentages of the number of times particular topics arose for the various respondent groups. Areas of differences between years or university groups of respondents were noted in separate tables. Where appropriate, data were presented in graphs rather than tables.

Percentages were shown when their values were deemed by this researcher to be educationally relevant. Group sizes for the answers ranged from under 10 for faculty university groupings up to 169 for the full list of graduates. With small group sizes (under 50), responses were considered to be relevant if over 10% of the respondents mentioned the same topic. For the larger group sizes (50+), 5% of the group was considered a relevant number.

Ethical Issues

The graduate questionnaire asked for the name and address of the supervisor. This information was on a separate page of the questionnaire which was removed from the completed questionnaires and stored separately. All questionnaires asked respondents to provide their names

and addresses if they were interested in any follow-up interviews on this same topic or in receiving a summary of results after the study was complete. Again, this information was on a separate page of the questionnaire and was removed and stored separately.

Four of the Physical Therapy Programs in one province participated in this study, only one of which provided a problem-based learning curriculum. While universities are referred to by letter (A, B, C and D), by using the curriculum information and the number of graduates reported for each university, it is possible that someone knowledgable about the Canadian programs would be able to identify the universities in the report.

All aspects of this research were approved by a University of Toronto Ethics Review Committee. Each participating university had the option to submit the research plan to an ethics review committee at their university, but none elected to do so.

Summary of the Methodology

A mail survey was carried out of two years' graduates from four Physical Therapy Programs, their clinical supervisors and faculty members of the four programs. Graduates from 1992 and 1994 were surveyed. Graduates were asked to hand the Supervisor Questionnaire to their supervisor, and to provide the name and address of the supervisor for follow up purposes. Three follow-up mailings were conducted, two of which included additional copies of the questionnaires. Questionnaires were developed following focus-group interviews and a review of the literature, and consisted of both quantitative data and short answer questions. Quantitative data were combined into scales which were then subjected to a Principle Components Analysis. Short answer question data were grouped according to topic and counts and percentages of the

number of times topics were raised were calculated. Results from the quantitative analysis and short answer questions are presented in Chapters 4 and 5, respectively.

Chapter 4 – Quantitative Data Results

Description of Respondents

Faculty Respondents

Fifty-one faculty at the four universities were sent questionnaires. Four faculty responded that they had not worked at their university for a minimum of 1 year. As this was mentioned in the cover letter as being a prerequisite for completing the questionnaire, these faculty did not complete the questionnaire. One faculty member felt she should be excluded from the study as her main job did not relate to teaching. This left a total of forty-six eligible faculty. Forty faculty responded to the questionnaire, for a total response rate of 87%. Individual university response rates ranged from 83% to 100% (Table 1). Eighty-two and one half percent of the responding faculty were women, 17.5 % were men. Response rate by mailing can be seen in Figure 1. Close to half of the faculty respondents had taught for fewer than 5 years (Figure 2). The majority of the faculty respondents had full time appointments at the university (Figure 3). Fewer than half of the faculty respondents were maintaining clinical practices (42.5%).

Table 1 Overall faculty response by university

University	Response Rate
A	83 %
B	83 %
C	88 %
D	100 %

Figure 1 Faculty response by mailing

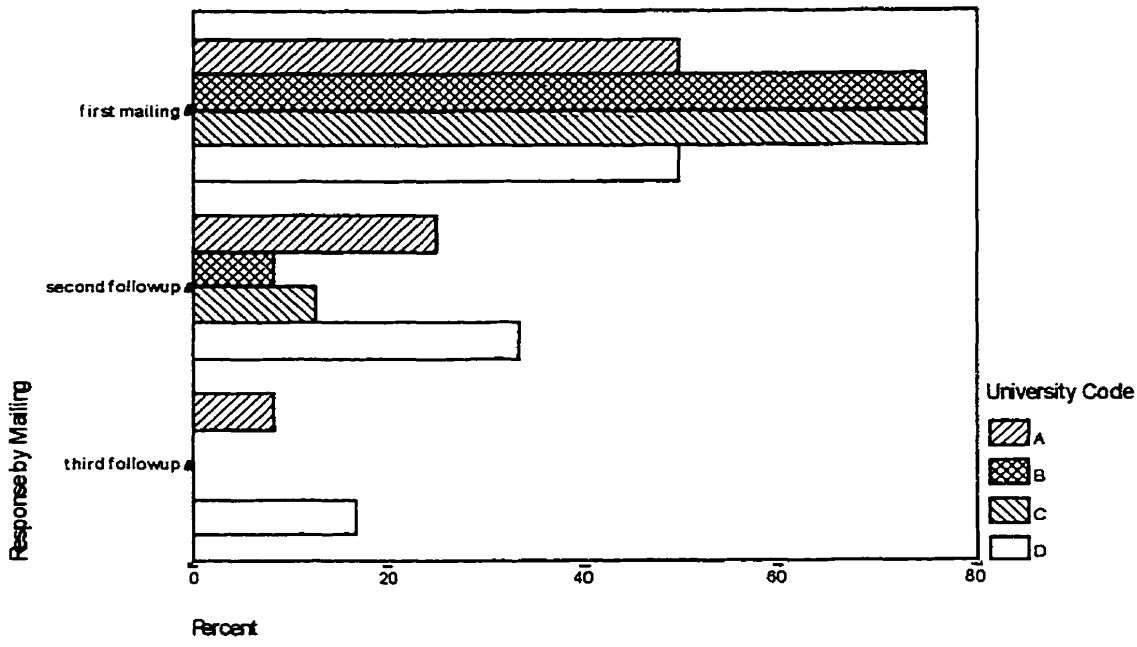


Figure 2 Faculty respondent teaching experience

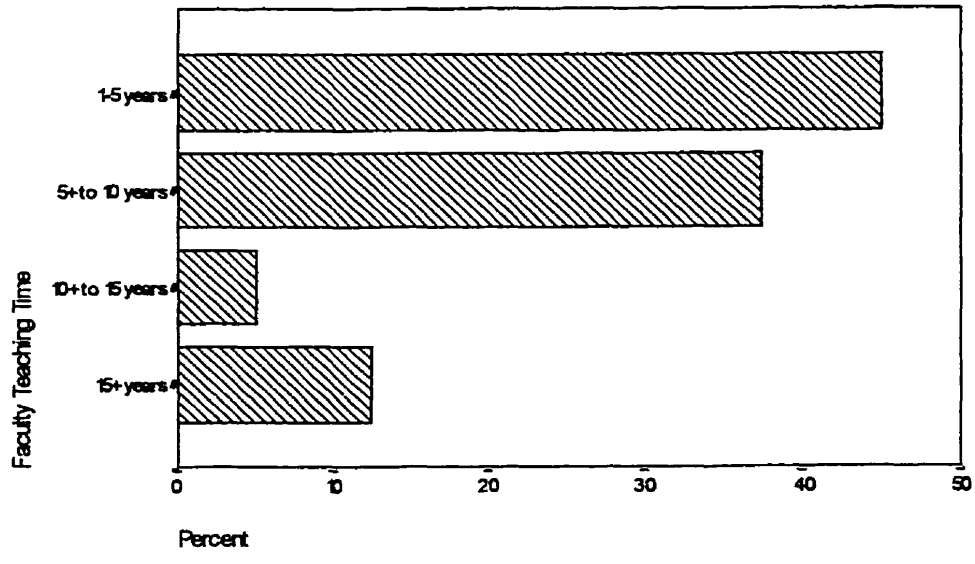
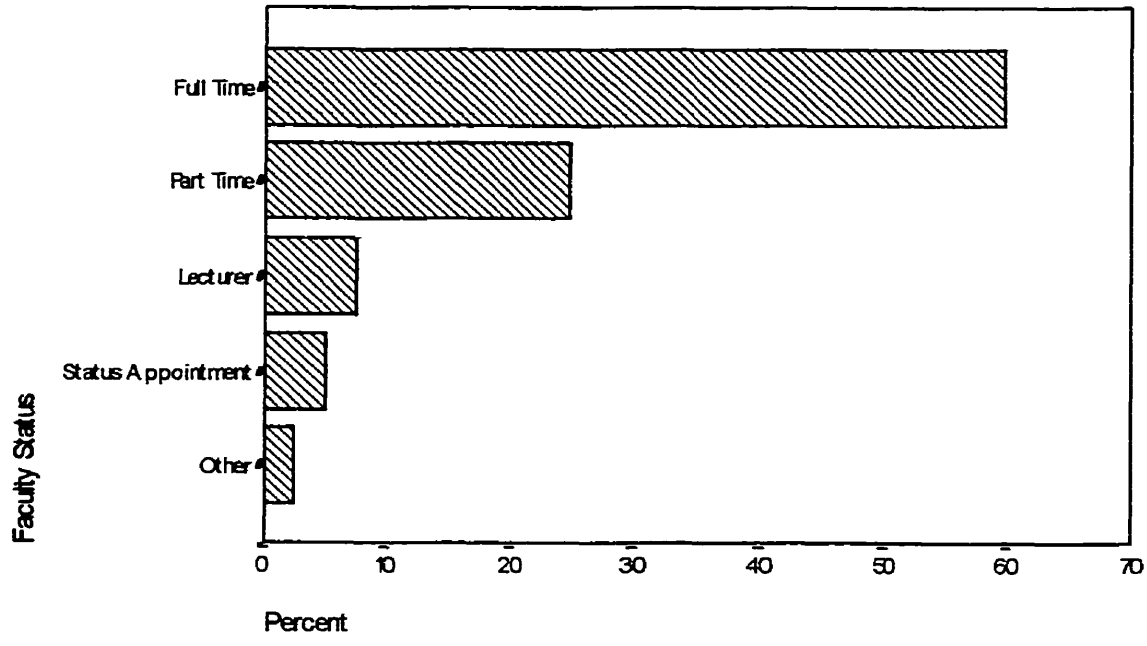


Figure 3 Faculty university status



Graduate Respondents

Questionnaires were sent to 348 graduates. Five of these graduates were in degree completion programs, three had graduated in 1993 or 1991 (the focus years being 1992 and 1994), one indicated she was not in clinical work and the questionnaire did not apply to her, and two were travelling physiotherapists who were not reachable. This left 337 graduates in the survey. Seventeen questionnaires were returned marked "wrong address" for which new addresses were not available. Of the remaining 320 questionnaires mailed out, 169 were returned completed, for a total response rate of 52.8%. Graduate distribution within the population and among the respondents, by university, is shown in Table 2. Individual university response rates can be seen in Table 3, population and respondent distribution by year is shown in Table 4 and the mean graduates' ages can be seen in Table 5.

The majority of responses were received after the first questionnaire mailing (70.2%). An additional 17.3% were received after the second questionnaire mailing (the second follow-up) and the final 12.5% after the third followup. This pattern was similar across universities (Figure 4).

Nine graduates indicated that there was no appropriate supervisor to complete the supervisor questionnaire (5.2%). Ninety-two of the 169 respondents allowed contact with their supervisors. In five cases, questionnaires were received from the supervisors without the corresponding graduate returning their questionnaire, bringing the total to 97 out of 174 graduates who agreed to contact with their supervisor (56%).

Table 2 Graduate distribution by university

	Population		**Respondents**	
University	**#**	**%**	**#**	**%**
A	56	17.5	27	16.0
B	81	25.3	48	28.5
C	124	38.8	54	32.0
D	59	18.4	40	23.7
Total	320	100%	169	100%

* numbers may not add exactly to 100% due to rounding

Table 3 Graduate response rate by university

University	# in Population	# of Responses	Respondent Rate (%)
A	56	27	48.2
B	81	48	59.3
C	124	54	43.5
D	59	40	67.8
Overall	320	169	52.8

Table 4 Graduate distribution by year

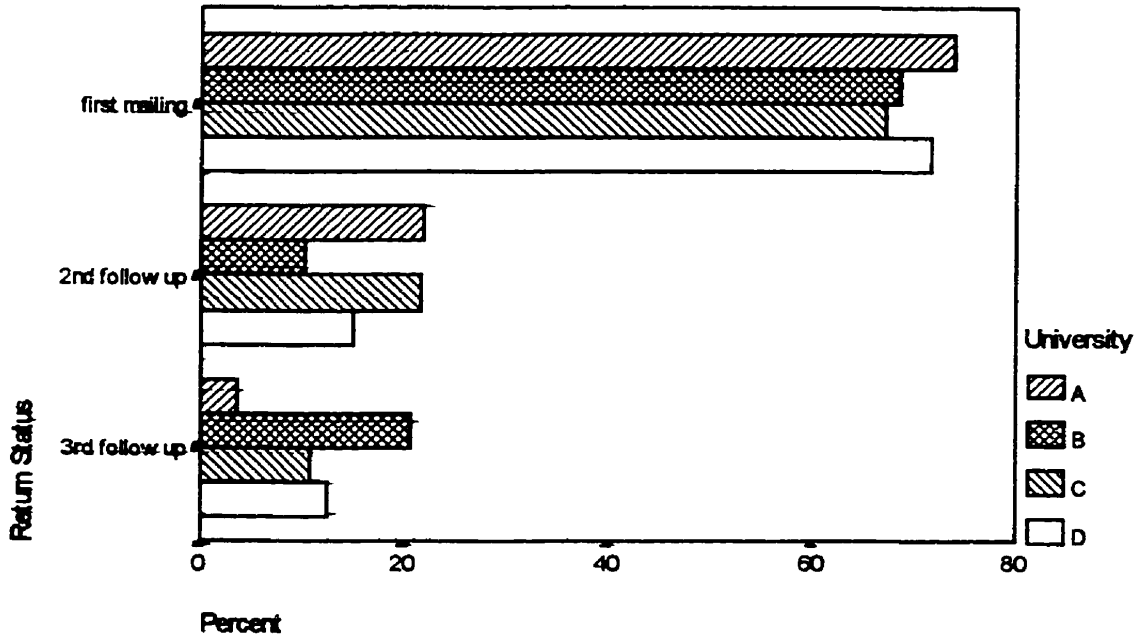
	Population		Respondents	
Year of Graduation	**#**	**%**	**#**	**%**
1992	132	41	68	40.2
1994	188	59	101	59.8
Total	320	100 %	169	100 %

Table 5 Age of graduates

	Mean Age	SD	Min	Max	#
All graduates	24.68	2.82	21	41	169
University A	26.67	2.56	23	35	27
University B	24.62	3.16	21	41	47
University C	24.19	2.58	21	32	52
University D	24.05	2.28	21	30	39

* Four graduates did not answer this question

Figure 4 Response pattern of graduates



Supervisor Respondents

Ninety-seven supervisor names were provided by graduates. Of these, one graduate had given the questionnaire to a clinical supervisor from one of her student placements, so these responses were not appropriate, and in three cases addresses were not provided. This left ninety-

three supervisors to be contacted. A response rate of 89% was achieved with this group (83 responses). The breakdown of the number and percent of supervisor responses from each university group is shown in Table 6. Graduates who responded to the first mailing were more likely to agree to contact with their supervisor than were those who responded to later mailing, as can be seen in Figure 6.

Forty-four percent of the responding supervisors were asked by 1992 graduates and 55% were asked by 1994 graduates (in one case this information was missing). The gender mix of the supervisors was 77% women, 23% men. The majority of the supervisors responded to the first contact, as can be seen in Figure 5. Just under ninety-two percent of respondents were physiotherapists, 5% were not, and in 4 % of the cases this information was missing. The majority of the respondents (88%) were maintaining a clinical practice. The relationship of the supervisors to the graduates can be seen in Figure 7, and the length of time the supervisors had

Table 6 Supervisors by university

	Population		**Respondents**	
University	**#**	**%**	**#**	**%**
A	20	21.7	18	22.0
B	21	22.8	18	22.0
C	29	31.5	29	35.4
D	22	23.9	17	20.7
Total	92	100%	82	100%

known the graduates is shown in Figure 8. There was a broad age range among the supervisors, as can be seen in Figure 9 .

Figure 5 Response pattern of supervisors

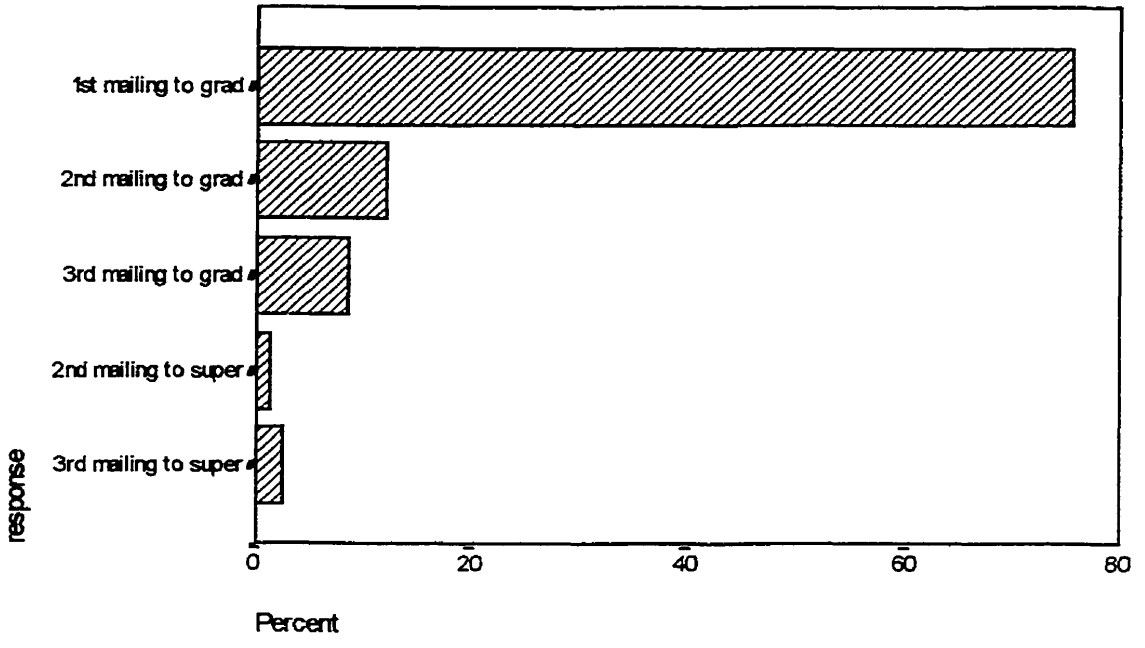


Figure 6 Graduates who allowed for contact with their supervisor, by graduate response pattern

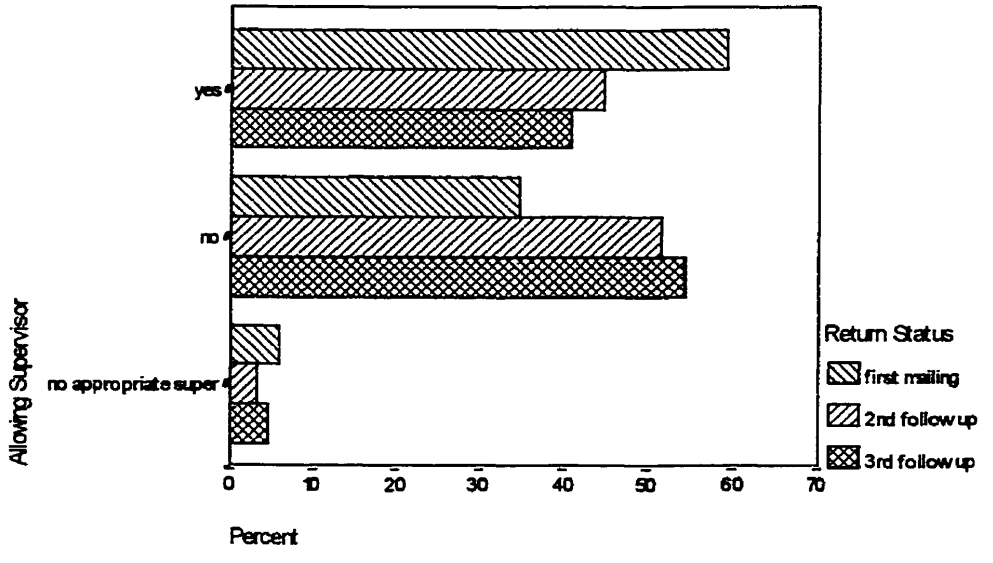


Figure 7 Relationship of supervisor to graduate

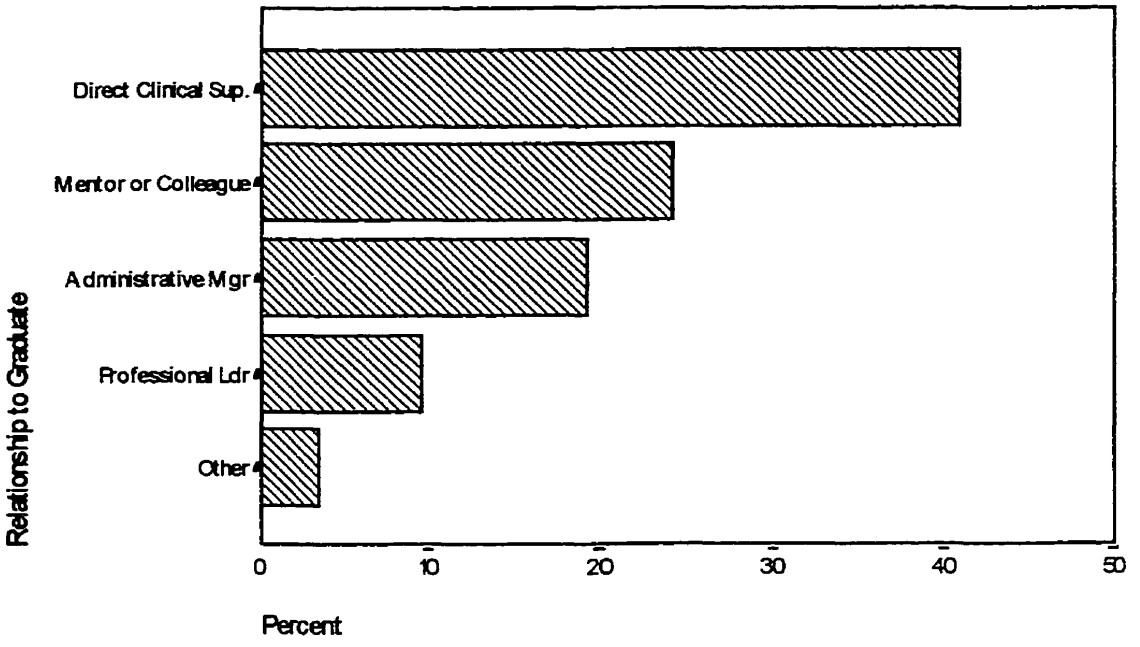


Figure 8 Length of time supervisors have known graduates

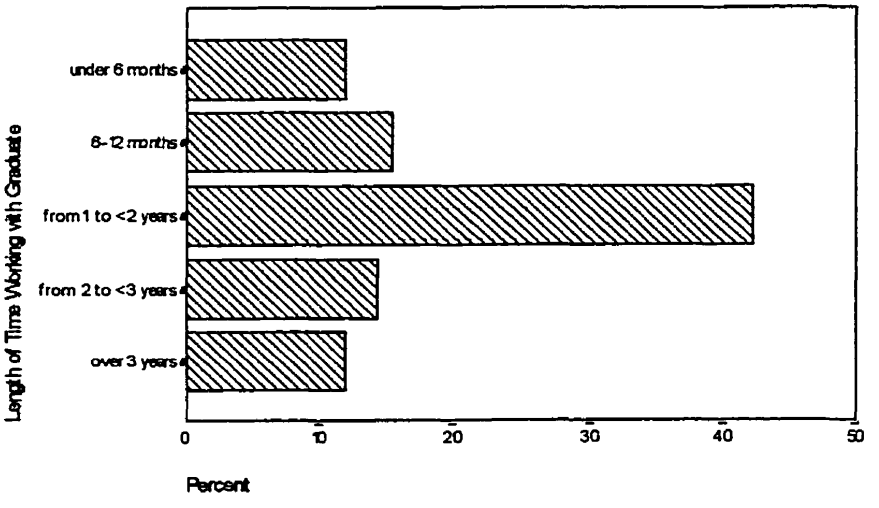
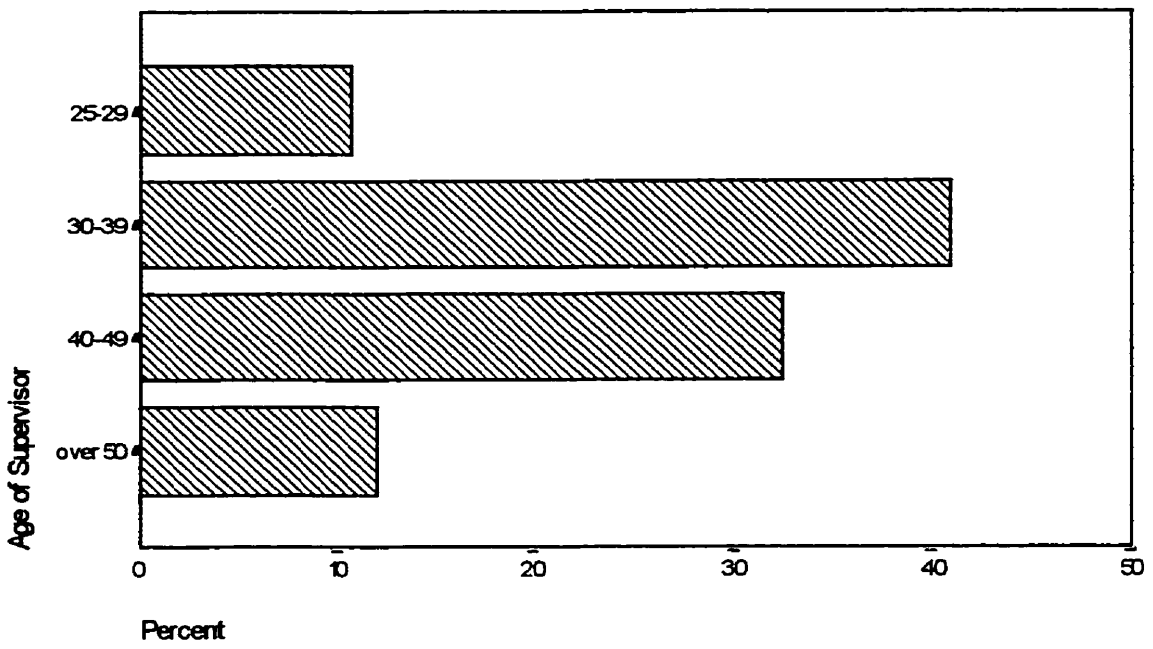


Figure 9 Age of responding supervisors



Place of Employment of Graduates

Faculty members were asked to list the locations which they thought would be the primary job for the new graduates. Just under 85% of the faculty chose working in a general hospital as their first choice, with the rest of the faculty members selecting private practice or a clinic as their first choice (Table 7). For the second choice, half of the faculty suggested private practice and for third choice the most common location mentioned was a rehabilitation hospital.

The actual picture is quite different, with under 40% of the graduates reporting that they worked in a general hospital, while just under 35% reported that their primary job was working in a private practice (Table 8). Sixty-five graduates reported working at two jobs, while twenty-four reported working at three jobs; these can also be seen in Table 8.

Table 7 Faculty selection for where new graduates work

Place of Employment	**1st Choice**		**2nd Choice**		**3rd Choice**	
	#	%	#	%	#	%
Community Centre			1	2.6		
Consulting Firm, Rehab					1	2.7
Facility for the Aged					1	2.7
General Hospital	32	84.2	4	10.5		
Long Term Care Facility			1	2.6	4	10.8
Private Practice / Clinic	6	15.8	19	50.0	8	21.1
Rehab Hospital			13	34.2	18	47.4
Visiting Agency, Home Care					3	8.1
WCB Facility					3	7.9
Totals	38	100%	38	100%	37	100%

Table 8 Graduates' place(s) of employment

Place of Employment	**Job 1**		**Job 2**		**Job 3**	
	#	%	#	%	#	%
Addiction Facility	3	2.0				
Arthritis Society			1	1.5	1	4.2
Community Centre			1	1.5		
Consulting Firm, Rehab	1	0.7	1	1.5		
Consulting Firm, Other	1	0.7			1	4.2
Facility for the Aged			4	6.2	1	4.2
General Hospital	58	38.4	11	16.9		
Government / Other official body			1	1.5		
Industry			1	1.5		
Long Term Care Facility	2	1.3	2	3.1	1	4.2
Nursing Home	1	0.7	2	3.1	1	4.2
Paediatric Hospital	6	4.0	3	4.6	2	8.3
Private Practice / Clinic	52	34.4	5	7.7	5	20.8
Psychiatric Facility	1	0.7			1	4.2
Rehab Hospital	14	9.3	8	12.3	1	4.2
School Board			1	1.5		
University / Educational Organization	1	0.7	4	6.2	2	8.3
Visiting Agency, Home Care	4	2.6	4	6.2	3	12.5
Visiting Agency, Other	1	0.7	2	3.1		
WCB Facility	1	0.7	10	15.4	2	8.3
Not Currently Working	1	0.7			3	12.5
Other	4	2.6	4	6.2		
Totals	151	100%	65	100%	24	100%

Summary of Respondents

Overall, 87% (n=40) of the eligible faculty responded to the questionnaire. Just over half of the eligible graduates responded to the questionnaire (52.8%, n=169). Over half of the graduates who responded (56%) allowed a contact with their supervisors. The response rate among contacted supervisors was 89% (n=83). In all cases, the percent of respondents from each university was proportional to the percent of the population from each university.

Response rates are summarized in Table 9.

Table 9 Summary of response rates

	Faculty		Graduates		Supervisors	
	#	%	#	%	#	%
Total Population	51		348		97	
Discarded	5	10 %	28	8 %	4	4 %
Eligible Sample	46		320		93	
Did Not Respond	6	13 %	152	47.2 %	10	11 %
Respondents	40	87 %	169	52.8 %	83	89 %

Scale Analysis

Every study of this kind must deal with the problem of respondents leaving some items on the questionnaire unanswered. So that all respondents could be included in the analysis, where answers were left blank mean substitution was used to replace the missing values. The amount of missing data varied by respondent group and topic. In the graduate data there were nine

questions that had no missing values, while the remaining questions had non-response rates ranging from zero to nine blank answers (5.3%). The area with the highest number of missing values was PTA supervision: nine graduates (5.3%) failed to respond to this question.

Faculty showed a higher non-response rate in specific areas: there were nine questions with no missing values, and in the other areas missing values ranged up to nine missing answers (22.5%). The highest rates of faculty non-response were found in the cardiorespiratory section of the questionnaire (ranging from 7 to 9 non-responses, or 17.5% to 22.5%). The neurology section was next, with five to seven blank sections (12.5% to 17.5%).

Of the three respondent groups, supervisors had the greatest tendency to leave entire sections blank. Approximately half the supervisors left the cardiorespiratory section blank, and even more left the auscultation and suctioning questions blank (49, or 59%, and 63, or 75.9%, respectively). The neurology section was left blank by approximately one-third of the responding supervisors (26 to 29, or 31.3% to 34.9% of respondents). The MSK area had the lowest non-response rate (4 blanks, or 4.8%). Supervisors also tended to leave questions concerning specialty areas blank more often: geriatrics (22, or 24.89%), paediatrics (54, or 65.7%), research (38, or 45.8%) administration (29, or 34.9%), and PTA supervision (22, or 26.5%). Finally, supervisors left critical appraisal blank 30 times (36.1%). A complete list of the amount of missing data is presented in Appendix 13.

Twenty-six scales were used in the analysis. The number of items in the various scales ranged from two to eight and values for the items varied. In some cases, the number of items or the values of items were different for the different groups of respondents (faculty, graduates or supervisors). As mentioned in the Methodology section, all scales were adjusted to be out of 10.

Subsequent analysis of the reliability of the scales showed that most had reasonable levels of internal consistency (Cronbach's Alpha), with the reliabilities of the scales ranging from 0.10 to 0.94. Reliability values for all scales are listed in Table 10. A complete list of the means and standard deviations for all scales and subgroups is in Appendix 14.

Principal Components Analysis (PCA)

As mentioned earlier (page 64), three scales were not used for the principal components analysis. A PCA of the twenty-three remaining scales was conducted. Varimax Rotation was used to clarify the factor structure. The principal components analysis produced four factors with eigen values greater than one. The criterion used to include items in a factor was a factor loading greater than or equal to 0.5. The results of the PCA analysis are presented in Table 11 and the rotated factor matrix is presented in Table 12. The balance of the data from the principal components analysis can be seen in Appendix 15.

Titles for the factors were assigned based on the scale patterns that emerged. Titles are: Factor 1 – Treatment Skills Factor; Factor 2 – Interpersonal Skills Factor; Factor 3 – Evidence-based Practice Factor; and, Factor 4 – Lifelong Learning Factor.

Table 10 Reliability of the original scales

Scale Name	# items in Scale	Alpha
1) Assessment Scale (n = 292)	3	0.59
2) Cardiorespiratory Scale (n = 292)	7	0.90
3) Clinical Reasoning Scale (n = 292)	3	0.48
4) Commitment Scale * (n = 209)	4	0.69
5) Communication Scale * (n = 209)	2	0.36
6) Critical Thinking Scale (n = 292)	2	0.69
7) Critical Appraisal Scale (n = 292)	2	0.69
8) Ethics Scale (n = 292)	2	0.91
9) Evidence-based Practice Scale * (n = 202)	2	0.35
10) Integration Scale (n = 292)	2	0.89
11) Interpersonal Skills Scale * (n = 209)	2	0.38
12) Knowledge Scale (n = 292)	2	0.72
13) Leadership Scale * (n = 209)	2	0.10
14) Library / Resource Scale * (n = 209)	2	0.14
15a) Lifelong Learning Scale – Graduates (n = 169)	5	0.21
15b) Lifelong Learning Scale – Faculty (n = 40)	4	0.33
15c) Lifelong Learning Scale – Supervisors (n = 83)	4	0.43
16) Musculoskeletal Scale (n = 292)	7	0.90
17) Neurology Scale (n = 292)	5	0.94
18) Problem-solving Scale (n = 292)	2	0.70
19a) Research Scale – Faculty & Graduates (n = 209)	3	0.42
19b) Research Scale – Supervisors (n = 83)	2	0.58
20a) Specialization Scale – Graduates (n = 169)	3	0.27

Scale Name	# items in Scale	Alpha
20b) Specialization Scale – Faculty & Supervisors (n = 123)	2	0.22
21a) Supervision Scale – Faculty (n = 40)	5	0.41
21b) Supervision Scale – Graduates who have not had a student (n = 57)	4	0.59
21c) Supervision Scale – Graduates who have had a student (n = 112)	5	0.55
21d) Supervision Scale – Supervisors of Graduates who have had a student (n = 38)	5	0.52
21e) Supervision Scale – Supervisors of Graduates without students (n = 45)	4	0.54
22) Teamwork & Role Boundaries Scale (n = 292)	3	0.12
23) Time Management Scale (n = 292)	2	0.61
24) Treatment Planning Scale (n = 292)	3	0.52
25) Treatment Progression Scale (n = 292)	3	0.58
26) Treatment Scale (n = 292)	8	0.71
* supervisors only had 1 item in these scales; therefore scale reliability was computed using only the graduate and faculty groups		

Table 11 Results of PCA analysis of scale ratings assessing graduates' abilities, by graduates, supervisors and faculty

Variable (Scale)	Communality	Factor	Eigenvalue	Pct of Var	Cum Pct
Critical Appraisal	.71576	1	9.89360	43.0	43.0
Assessment	.76333	2	2.69172	11.7	54.7
Clinical Reasoning	.78519	3	1.29093	5.6	60.3
Communication	.58041	4	1.11251	4.8	65.2
Cardiorespiratory	.57556				
Critical Thinking	.74266				
Evidence-based Practice	.54515				
Ethics	.49513				
Integration	.65512				
Interpersonal Skills	.67978				
Knowledge	.53759				
Library & Resource Skills	.64926				
Lifelong Learning	.73288				
Musculoskeletal Skills	.55300				
Neurology Skills	.56760				
Problem Solving	.75532				
Research	.54537				
Supervision	.60223				
Teamwork	.46489				
Time Management	.60896				
Treatment Skills	.79654				
Treatment Planning	.82798				
Treatment Progression	.80906				

Table 12 Rotated factor matrix

Scale	Factor 1	Factor 2	Factor 3	Factor 4
Treatment Planning	**.87304**	.05071	.13712	.21074
Assessment	**.85434**	.08570	.15944	.02580
Treatment Progression	.82601	.17459	.11709	.28738
Clinical Reasoning	**.81669**	.10978	.27045	.18170
Treatment	**.80073**	.33500	.05997	.19887
Cardiorespiratory Skills	.71945	.12437	.16538	.12303
Musculoskeletal Skills	**.69354**	.17735	.02565	.19973
Neurology Skills	**.65114**	.01143	.18352	.33137
Knowledge	**.54444**	.48430	.01045	.08067
Interpersonal Skills	.13140	**.78368**	.19221	.10680
Communication Skills	.07177	**.70137**	.16457	.23717
Teamwork	.21983	**.58072**	.24934	.13100
Supervision	.17686	**.55133**	.08244	**.51009**
Research	.10059	**.54228**	.29676	.39130
Time Management	.42677	**.51211**	.17805	.36452
Ethics	.06797	**.50163**	.48868	.00883
Critical Appraisal	.11973	.16472	**.81588**	.09290
Critical Thinking	.30715	.25671	**.69382**	.31786
Evidence-based Practice	.09380	.19245	**.69375**	.13428
Problem Solving	.41715	.29414	**.51971**	.47401
Lifelong Learning	.17477	.27481	.12595	**.78164**
Library & Resource Usage	.13784	.17726	.17038	**.75485**
Integration	.43582	.20008	.40645	**.50985**

Description of Factors

Factor one, Treatment Skills Factor, is very clearly related to treatment. It includes all three major clinical areas, as well as the Assessment, Treatment Planning, Treatment Progression, Treatment, Clinical Reasoning and Knowledge Scales.

Factor two was labelled the Interpersonal Skills Factor. The large loadings come from the Interpersonal Skills, Communication, Teamwork and Role Boundaries, Supervision, Research, Time Management and Ethics Scales.

The third factor was labelled the Evidence-based Practice Factor. The four major loadings came from the Critical Appraisal, Evidence-based Practice, Critical Thinking, and Problem-solving Scales.

Factor four was labelled Lifelong Learning. The four major loadings come from the Lifelong Learning, Library / Resource, Supervision and Integration Scales.

The reliabilities for the four factor scales can be seen in Table 13. (The complete reliability analyses are presented in Appendix 17) As with some of the scales, the number of items in the factors and the values for some of the items were different for the different groups of respondents. All factor scales were standardized to be out of ten. The details of the questionnaire items loading onto each of the factors can be seen in Appendix 16.

ANOVAs were conducted on the factor scales to look for differences between the groups. Respondents were grouped by category (faculty, graduate, supervisor) and by university, and graduates and supervisors were grouped by year of graduation. The results of the ANOVAs on the factor scores can be seen in Tables 14, 15 and 16. (The complete ANOVA tables are presented in Appendix 18.) Values with $p<0.05$ are indicated in the tables.

These tables show that there were definitely differences among the scores of the faculty, graduates and supervisors for all four factors. From Table 14 and Figure 10 we see that the graduates rated themselves lower in all four factors than either the faculty or supervisor groups rated them. The supervisors' values were the reverse of this, with all four values being the highest. From Table 15 we see that the graduates of University A rated themselves highest in Interpersonal Skills, Evidence-based Practice and Lifelong Learning. Remember that in the Treatment Factor there were no significant differences between the university ratings among any of the three groups. Faculty members from University A rated their graduates highest on the EBP Factor. The supervisors of graduates from the different universities did not differ on any of the factors. There were no differences between the years for either the graduate or supervisor groups (Table 16) .

Table 13 Internal reliability of factor scales (Alpha)

Factor Name	**# items in Scale**	**Alpha**
Factor 1 – Treatment Skills Factor (n=292)	29	.93
Factor 2 – Interpersonal Skills Factor		
Faculty (n=40)	29	.86
Graduates who had students (n=112)	29	.86
Graduates who did not have students (n=57)	28	.85
Supervisors where the graduate had students (n=38)	26	.90
Supervisors where the graduate did not have students (n=45)	25	.89
Factor 3 – Evidence-based Practice Factor		
Faculty & Graduates (n=209)	9	.85
Supervisors (n=83)	8	.87
Factor 4 – Lifelong Learning Factor		
Faculty (n=40)	23	.84
Graduates who had students (n=112)	24	.82
Graduates who did not have students (n=57)	23	.76
Supervisors where the graduate had students (n=38)	22	.92
Supervisors where the graduates did not have students (n=45)	21	.90

Table 14 Means and standard deviations of the factor scales, by respondent †

	Faculty (n=40)		Graduates (n=169)		Supervisors (n=83)	
	Mean	SD	Mean	SD	Mean	SD
Treatment Factor *	7.56 [2]	.96	6.89 [2]	.99	7.63 [2]	.89
Interpersonal Skills Factor *	6.95 [3]	.75	6.38 [3]	1.10	7.63 [2]	1.04
EBP Factor *	8.20 [1]	1.25	7.51 [1]	1.42	8.58 [1]	1.20
Lifelong Learning Factor *	6.78 [4]	.80	6.35 [4]	1.02	7.56 [3]	.99

†superscripts refer to the rank for that column * $p<.05$

Figure 10 Means of factors, by respondent group

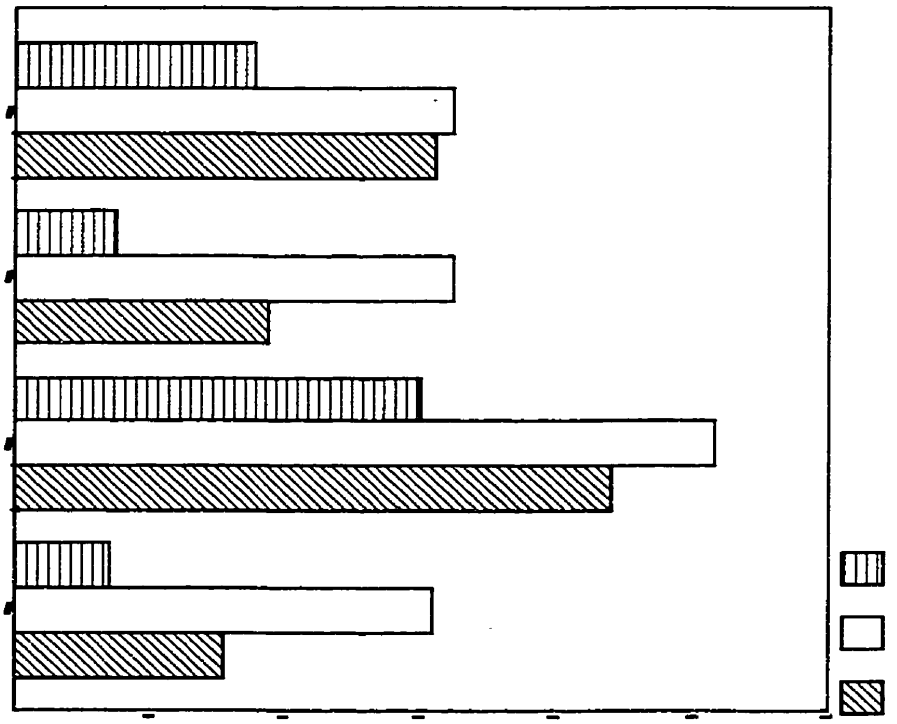


Table 15 Means and standard deviations of factor scales by university

	University							
	A		B		C		D	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Graduates	n = 26		n = 48		n = 56		n = 39	
Treatment Factor	7.09	.83	6.99	1.06	6.73	.99	6.87	1.02
Interpersonal Skills Factor *	7.20	.95	6.20	1.01	6.22	1.05	6.27	1.16
EBP Factor *	8.93	.73	7.27	1.33	7.36	1.46	7.08	1.26
Lifelong Learning Factor *	7.11	.82	6.16	1.03	6.20	.93	6.30	1.07
Faculty	n = 10		n = 10		n = 14		n = 6	
Treatment Factor	7.41	1.04	7.20	1.10	7.85	.83	7.76	.87
Interpersonal Skills Factor	6.98	.77	6.74	.80	6.94	.72	7.26	.77
EBP Factor *	9.17	.63	7.42	1.45	8.19	1.27	7.93	.50
Lifelong Learning Factor	7.21	.73	6.45	.75	6.66	.80	6.86	86
Supervisors	n = 18		n = 18		n = 28		n = 18	
Treatment Factor	7.52	.77	7.52	.87	7.94	.85	7.43	1.01
Interpersonal Skills Factor	7.78	.84	7.45	.99	7.95	1.05	7.28	1.00
EBP Factor	8.82	.99	8.20	1.41	8.80	.96	8.32	1.46
Lifelong Learning Factor	7.63	.86	7.50	1.02	7.79	1.04	7.27	.91

* $p < 0.05$

Table 16 Means and standard deviations of factor scales by year of graduation

	Year			
	1992		1994	
	Mean	SD	Mean	SD
Graduates *	n = 71		n = 98	
Treatment Factor	6.83	1.03	6.94	.97
Interpersonal Skills Factor	6.47	1.20	6.31	1.02
EBP Factor	7.28	1.60	7.68	1.25
Lifelong Learning Factor	6.32	1.10	6.38	.96
Supervisors *	n = 36		n = 46	
Treatment Factor	7.60	.96	7.68	.83
Interpersonal Skills Factor	7.72	1.01	7.60	1.00
EBP Factor	8.54	1.20	8.59	1.22
Lifelong Learning Factor	7.61	1.02	7.55	.94
* None of these comparisons was significant at the 0.05 level				

Scales with reliabilities of over 0.7 were also subjected to an ANOVA. This analysis was conducted on eight scales: CR, Ethics, Integration, Knowledge, MSK, Neurology, Problem-solving, and Treatment. The reliabilities of these scales were presented in Table 10, and the means and standard deviations are presented in Tables 17 to 20. There were significant differences between the groups for all of these scales (Table 17). Graduates rated themselves

lower than either the faculty or supervisors on all but two scales (Table 17), while supervisors rated the graduates highest in five of the eight scales.

Tables 18 to 20 sets out the differences in the scales by university. University A faculty members rated their graduates highest in the Problem-solving and Integration scales, while University B faculty members rated their graduates lowest in these areas. Knowledge was rated lowest by University A faculty members and highest by University D faculty members.

With respect to the graduates, University A graduates rated themselves higher than the other graduates in the Ethics and Problem-solving Scales, while University B graduates rated themselves highest in the MSK Scale. Supervisors of University C graduates gave them the highest ratings for both the Knowledge and Treatment Scales. The supervisors of University A and D graduates rated them low in the Treatment area. The final area of difference was the supervisors' ratings of the Ethics Scale (Table 21), where a very clear difference is noted in favour of the 1994 graduates.

Table 17 Differences in scales, by group †

	Faculty (n = 40)		Graduates (n = 169)		Supervisors (n = 83)	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
Cardiorespiratory Scale *	7.93 [2]	1.20	6.99 [3]	1.44	7.27	.72
Ethics Scale *	6.38	1.88	6.41	2.03	7.25	2.57
Integration Scale *	6.72	1.29	6.08	1.66	7.29	1.61
Knowledge Scale *	7.50 [3]	1.40	7.50 [1]	1.44	8.28 [1]	1.44
Musculoskeletal Scale *	8.03 [1]	1.29	7.28 [2]	1.43	7.80 [2]	1.38
Neurology Scale *	7.28	1.20	6.33	1.73	7.27	1.28
Problem-solving Scale *	7.40	1.30	6.71	1.63	7.75 [3]	1.47
Treatment Scale *	7.42	1.18	6.76	1.07	7.51	0.85

† superscripts highlight the top three ranked scales in each column
* $p<.05$

Table 18 Graduate means and standard deviations for selected scales, by university

	University							
	A (n = 26)		B (n = 48)		C (n = 56)		D (n = 39)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Cardiorespiratory Scale	6.69	.90	7.07	1.13	6.52	1.08	6.76	1.02
Ethics Scale *	8.15	1.62	6.44	1.98	5.84	1.83	6.05	2.05
Integration Scale	6.42	1.60	6.19	1.85	5.98	1.57	5.88	1.58
Knowledge Scale	7.19	1.52	7.65	1.33	7.41	1.47	7.67	1.47
MSK Scale *	7.03	1.17	8.13	1.37	6.75	1.31	7.17	1.41
Neurology Scale	6.62	1.73	5.88	1.93	6.42	1.68	6.56	1.49
Problem-solving Scale *	7.96	1.18	6.77	1.61	6.34	1.58	6.31	1.61
Treatment Scale	6.69	4.60	6.19	1.85	5.98	1.57	5.88	1.58

* $p < 0.05$

Table 19 Faculty means and standard deviations for selected scales, by university

	University							
	A (n = 10)		B (n = 10)		C (n = 14)		D (n = 6)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Cardiorespiratory Scale	7.52	1.26	7.35	1.47	8.39	.84	8.48	.79
Ethics Scale	6.90	1.60	6.20	.92	6.43	2.06	5.67	3.01
Integration Scale *	7.20	1.14	5.73	1.29	7.02	.94	6.88	1.61
Knowledge Scale *	6.40	1.35	7.80	1.23	7.79	1.25	8.17	1.33
MSK Scale	7.49	1.81	8.11	1.44	8.32	.81	8.10	.91
Neurology Scale	7.50	1.25	6.65	1.18	7.75	1.18	6.88	.75
Problem-solving Scale *	8.50	.71	6.30	1.16	7.36	1.15	7.50	1.22
Treatment Scale	6.71	1.60	7.41	1.09	7.84	.79	7.63	.97

* $p < 0.05$

Table 20 Supervisor means and standard deviations for selected scales, by university

	University							
	A (n = 18)		B (n = 18)		C (n = 28)		D (n = 18)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Supervisors								
Cardiorespiratory Scale	7.27	.65	6.94	.67	7.50	.84	7.25	.55
Ethics Scale	7.28	2.30	6.39	3.18	7.79	2.15	7.11	2.70
Integration Scale	7.22	1.63	7.02	1.94	7.70	1.46	7.08	1.47
Knowledge Scale *	8.48	1.20	7.62	1.33	8.93	1.12	7.85	1.78
MSK Scale	7.49	1.28	7.96	1.16	8.16	1.19	7.51	1.70
Neurology Scale	7.01	1.00	7.66	1.57	7.30	1.35	7.27	.90
Problem-solving Scale	7.73	1.22	7.48	1.76	8.12	1.39	7.47	1.53
Treatment Scale	7.22	.80	7.61	.73	7.88	.67	7.25	1.02

Table 21 Means and standard deviations of selected scales, by year of graduation

	Year			
	1992		1994	
	Mean	SD	Mean	SD
Graduates	n = 71		n = 98	
Cardiorespiratory Scale	7.19	1.48	6.85	1.41
Ethics Scale	6.31	1.86	6.49	2.16
Integration Scale	5.82	1.74	6.28	1.57
Knowledge Scale	7.46	1.37	7.53	1.49
MSK Scale	7.17	1.32	7.36	1.52
Neurology Scale	6.13	1.84	6.48	1.64
Problem-solving Scale	6.46	1.80	6.86	1.49
Treatment Scale	6.73	1.13	6.78	1.03
Supervisors	n = 36		n = 46	
Cardiorespiratory Scale	7.23	0.77	7.30	0.70
Ethics Scale *	6.22	3.28	8.00	1.43
Integration Scale	7.31	1.51	7.31	1.71
Knowledge Scale	8.18	1.58	8.41	1.31
MSK Scale	7.77	1.51	7.87	1.21
Neurology Scale	7.36	1.38	7.27	1.14
Problem-solving Scale	7.72	1.58	7.78	1.41
Treatment Scale	7.53	0.87	7.54	0.82

* $p<0.05$

Summary of Quantitative Results

Data from the three respondent questionnaires were combined and the items were entered into scales, which were then subjected to a principal components analysis. Four factors emerged from this analysis: Treatment Skills Factor, Interpersonal Skills Factor, Evidence-based Practice Factor and Lifelong Learning Factor. The factor scales were then subjected to ANOVA testing to identify areas where the groups differed in their opinions of the level of the graduates' abilities. Clear differences were found among the opinions of the groups of respondents by category (faculty, graduates or supervisors). Some differences were also noted between the graduates and faculty from the different universities, but no differences were noted either among the supervisors of the four universities or by year of graduation.

Eight scales with high reliabilities were also subjected to ANOVA testing. Again, there were clear differences among the categories of respondents, some differences noted in the university comparisons but only one difference noted by year of graduation.

When looking at the means for the factors and scales where the ANOVAs indicated significant differences, the graduates tended to rate themselves more harshly than either the supervisor or faculty respondents. In looking at differences between the 1992 and 1994 graduates, the only significant difference which emerged was that the supervisors rated the 1994 graduates significantly higher in the Ethics Scale.

Chapter 5 – Responses to Short Answer Questions

Each questionnaire had a number of short-answer or fill-in-the-blank questions. The responses to these questions are presented in this section. If either 5% or 10% of the respondents mentioned a particular topic, this topic was highlighted as being one that was worth looking at further. In general, for group sizes of under 50 people, percentages are only shown if the number of respondents is over 10%, while for the larger group sizes percentages are shown if the number of respondents is over 5%.

Strengths of Graduates

Respondent Groups

Faculty

Respondents were asked directly "What do you consider to be the greatest strengths which the graduates bring to the job environment?" Thirty-eight faculty members responded to this question, generating 22 topics. Slightly over 50% of the topics were mentioned by only one respondent. Due to the small number of faculty members, only topics mentioned by more than 10% of the respondents were considered relevant. The topics and the frequencies, for those topics mentioned by over 10% of the faculty members, are included in Table 22. The only topic mentioned by faculty at all four universities was "Knowledge Base", though it was mentioned by a smaller percentage of University A & D respondents than those of University B and C (29%

and 20% vs. 77% and 69%). Topics mentioned by fewer than 10% of the respondents can be found in Appendix 19.

Table 22 Faculty list of strengths (n=38)

Topic	#	%
Knowledge	22	58
Enthusiasm	11	29
Life-long Learning	10	26
Evidence-based Practice	8	21
Critical Appraisal Skills	5	13
Problem-solving	5	13

Graduates

All but three of the graduates (n=166) responded to the question on strengths. Because of the large size of this group of respondents, if over 5% of the graduates mentioned a topic, that topic was considered relevant. A total of 59 strengths were listed by these graduates. Of these topics, 20 (34%) were mentioned only once, and 24 (41%) were mentioned from 2-8 times. All of these attracted fewer than 5% of the respondents. These topics ranged from knowing German to being self-directed, and can be seen in Appendix 19.

The 15 topics that were mentioned by over 5% of the respondents are shown in Table 23. The top three topics were Interpersonal Skills (mentioned by 30% of the respondents to this question), Communication Skills (26%) and Rapport (22%). Teamwork was further down the

list at 10%. While each of these topics has unique characteristics, it could be argued that communication skills and rapport are both subdivisions of interpersonal skills. Combining these three topics allows for a closer look at the broad area of Interpersonal Skills. One-hundred and eleven respondents (68% of those answering the question on strengths) mentioned at least one of these three topics. While it might be reasonable to assume that there would be quite a bit of overlap between these areas, only 19 respondents mentioned two areas and none mentioned all three areas. The responses were essentially the same between the 1992 and 1994 grads (65% and 68% respectively).

Differences between the years are shown in Table 24. Only topics mentioned by over 5% of the respondents are included in this list.

Table 23 Graduates' list of strengths (n=166)

Topics	#	%
Interpersonal Skills, Communication Skills & Rapport combined	111	68
Interpersonal Skills	50	30
Communication Skills	43	26
Rapport	36	22
Lifelong Learning	35	21
Problem-solving Skills	34	20
Time Management & Organizational Skills	26	16
Empathy	16	10
Enthusiasm	16	10
Teamwork	16	10
Treatment Skills	14	8
Assessment Skills	12	7
Teaching	11	7
Musculoskeletal (MSK)	10	6
Flexibility	10	6
Knowledge Base	9	5

The only topic which over 10% of both 1992 and 1994 graduates listed was Time Management and Organization Skill; 19% of the 1994 graduates and 11% of the 1992 graduates

mentioned it. The second noteworthy area is teaching, mentioned by 11% of the 1992 graduates and under 5% of the 1994 graduates.

Table 24 Graduates' list of strengths, year differences

Year	1992 (n=66)		1994 (n=100)	
Topics	#	%	#	%
Time Management & Organizational Skill	7	11%	19	19%
Knowledge Base	2		7	7%
Flexibility	3	5%	7	7%
Musculoskeletal Specialty	3	5%	7	7%
Personality	1		6	6%
Manual Therapy	1		5	5%
Teaching	7	11%	4	
Critical Thinking	5	8%	2	

Differences between the universities are shown in Table 25. Responses among the universities showed that University A graduates mentioned the combined areas of Communication Skills, Interpersonal Skills and Rapport at a slightly higher rate than the other three universities. When looked at individually, Rapport was listed as a strength more often by the University B graduates. Communication Skills and Interpersonal Skills were mentioned equally often by graduates of all universities, so are not included in this table. Other topics listed more often as strengths by University A graduates are: teamwork, critical thinking, research, and,

self-evaluation. University B graduates listed rapport as a strength more often than graduates of the other universities, and Problem-solving and Lifelong Learning less often. University C graduates listed Empathy less often and Lifelong Learning more often. University D listed four areas more often than the other graduates: Empathy, Knowledge, Flexibility and being Self-directed. Finally, Universities B and D mentioned Teaching and Time Management as strengths more often than graduates of Universities A and C.

Supervisors

Eighty-three supervisors responded to the question on strengths. In one case the coding had been removed from the questionnaire, so it was not possible to assign these responses to a university or year; however, they were included in the combined totals for all questions. Forty-five topics were raised by the supervisors, 25 of which (56%) were mentioned by fewer than 5% of the supervisors. These topics can be seen in Appendix 19. The 20 topics that were mentioned more often are shown in Table 26.

Differences between responses about the 1992 and 1994 graduates are shown in Table 27. In three cases, the 1992 graduates were listed as having strengths at a higher rate than the 1994 graduates and in five cases the reverse happened.

There were also differences noted by university groupings, as can be seen in Table 28. Each university was mentioned less in one area than other three universities. Each university was also mentioned at a higher rate than the other universities in between two and five areas.

Table 25 Graduates' list of strengths, showing differences by university

	University			
	A (n=25)	B (n=46)	C (n=56)	D (n=39)
Topics	# %	# %	# %	# %
Interpersonal Skills, Communication Skills, Rapport, all combined	19 76%	30 65%	37 66%	25 64%
Teamwork	5 20%	3 7%	4 7%	4 10%
Critical Thinking	4 16%	1	2	
Research	4 16%		3 5%	1
Self-evaluation	3 12%		2	2
Knowledge Base		3 7%	1	5 13%
Flexibility	1	2	2	5 13%
Self-directed	1		3 5%	4 10%
Empathy	2 8%	5 11%	2	7 18%
Lifelong Learning	4 16%	7 15%	16 29%	8 21%
Teaching	1	5 11%		5 13%
Time Management & Organizational Skills	1	12 26%	4 7%	9 23%
Rapport	4 16%	14 30%	12 21%	6 15%
Problem-solving Skills	7 28%	4 9%	12 21%	11 28%

Table 26 Supervisors' list of strengths (n=82)

Topics	#	%
Lifelong Learning	20	24
Problem-solving Skills	19	23
Enthusiasm	16	20
Personality	13	16
Interpersonal Skills	13	16
Knowledge Base	12	15
Teamwork	10	12
Organization	9	11
Communication Skills	8	10
Rapport	8	10
Professionalism	7	9
Flexibility	6	7
Assessment Skills	6	7
Musculoskeletal Specialty	5	6
Maturity	5	6
Confidence	5	6
Independent	5	6
Initiative	4	5
Treatment Skills	4	5
Work Ethic	4	5

* For one questionnaire the coding had been removed, so it was not possible to assign that supervisor to a year. His/her responses were included in the combined totals.

Table 27 Supervisors' list of strengths, by year

	Year			
	1992 (n=37)		1994 (n=44)	
Topics	#	%	#	%
Lifelong Learning	13	35	7	16
Enthusiasm	10	27	6	14
Knowledge Base	8	22	4	
Problem-solving Skills	6	16	12	27
Interpersonal Skills	4	11	9	20
Organization	2		7	16
Communication Skills	2		6	14
Rapport	2		6	14
Professionalism	2		5	11

* For one questionnaire the coding had been removed, so it was not possible to assign that supervisor to a year. His/her responses were included in the combined totals.

Table 28 Supervisors' list of strengths, by university

	University			
	A (n=17)	B (n=17)	C (n=29)	D (n=18)
Topics	# (%)	# (%)	# (%)	# (%)
Independent	3 (18%)			2 (11%)
Teamwork	3 (18%)	1	5 (17%)	1
Enthusiasm		3 (18%)	10 (34%)	3 (17%)
Communication Skills	2 (12%)		4 (14%)	2 (11%)
Personality	2 (12%)	5 (29%)	5 (17%)	1
Rapport	1	4 (24%)	2	1
Maturity	1	3 (18%)	1	
Musculoskeletal Specialty	1	3 (18%)	1	
Treatment Skills		2 (11%)	1	1
Problem-solving Skills	4 (24%)	4 (24%)	3	7 (39%)
Knowledge Base	1	3 (18%)	6 (21%)	2 (11%)
Interpersonal Skills	2(12%)	1	4 (14%)	6 (33%)
Flexibility	1	1	2	2 (11%)
Confidence		1	1	3 (17%)
Organization		1	4 (14%)	4 (22%)
Lifelong Learning	5 (29%)	6 (35%)	8 (28%)	1
Interpersonal Skills, Communication Skills, Rapport combined	5 (29%)	4 (24%)	10 (35%)	9 (50%)

Items to Keep

As a general summary, the final question on the questionnaire asked for three items respondents thought should be introduced to the programs, three items that should be discontinued, and three items that should be kept as they are. Items listed as "things which should be kept as they are" can be seen as strengths of the program and, therefore, as things that contribute to areas of strength in the graduates.

Faculty

Thirty-four faculty responded to the question on what parts of their program they felt should be kept. Thirty-two topics were generated, 75% of which were mentioned by fewer than 10% of the faculty members. Four topics were mentioned four times (12%): clinical skills components; clinical placements (length and variety); electives; and self-directed learning. The problem-based approach was mentioned a total of six times, by faculty at two universities (16%). Finally, three topics were mentioned seven times (21%): evidence-based practice; integration; and the research component of the program. Under integration, both integration of specialty areas (musculoskeletal, cardiorespirology and neurology) and integration of the basic and clinical sciences were mentioned. Evidence-based practice was the only topic mentioned by faculty members at all four universities.

Graduates

The majority of the graduates (n=164) responded to the question of what to keep in their Physical Therapy Program. The graduates' suggestions were much more specific than either

faculty or supervisor responses. Seventy-eight topics were generated, 14 of which (18%) were chosen by more than 5% of the graduates. These topics are shown in Table 29. The top three topics, all mentioned by over 20% of the graduates, were the MSK courses, clinical placements and the basic sciences. The topics listed by fewer than 5% of the graduates are found in Appendix 19.

Table 30 shows the pattern of university differences. University D tended to be middle-of- the-road.

University A runs a problem-based curriculum. All the graduates who mentioned the block system and problem-based learning were from this university. The eight who mentioned the block system constituted 31% of the graduates from that program, while 62% (n=16) of the graduates from the same program mentioned problem-based learning. On the other hand, graduates from this university mentioned the cardiorespirology, MSK and neurology specialties, as well as clinical placements, at a much lower rate than graduates of the other universities, as can be seen in Table 30. However, they mentioned clinical skills at a much higher rate.

Table 29 Graduates' list of things to keep (n=164)

Topic	#	%
Musculoskeletal Course	47	29
Clinical Placements	45	27
Basic Sciences	38	23
Cardiorespirology	31	19
Neurology Course	28	17
Manual Therapy	28	17
Research	23	14
Specialized Electives	20	12
Patient Contact	16	10
Problem-based Learning	16	10
Professor Qualifications	13	8
Exam formats	11	7
Clinical Skills	9	5
Block System	8	5

Graduates of University C were the only group to mention electives at a significant rate.

University B graduates mentioned Manual Therapy and the MSK course at a much higher rate than those from the other three universities, but did not mention patient contact even once.

Table 30 Differences in graduates' lists of what to keep in their programs, by university

	University			
	A (n=26)	B (n=38)	C (n=53)	D (n=47)
Topic	# (%)	# (%)	# (%)	# (%)
Cardiorespirology	2 8%	9 24%	10 19%	10 21%
Neurology Course	2 8%	7 18%	11 21%	8 17%
Clinical Skills	4 15%		4 8%	1
Exam Formats	3 12%	1	6 11%	1
Clinical Placements	1	16 42%	19 36%	9 19%
Musculoskeletal Specialty Course	1	22 58%	14 26%	10 21%
Manual Therapy	1	20 53%	2	5 11%
Patient Contact	3 12%		7 13%	6 13%
Specialized Electives		2	16 30%	2

The only point of interest found in looking at differences between the 1992 and 1994 graduates was that 15 of the 16 graduates who mentioned patient contact as an area to keep were 1994 graduates.

Supervisors

Forty-eight supervisors responded to the question on what elements of the programs should be kept as they are. They mentioned thirty-nine topics; however 21 of those topics (54%) were mentioned only once. Nine respondents said they had no opinion on this question. Only four topics were mentioned by over 10% of the respondents: Basic Sciences (19%); Clinical Placements (17%); MSK courses (8%); and Problem-solving (10%). None of the supervisors of University C graduates mentioned either Clinical Placements or MSK courses. The supervisors of 1994 graduates mentioned all of these top four topics at a higher rate than the supervisors of the 1992 graduates. The other topics mentioned by the supervisors are listed in Appendix 19.

Weaknesses of Graduates

Respondent Groups

Faculty

Thirty-eight faculty members responded to the question on graduates' weaknesses. Two of those said they felt graduates had no weaknesses and another did not feel she had been on faculty long enough to have an opinion. The remaining thirty-five faculty members came up with 27 topics, five of which were mentioned by over 10% of the faculty members: these are listed in

Table 31. The topics listed by less than 10% of the faculty members are found in Appendix 19. Only two topics were mentioned by faculty at all four universities: Business Skills and Professional Roles. Three of the four respondents who mentioned weak Communication Skills were from University B, and four of the five who mentioned Teamwork as a weakness were from University C.

Table 31 Faculty list of weaknesses (n=38)

Topic	#	%
Professional Roles	6	16
Business Skills	5	13
Teamwork	5	13
Supervision	5	13
Communication Skills	4	11

Graduates

Although 66 weaknesses were listed by the graduates, 56 of them (85%) were mentioned by under 5% of the graduates. Those topics can be found in Appendix 19. The musculoskeletal area topped the list of weaknesses: 21% of graduates mentioned this topic. The top ten topics (mentioned by more than 5% of the graduates) and response rates can be seen in Table 32. All three major treatment areas (cardiorespiratory, MSK and neurology) were mentioned among the top five topics listed as weaknesses. All but two of the topics (Business / Administration Skills and Insurance / Legal Issues) were strongly related to patient care.

Eight topics showed differences between the 1992 and 1994 graduates (Table 33). In five of these cases, the 1994 graduates reported the weakness at a higher rate, while in three cases it was the 1992 graduates that reported it at a higher rate.

Table 32 Graduate list of weaknesses (n=159)

Topic	#	%
Musculoskeletal Specialty	33	21
Treatment & Progression of Treatment	30	19
Manual Therapy Skills	30	19
Neurology Specialty	26	16
Cardiorespiratory Specialty, Intensive Care Unit & Suctioning	23	14
Business / Administration Skills	19	12
Insurance & Legal Issues	18	11
Paediatrics	12	8
Integration & Complex Patients & Motor Vehicle Accident Patients	10	6
Psychology / psychosocial issues / difficult patients	8	5

Table 33 Graduates' list of weaknesses, by year

	Year	
	1992 (n=62)	1994 (n=97)
Topic	# %	# %
Treatment & Progression of Treatment	7 11%	23 24%
Manual Therapy Skills	8 13%	22 23%
Cardiorespiratory Specialty, Intensive Care Unit & Suctioning	6 10%	17 18%
Insurance & Legal Issues	5 8%	13 13%
Integration & Complex Patients & Motor Vehicle Accident Patients	2 3%	8 8%
Musculoskeletal Specialty	17 27%	16 16%
Neurology Specialty	14 23%	12 12%
Paediatrics	6 10%	6 6%

There are a number of ways of looking at the data on graduates' weaknesses. Table 33 shows only those topics mentioned by more than 5% of either the 1992 or 1994 graduates. There were other instances of differences by year which are notable. Of the 66 topics mentioned by graduates, 34 topics were mentioned by both 1992 and 1994 graduates. Eleven topics were mentioned only by 1992 graduates; however twenty-one topics were mentioned only by 1994 graduates. While many of these topics were only mentioned by one or two respondents, it is still interesting that the 1994 graduates mentioned twice as many topics as the 1992 graduates. The list of topics mentioned by each group can be found in Appendix 19.

There were distinctions in other areas as well. First, Evidence-based Practice was listed as a weakness by six respondents, all of them 1992 graduates. This constituted 10% of that year's respondent group. In nine other areas the preponderance of the graduates were from 1994. These can be seen in Table 34.

Response differences by University are in Table 35 . Each university has one area where the graduates report being weaker than the other universities and three of the universities have one or more areas where the graduates report less weakness than the other universities.

Table 34 Topics where most of graduates mentioning the weakness were from 1994

	Graduate Group	
	1994 (n=97)	All graduates (n=169)
Topic	#	#
Treatment & Progression of Treatment	23	30
Manual Therapy Skills	22	30
Insurance & Legal Issues	18	18
Integration & Complex Patients & MVA patients	8	10
Ergonomics	5	7
Charting	4	6
PTA Supervision	4	5
Communication Skills	4	5
Pain Management	3	4

Table 35 Graduates' list of weaknesses, by university

	University			
	A (n=20)	B (n=36)	C (n=60)	D (n=43)
Topic	# %	# %	# %	# %
Insurance & Legal Issues		4	7	7
Integration & Complex Patients & Motor Vehicle Accident Patients		3	4	3
Treatment & Progression of Treatment	2 10%	6 17%	14 23%	8 19%
Cardiorespiratory Specialty, Intensive Care Unit & Suctioning	5 25%	6 17%	8 13%	4 9%
Manual Therapy Skills	2 10%	3 7%	14 23%	11 31%
Neurology	4 20%	10 28%	5 8%	7 16%
Musculoskeletal Specialty	5 25%	8 22%	10 17%	10 23%
Psychology / psychosocial issues / difficult patients		5 14%	3	

Supervisors

A total of 69 supervisors responded to the question on graduates' weaknesses. They came up with a total of thirty-three topics. The most common answer by far was that no weaknesses were noted. This was the answer of 38% of the respondents. The majority of the

other topics were listed only once. Only four topics were mentioned by more than 5% of the supervisors (Table 36): Caseload Management (17%); Manual Therapy (13%); and Paediatrics and Teamwork (both at 7%). It is worth noting that the 1994 supervisors mentioned 22 topics, while the 1992 supervisors offered only 15 topics. Topics listed by fewer than 5% of the supervisors can be seen in Appendix 19. With the very small numbers in three of the groups, comparisons between the universities must be made carefully; however, there were three values which did seem to stand out. University A had a weakness in Manual Therapy mentioned at a higher rate, while Universities C and D had high rates of reported weakness in the area of Caseload Management. Values from 1992 and 1994 were virtually identical.

Table 36 Supervisors' list of weaknesses

	University					
	A (n=15)	B (n=15)	C (n=25)	D (n=13)	Combined (n=69*)	
Topics	#	#	#	#	#	%
Caseload Management	1 7%	2 14%	5 20%	3 23%	12	17
Manual Therapy	4 27%	1	2	2 15%	9	13
Paediatrics	1	1	1	2 15%	5	7
Teamwork	2 13%	1	2		5	7
*one respondent could not be assigned to year or university, but was included in the totals						

Prerequisites

Respondents might feel that further prerequisites in certain areas would have prepared the graduates better and allowed them to benefit more from the physiotherapy course work. Not benefitting from course work could potentially lead to a weakness in the graduates. In that case, identifying these areas could conceivably help identify weaknesses in the graduates. The questionnaires addressed this by asking for suggestions as to what prerequisites should be required from applicants to the programs in addition to what is currently asked of them. It should be noted that the prerequisites are not currently the same across the four universities.

Faculty

Seven respondents (20%) said no further prerequisites were needed. Nine topics were mentioned by more than one faculty member while five topics were mentioned only once. A fair degree of consistency was seen in the faculty responses. Over half the faculty (51%) mentioned the basic sciences (anatomy & physiology), as can be seen in Table 37. Within the hard sciences, Physics carried the most weight, with seven respondents; Biology was mentioned three times and Chemistry once. Faculty from Universities C and D mentioned the hard sciences at a high rate (9 of 13

Table 37 Faculty list of suggested prerequisites (n=35)

Topic	#	%
Basic Sciences (Anatomy & Physiology)	18	51
Hard Sciences (Biology, Chemistry, Physics)	11	31
Statistics	11	31
Psychology / Sociology	10	29
Communication Skills	6	17
English	5	14

respondents and 4 of 4 respondents respectively), while those from Universities A and B did not mention this area. Psychology was the only topic mentioned by faculty members at all four universities. Biomechanics / Kinesiology, Ethics and Pathology were each listed by two or three respondents and were thus under 10%. The topics mentioned only once were Business Skills, Histology, Mathematics, Multicultural Issues and Organizational Behaviour.

Graduates

Many of the respondents to this question (40% of the 115 respondents) felt that no further prerequisites were needed. When all the data were combined, there were only seven topics which attracted over 5% of the graduates (Table 38). Ten respondents mentioned that they already taken anatomy, physiology or biomechanics in other programs (often physical education or kinesiology degrees). Most of these respondents volunteered that they were very happy that they had already taken these courses because the background was a big help in the physiotherapy courses.

It is of note that University A respondents picked the "heavy" subjects at a much higher rate than those from the other universities, as can be seen in Table 39. University B was the only university where no graduates reported a previous degree covering these topics. It should be noted here that the four

Table 38 Graduates' list of suggested prerequisites (n=115)

Topics	#	%
Anatomy	16	14
Previous degree covered basic sciences	13	10
Physiology	10	9
Biomechanics / Kinesiology	9	8
Hard Sciences	8	7
Business / Marketing	6	5
Psychology	6	5

universities had different admission criteria: three of them accepted applicants directly out of high school. For the graduating classes of 1992 and 1994, University A was the only program which required a previous degree.

Interestingly, 1994 graduates were more likely to mention anatomy and physiology as suggested prerequisites, while the 1992 graduates were more likely to report having taken these subjects in a previous program (Table 40).

Table 39 Graduates' list of prerequisites, by university

	University			
	A (n=19)	B (n=30)	C (n=39)	D (n=27)
Topics	# %	# %	# %	# %
Anatomy	4 21%	5 17%	3	4 15%
Physiology	3 16%	2	2	3
Biomechanics / Kinesiology	3 16%	1	3	2
Hard Sciences	4 21%		2	2
Previous degree covered basic sciences	3 16%		7 18%	3 11%

Table 40 Graduates' list of suggested prerequisites, by year

	Year	
	1992 (n=45)	1994 (n=70)
Topics	# %	# %
Anatomy	4 9%	12 17%
Physiology	2 4%	8 11%
Previous degree covered basic sciences	7 16%	6 9%

Table 41 Supervisors' list of suggested prerequisites (n=54)

Topic	#	%
Basic Sciences / Physiology / Anatomy	12	22
Business Skills	11	20
Communication Skills	10	19
Psychology	10	18
English	6	11

Supervisors

Fifty-four supervisors responded to the question on prerequisites. Fifteen percent of them reported that no prerequisites, above what was currently being asked of applicants, were needed. Five topics were listed by more than 10% of the respondents (Table 41). As with the faculty and graduates, Basic Science was the topic listed most often. Supervisors were also interested in Business Skills, which was not mentioned by either other respondent group. Supervisors listed Communication Skills, Psychology and English, as did faculty members.

Add to Program

Faculty

The final item on the questionnaire, asking for three things which the respondents would suggest introducing to the programs, was also intended to uncover potential weaknesses of the graduates. Thirty-four faculty responded to this question. A total of 49 topics were presented by the faculty as areas which should be added to the programs. As with other questions analyzed, few of these topics were mentioned by more than one person. Five topics were mentioned by more than 10% of the respondents and these can be seen in Table 42. The complete list of topics can be seen in Appendix 19.

While the numbers for any one university are small, it is noteworthy that of the six respondents who mentioned Ergonomics / Industrial Rehabilitation, five were from University D. Ethics and Manual Therapy were both listed by faculty members from all four universities. Both graduates and supervisors listed Business Skills as a suggested prerequisite, while faculty included this as a topic to be added to the programs.

Table 42 Faculty list of what should be added to the programs (n=34)

Topic	#	%
Business / Marketing / Administration	9	26
Manual Therapy	6	18
Ethics	6	18
Ergonomics / Industrial Rehabilitation	6	18
Psychology / Psychiatry / Psychosocial Issues	4	12

Graduates

One-hundred and sixty-one graduates responded to the question on what areas they thought should be introduced to the programs. In general, their comments were not totally new areas, but indicated a desire for expanding areas currently covered in the programs. Ninety-five topics were generated, but 36 (38%) were only mentioned once. Only 10 topics were mentioned by over 5% of the graduates, and they are shown in Table 43. The list of topics mentioned by under 5% of the graduates can be found in Appendix 19.

The most common suggestion was Manual Therapy skills (30%). University B graduates mentioned this topic at a considerably lower rate than those from the other universities (18%, versus 27%, 35% and 35% for Universities A, C and D). All respondents simply said "more manual therapy." The second most common answer was specialization. University B graduates suggested this at a much higher rate than those of other universities: 50%, versus 12%, 24% and 12% for Universities A, C, and D respectively.

Table 43 Graduate's list of what to introduce to the programs (n=161)

Topic	#	%
Manual Therapy	48	30
Specialization	40	25
Business Skills	32	20
Clinical Placements	29	18
Neurology Specialty	16	10
Clinical Skills	14	9
Sports Medicine	13	8
Problem-solving Skills	9	6
Pharmacology	8	5
Politics	8	5

The graduates showed clearly that they were interested in having the opportunity to specialize during the final portion of their program. Most people just mentioned specialization in

general terms, but a number mentioned MSK options and a few mentioned Neurology options. The Cardiorespiratory area was mentioned only once.

The next most common answer was Business Skills. Graduates were interested in skills that would enable them to run a private practice. These included marketing skills, administration skills, accounting, billing to OHIP, and dealing with the WCB (Worker's Compensation Board) and insurance companies.

Clinical Placements were generally mentioned in a positive light; however, suggestions to increase both the length of placements and the number of placements was common. Requests to have more (and earlier) sessions in the hospital to observe patients were also common.

Three differences were noted between the 1992 and 1994 graduates. The 1992 graduates mentioned Business Skills and Clinical Placements at a higher rate than the 1994 graduates (25% versus 18% and 25% versus 19%), and the 1994 graduates mentioned specialization at a higher rate (33% versus 14%).

The majority of the less common topics were mentioned by a number of schools; however, in a few cases one school clearly stood out. Five of the six graduates who mentioned Integration were from University C; all five who mentioned Functional Anatomy were from University C; five of the six who mentioned EBP were from university C; and four of the six who mentioned Paediatrics were from University B.

Supervisors

Sixty-eight supervisors answered the question on what should be introduced to the programs. Supervisors mentioned areas which they would like to see expanded as well as new

areas they thought should be added. Nine supervisors (13%) responded that they did not know what should be added, and one said nothing should be added. Table 44 shows the top four topics mentioned. Only two topics were mentioned by a large number of respondents: Business Skills and Manual Therapy Skills. Many other topics were mentioned (a total of 67 topics in all), but almost half (31 topics) were mentioned by only one respondent. The remaining 63 topics can be found in Appendix 19.

Table 44 Supervisors list of what to introduce to the programs (n=68)

Topic	#	%
Business Skills	17	25
Manual Therapy	17	25
Ergonomics / Functional Retraining	6	9
Clinical Placements	6	9

Confidence

Generalized weaknesses might indicate a lack of confidence on the part of graduates. Two questions were directed at confidence. The first question was how long each group of respondents felt it took the graduates to get "up to speed", and the second was whether each group thought the graduates felt comfortable with direct access.

There was a very wide range of estimates given of the time span it took for the graduates to feel up to speed. The shortest period was 2 weeks, and the longest period was the choice of "not there yet" by a number of 1992 graduates. Response patterns were very similar among all three groups.

Supervisors had a tendency to say graduates were up to speed earlier than either graduates or faculty. Supervisors had a higher rate of reports of 3 or 6 months while graduates tended more towards reporting 6, 12 or 24 months. While faculty are not directly observing graduates in the work settings, faculty do have considerable contact with clinical supervisors in the facilities in the surrounding areas. This contact may be related to joint research projects, committee work, student placements, or other professional relationships. From this contact the faculty members would get a feel for the performance of their graduates. Faculty tended to report 12, 18 or 24 months. Means and SD can be seen in Table 45. For the purpose of this calculation, any graduates who said "not there yet" were classified as either 24 months (1994 graduates) or 48 months (1992 graduates). Two faculty members and seven supervisors did not respond to this question.

Table 45 Up to speed reports by all three respondent groups

Respondent Group	Mean (months)	SD	N
Faculty	13.12	8	38
Graduates	11.51	11	169
Supervisors	6.77	6	73

The second question directed at this topic was related to graduates' level of comfort with direct access. The Regulated Health Professions Act in Ontario allows for direct access to PTs within certain limits. In hospital, for example, a physician's referral is still required; but at out-patient clinics, schools and home care settings a referral is not required.

The majority of the graduates responded to this question (n = 159). A few said direct access was not possible at their site, so they had no opinion. Twenty-three graduates said no, they were not comfortable with direct access. One hundred and twenty-four of 159 graduates

responding to the question on direct access (78%) reported being comfortable with this aspect of care (Table 46).

Table 46 Graduates' comfort with direct access (n=159)

# Respondents who said Direct Access was not possible in their setting	12	8%
# Respondents who were not comfortable with direct access	23	14%
# Respondents who were comfortable with direct access	124	78%
Reason for comfort with Direct Access	#	%
Confidence	52	42
Better assessment than doctor	45	36
Scope of practice includes Direct Access	26	21
Easier access to treatment for clients	4	3

The 124 graduates who were comfortable with direct access mentioned three major areas. First, they simply said they were confident that they could screen the patients well and refer them to a doctor as needed. In some cases they felt that if the presentation was odd they would prefer a medical opinion.

> "I feel confident in my ability to rule out serious pathology in a manner that would be considered reasonable by my peers (MDs & PTs) and that I do not put clients at risk of declining health."

The next most common comment was that PTs do a more detailed and thorough assessment than the doctors. Many graduates pointed out that often referrals simply say "assess

and treat," or "shoulder pain," or "low back pain," and the therapist must do a complete assessment and come to a clinical impression as to the specific problem before proceeding with treatment. As one graduate said: "Well, in my area I spend 30 – 40 minutes evaluating. I don't know too many doctors who do this..." Many graduates reported that the doctor's diagnosis was often incorrect. In one graduate's opinion ". . . in reality over 50% of our MD referrals are either misdiagnosed or too vague (i.e. "LBP" [low back pain])."

The third area was the scope of practice of physical therapy. Many graduates reported that they were already seeing patients without referrals. Most of the graduates in this category reported something along the lines of "We are trained well enough to recognize problems out of our scope of practice and divert proper treatment thereof."

In addition to the three main areas, a few graduates reported that direct access offered earlier access to patients, and therefore allowed for quicker treatment and a better and quicker return to optimal function.

It should be pointed out that the majority of the graduates were referring to musculoskeletal conditions. One mentioned neurology in a school program, where children with previously diagnosed conditions were assessed and treated as needed. One graduate mentioned the Intensive Care Unit (ICU), where referrals were self-generated. In this case, the therapist did chart reviews and assessed patients, and then indicated for which patients treatment was appropriate. At that time, the doctor was asked to write the "official" referral.

Sixty-three supervisors responded to the question on direct access. Twenty-four of them said that direct access was not possible where they were working, so they had no opinion on this topic. Of the other thirty-nine, only three said that they did not feel that the graduate was ready

for direct access. A fourth felt that extensive training would be needed to become an independent practitioner and made reference to a physical therapy practitioner at her hospital. Independent practice, as it was defined for this physical therapy practitioner role, encompassed a larger scope of practice than a regular PT, as it included adjusting medications and ordering lab tests and x-rays. This role required an intensive six-month residency and was on a different level of independent practice than this survey was considering.

The four supervisors who said their graduates were not ready stated that the graduates' assessment skills were not strong enough. A few supervisors said that the graduate working with them would be fine *now* with direct access, but on first graduating would not have had strong enough assessment and diagnostic skills to deal with direct access.

The most common answer for those supervisors who felt the graduate was ready for direct access was that the graduate's assessment skills were strong (31%) (Table 47). Another twenty-one percent of the supervisors felt that the graduates knew their limitations and would ask for help or speak to a doctor if they were unsure of the appropriateness of the patient coming for treatment, and thirteen percent felt that the education programs were preparing graduates who had enough knowledge to deal with direct access.

Other comments were related to the scope of practice of the graduates who were already dealing with direct access; teamwork, whereby the graduates would consult other team members whenever appropriate; and observations that the graduates showed confidence in their work. One supervisor was concerned about the liability issues involved in direct access, but did not comment on the graduate's ability.

The faculty were asked: "Do you feel that the graduate is comfortable in treating clients who have not been referred by a medical doctor (direct access)?" Of the 40 faculty members who responded to this question, 35 (88%) said yes.

Table 47 Supervisor responses regarding graduates' readiness for direct access (n=63)

Not possible in setting	24	
Available Respondents	39	
Reason graduates are ready for direct access	#	%
Assessment skills strong	12	31
Know their limitations	8	21
Skills Strong	5	13
Confidence	4	10
Teamwork	3	8
Scope of Practice includes Direct Access	2	5
Not ready for direct access	4	10
Concern regarding liability	1	3

Lifelong Learning / Evidence Based Practice

A few questions addressed the issue of lifelong learning either directly (how many courses did the graduate take and how many journal articles had they read) or indirectly (could the graduate list outcome measures). Graduates were asked to list four outcome measures. There was a clear indication that many graduates were not at all clear about what constituted an outcome measure. Some responses to this question included the following: age, height, reflexes, bed mobility, ambulation, improvement on reassessment, unilateral stance, and independence. None of these are validated measurement tools. Some (eg. age and height) can certainly not be

expected to change as a result of physical therapy treatment of any sort. Items listed which were not deemed to be an outcome measure were removed from the list prior to calculations being done. Decisions were checked with four faculty members, one of whom was a co-author of a book on this topic (Cole, Finch, Gowland, & Mayo, 1994).

The number of outcome measures that graduates were able to name is reported in Table 48. During the pilot test, one faculty member suggested that this question would have a poor response from the 1992 graduates as they were out of school before the educational programs included much discussion of this topic. In spite of this, a higher percentage of the 1992 than the 1994 graduates were able to list four or more outcome measures. The average number of listed by 1992 graduates was 3.39 and by 1994 graduates was 3.41.

While a total of 106 outcome measures were named, only 12 were mentioned by over 5% of the graduates (Table 48). The complete list is in Appendix 19. What is interesting is that with over 50% of physical therapy clinical practice being in the MSK area and ROM and strength testing being the two most common assessment tools used by therapists, under 60% of PTs mentioned ROM and under 40% mentioned strength (Table 49).

Two questions related to lifelong learning asked how many journals the graduates had read in the previous six months and how many courses they had attended since graduation. The average number of journals read and courses taken are presented in Table 50, while the ranges are presented in Tables 51 and 52. It was expected that the 1994 graduates would have attended more courses as they had two more years post graduation in which to do so, and the results clearly indicate that this is the case.

Table 48 The number of outcome measures named by graduates

	Year					
	1992 (n=71)		1994 (n=98)		Combined (n=169)	
Number of Outcome Measures listed	#	%	#	%	#	%
0	8	11.3	8	8.2	16	9.5
1	0	0	3	3.1	3	1.8
2	3	4.2	1	1.0	4	2.4
3	3	4.2	11	11.2	14	8.3
4 +	57	80.3	75	76.5	132	78.1

Table 49 Outcome measures listed by over 5% of graduate respondents (n=151)

Outcome Measure Named	#	%
ROM	89	58.9
Strength	56	37.1
Berg Balance Scale	39	25.8
Pain Scales	35	23.2
Functional Independence Measure (FIM)	33	21.9
Chedoke McMaster Stroke Assessment	19	12.6
Timed Up and Go	19	12.6
Grip Strength	18	11.9
VAS	16	10.6
Girth	16	10.6
6 Minute timed walk	10	6.6
OSWESTRY	9	6.0
Get up and go	8	5.3

Table 50 Average number of journals read and courses attended

	Year			
	1992		1994	
	Mean	SD	Mean	SD
# of Journals Read	3.41	2.01	6.89	2.88
# of Courses Attended	6.89	2.88	4.57	2.23

Table 51 Number of journals read in the past 6 months

	Year					
	1992		1994		Both Years	
Number of Journals Read in Past 6 Months	#	%	#	%	#	%
0	3	4.2	4	4.1	7	4.1
1	7	9.9	10	10.2	17	10.1
2	19	26.8	10	10.2	29	17.2
3	10	14.1	23	23.5	33	19.5
4	14	19.7	17	17.3	31	18.3
5	8	11.3	13	13.3	21	12.4
6	3	4.2	5	5.1	8	4.7
7	3	4.2	5	5.1	8	4.7
8	4	5.6	11	11.2	15	8.9
Totals	71	100%	98	100%	169	100%

Table 52 Number of post graduate courses attended

	Year					
	1992		1994		Both Years	
Number of Courses Taken	#	%	#	%	#	%
0	1	1.4	1	1.0	2	1.2
1	0	0	8	8.2	8	4.7
2	2	2.8	11	11.2	13	7.7
3	6	8.5	13	13.3	19	11.2
4	8	11.3	17	17.3	25	14.8
5	7	9.9	14	14.3	21	12.4
6	9	12.7	10	10.2	19	11.2
7	8	11.3	15	15.3	23	13.6
8	9	12.7	6	6.1	15	8.9
9	6	8.5	2	2.0	8	4.7
10	6	8.5	1	1.0	7	4.1
11	5	7.0	0	0	5	3.0
12	3	4.2	0	0	3	1.8
13	1	1.4	0	0	1	0.6
Totals	71	100%	98	100%	169	100%

Manual Therapy

In the FGIs only one specific clinical skill was mentioned: Manual Therapy. Graduates raised this as they felt their knowledge was weak in this particular skill and thus hampered them when they first started working. Several times the question of whether an undergraduate program should be a generalist program or allow for specialization was raised. The issue of generalist or specialist programs is of particular interest to the profession at this time. In order to explore this topic further, respondents were asked whether they thought the undergraduate programs should retain a generalist focus or should allow for specialization, and what level of manual therapy should be taught. Responses to these questions are summarized in Tables 53 and 54.

Table 53 Should the undergraduate programs focus on generalist or specialist skills?

	Group					
	Faculty (n=40)		Graduates (n=169)		Supervisors (n=83)	
	#	%	#	%	#	%
Generalist	37	92.5	84	49.7	62	74.7
Not Sure	2	5.0	70	41.4	20	24.1
Specialist	1	2.5	15	8.9	1	1.2

It is interesting to note that while the faculty members are almost unanimous in favouring a generalist program (over 90%), they also lean towards teaching higher manual therapy skills at

the undergraduate level. Over 65% of faculty members believe that an E2V2 (Extremity Course Level 2, Vertebral Course Level 2) or higher level should be taught, while only 36% of graduates and 30% of supervisors have this opinion.

Table 54 Level of manual therapy to be taught in undergraduate programs

	Group		
	Faculty (n =36)	Graduates (n=168)	Supervisors (n=68)
None (should be post graduate only)	2 5.6%	17 3.0%	2 14.5%
Not sure	1 2.8%	39 5.3%	6 2.4%
E1V1 (extremity course level 1, vertebral course level 1)	9 25.0%	46 55.6%	27 53.0%
E2V2	19 52.8%	47 24.9%	23 26.5%
E3V3	5 13.9%	19 11.2%	10 3.6%

Comparison of Groups

For comparison purposes, the following tables consider similarities among the three respondent groups, about what they viewed as the strengths and weaknesses of the graduates. Only areas that were mentioned by more than one group are included in these tables. From Table 55 we can see that nine topics were mentioned as strengths by both the graduates and the

supervisors and four strengths were listed by all three groups. It is satisfying to note that the three top choices of each group are represented on this table.

Both the graduates and the supervisors mentioned Time Management / Organizational skills as being stronger more often for the 1994 graduates. There was no topic which both the graduates and supervisors mentioned as being stronger more often in the 1992 graduates. Supervisors mentioned knowledge more often as a strength of the 1992 graduates, while with the graduates it was the 1994 graduates who mentioned knowledge as a strength more often.

It was not possible to consider university differences among the faculty members due to the small number of respondents from each university. There were a few similarities between the supervisor and graduate lists of strengths for the individual universities. For University A, both supervisors and graduates mentioned Teamwork as a strength more often than respondents from the other universities. For University B the area both mentioned was rapport. University C graduates and supervisors had no areas in common. University D graduates and supervisors had two areas in common: Flexibility and Time Management / Organizational Skills.

In considering which components of the programs to keep, there was only one topic mentioned by all three respondent groups: Clinical Placements. Graduates also mentioned Patient Contact, which certainly goes along with placements, but could also include short sessions in which they were allowed to observe or perhaps participate in treatments. A number of areas were mentioned by two groups, as can be seen in Table 56. Both faculty members and graduates mentioned clinical skills; however, the graduates also mentioned each of the clinical areas specifically, as well as mentioning manual therapy skills.

Table 55 Strengths of graduates, as listed by groups

Faculty*	Graduates	Supervisors
	Communication Skills	Communication Skills
Enthusiasm #2	Enthusiasm	Enthusiasm #4
	Flexibility	Flexibility
	Interpersonal Skills	Interpersonal Skills
	Interpersonal Skills, Communication Skills, & Rapport combined #1	Interpersonal Skills, Communication Skills, & Rapport combined #1
Knowledge Base #1	Knowledge Base	Knowledge Base
Lifelong Learning #3	Lifelong Learning #2	Lifelong Learning #2
	Musculoskeletal Specialty	Musculoskeletal Specialty
Problem-solving Skills	Problem-solving Skills #3	Problem-solving Skills #3
	Rapport	Rapport
	Teamwork	Teamwork
	Time Management & Organization #4	Organization
	Treatment Skills	Treatment Skills

* #1, #2, #3 and #4 refer to the top four strengths listed by each respondent group. Fourth for the faculty members was Evidence-based Practice, which was not listed by either other respondent group.

Weaknesses mentioned by the three groups of respondents tended to differ, with the faculty mentioning broad topics (eg. professional roles and supervision skills), the supervisors mentioning both broad and specific topics (eg. caseload management and manual therapy), and

the graduates mentioning treatment-related topics (all three major treatment areas were included, as well as integration and psychosocial issues). Comparison of the weaknesses (Table 57) found no weakness mentioned by a significant number of all three groups of respondents. The top weakness mentioned by each group was not mentioned by any other group. These top weaknesses were professional roles (faculty), MSK (graduates) and caseload management (supervisors). The graduate's second most common reported major weakness was Treatment and Progression of Treatment and this was also not mentioned by either of the other respondent groups. The only topic where both supervisors and graduates of one university mentioned the same weakness was University A, the topic being Manual Therapy.

All three respondent groups agreed on two areas for additional prerequisites: Basic Sciences and Psychology courses (Table 58). In terms of what the respondents thought should be added to the programs, Business Skills and Manual Therapy were the two topics mentioned by all three groups (Table 59).

Table 56 Comparison of things to keep in the programs

Faculty	Graduates	Supervisors
	Basic Sciences	Basic Sciences
Clinical Placements	Clinical Placements	Clinical Placements
	Patient Contact	
Clinical Skills Components	Clinical Skills	
	Cardiorespiratory Specialty	
	Manual Therapy	
	Musculoskeletal Specialty	Musculoskeletal Specialty
	Neurology	
Electives	Electives	
Problem Based Approach	Problem Based Learning	
Research	Research	

Table 57 Comparison of weaknesses among the three respondent groups

Faculty	Graduates	Supervisors
Business Skills #2	Business / Administration Skills	
	Manual Therapy Skills #3	Manual Therapy #2
	Paediatrics	Paediatrics #3
Teamwork #3		Teamwork

*#2 and #3 refer to the top three weaknesses listed by each respondent group. None of the top weaknesses were mentioned by a second group.

Table 58 Prerequisites suggested by the respondent groups

Faculty	Graduates	Supervisors
Basic Sciences	Basic Sciences	Basic Sciences
Hard Sciences	Hard Sciences	
	Business / Marketing	Business Skills
Communication Skills		Communication Skills
Psychology / Sociology	Psychology	Psychology
English		English

Table 59 What to introduce to the programs

Faculty	Graduates	Supervisors
Business / Marketing / Administration	Business Skills	Business Skills
Ergonomics / Industrial Rehabilitation		Ergonomics / Functional Retraining
Manual Therapy	Manual Therapy	Manual Therapy
	Clinical Placements	Clinical Placements

Summary of Short Answer Question Results

Replies to the short answer questions were presented in the form of tables outlining the strengths and weaknesses of the graduates as perceived by the three respondent groups. Strengths were addressed directly by the question on graduate strengths and indirectly through responses to the question on what items should be kept in the programs. Weaknesses were addressed directly by the question on weaknesses, as well as by suggestions for additional prerequisites and suggestions of what to add to the programs. Confidence, as a general assessment of the graduates' readiness for professional activities, was addressed by asking about the length of time it took the graduates to get "up to speed," as well as by asking about their confidence with direct access.

Some similarities among the three respondent groups were noted, but more often similarities were noted between only two groups. For both the strengths and weaknesses,

graduates and supervisors had more topics in common than the faculty had with either group. The top three strengths and weaknesses, as listed by each respondent group, can be seen in Table 60.

Table 60 Top three strengths and weaknesses of graduates, as listed by each respondent group

	Faculty	Graduates	Supervisors
Strengths	Knowledge Base Enthusiasm Lifelong Learning	Interpersonal Skills, Communication Skills, & Rapport combined Lifelong Learning Problem-solving Skills	Interpersonal Skills, Communication Skills, & Rapport combined Lifelong Learning Problem-solving Skills
Weaknesses	Professional Roles Business Skills Teamwork	Musculoskeletal Specialty Treatment & Progression of Treatment Manual Therapy	Caseload Management Manual Therapy Paediatrics

Chapter 6 – Discussion

The original four questions posed by this thesis can be summarized easily. Questions 1, 2, 3: What areas, skills, functions and knowledge are reported by each respondent group (1. the graduates themselves, 2. their supervisors, 3. faculty at four universities) as being the strengths and weaknesses of new graduates? Question 4: What are the differences between what the various respondent groups report as strengths and weaknesses? The discussion will focus on a practical viewpoint and will consider the implications of the findings to the educational programs. The chapter continues with a discussion of all the similarities and differences among the responses of the three groups. Then two areas of particular interest to the profession at this time, Specialization, and Business Skills, will be explored in greater depth. Finally, there will be a brief consideration of a recent document outlining a competency profile for the entry-level physiotherapist in Canada.

Strengths of graduates

Ranking the factor scales by the means shows that the EBP Factor was rated the highest by all three groups (Table 11). Ranking the eight scales selected for ANOVA testing shows that the Knowledge and MSK Scales were ranked first and second respectively by both graduates and supervisors and third and first by faculty (Table 14). In Table 60 we see that combining the three strengths listed most often by each respondent group yields a short list of five strengths: Enthusiasm; Interpersonal Skills, Communication Skills and Rapport (combined); Knowledge

Base; Lifelong Learning; and Problem-solving Skills. Each one of these was mentioned by over 20% of at least one of the respondent groups. The only strength which was listed in the top three by all the respondent groups in the short answer question section was Lifelong Learning. In total, then, seven areas are seen as strengths of new graduates, as listed in Table 61.

Table 61 Strengths of new graduates

Enthusiasm
Interpersonal Skills, Communication Skills & Rapport
Evidence-based Practice
Knowledge Base
Lifelong Learning
Musculoskeletal Specialty
Problem-solving Skills

It could easily be argued that some of these characteristics are not taught in a university program. For instance, Enthusiasm may be expected in any new graduate from any program, whether university, college, or private technical schools. If the career has been well chosen, new graduates are likely to be enthusiastic about their chosen careers.

While many respondents simply listed enthusiasm as a strength, comments from some graduates were more specific, describing an "enthusiasm towards [the] physiotherapy profession." One faculty member described this more explicitly as "enthusiasm and energy, as demonstrated by interest in and commitment to professional issues, e.g. committee work, assisting on research projects."

While there is evidence that communication skills can be learned, and currently most health care programs do include some form of teaching in this area, one graduate who listed this as a strength added: "... although I believe I had good communication skills before I was in the

physio program." So, while these skills may well be a strength of new graduates, it is by no means clear that the skills are a result of the educational programs.

Evidence-based Practice has become the new buzzword in health care education and practice. All three respondent groups ranked this factor scale highest, although faculty members were the only group that mentioned it as a strength in the short answer questions. With the current changes in health care pushing for greater accountability, there is an increasing expectation that EBP will be used. But while respondents recognize its importance, are the graduates actually using EBP?

One way of measuring whether graduates are using EBP is to ask whether they are using outcome measures. Use of an outcome measure would provide evidence that the current treatment is or is not having the desired effect and would allow the PT to adjust the treatment accordingly. An outcome measure is a "measurement tool (instrument, questionnaire, rating form, etc.) used to document change in one or more patient characteristics over time" (Cole et al., 1994). Many assessment tools are not validated outcome measures. The Ontario Physiotherapy Association (OPA) includes a short questionnaire with its mailings from time to time and asks for a faxed response. One recent survey was related to research, and generated responses from 247 members. Results were reported in the following month's newsletter, which stated that "The physiotherapist who compiled the results noted some members demonstrated they are not aware of existing valid outcome measures" (Butcher, 1998). While close to 80% of graduates were able to list four or more outcome measures (Table 48), this leaves 20% unable to do so. Two staples of the PT's assessment tools, ROM and Manual Muscle Tests for strength, were mentioned by under 60% and 40% of graduates respectively. (While these are not

considered functional outcome measures, they are measures of impairment.) This corresponds to the writer's personal observation that outcome measures are often viewed as sophisticated devices used by researchers. How they apply in day-to-day clinical work is missed by many therapists.

While 106 of the outcome measures listed in survey responses were accepted by the researcher as being outcome measures, 43 of the items listed were excluded. In other words, 29% of the items listed by graduates were not validated tools. There is clearly widespread misunderstanding about what an outcome measure is. Finally, although the 1992 graduates would not have had much exposure to the concept of outcome measures in school, their responses appeared to be as good as those of the 1994 graduates, so it would appear that much of the knowledge in this area is picked up either on the job or via post-graduation courses.

It is heartening that lifelong learning is mentioned as a strength because, combined with EBP, this is a crucial area for maintaining competence. While there are currently no criteria set by the College of Physiotherapy of Ontario related to maintaining competence, there are constant reminders that keeping up with new knowledge will be important. The majority of graduates are clearly taking post-graduation courses and continuing to read journal articles (Tables 50, 51 and 52). The effort to keep up with current research combined with the fact that they have recently spent two to four years in school learning about the most current research results and proven clinical treatments clearly relates to another of the reported strengths: Knowledge Base.

The next listed strength was the MSK treatment specialty. Since 50% or more of PT practice is in the MSK specialty, it would be worrisome if this was not listed as a strength.

MSK courses usually account for more of the practical course work than either neurology or cardiorespirology and it is likely that graduating students will have had more than one clinical placement in MSK specialty areas.

The final item in the list of strengths is problem-solving skills. This topic is mentioned as an important skill right from admissions committee deliberations through to final graduation. One graduate stated that she had a "desire to understand underlying pathology and resolve it," while another described her problem-solving strength as follows, "assessments [are] thorough and [I am] able to look for the source of the problem rather than just the symptoms." One faculty member expanded on this by stating that "Our graduates are excellent problem solvers and lifelong learners. They know what questions to ask where and how to find the information and how to apply it to the situation at hand." Another wrote that students had the "ability to identify issues relevant to the patient's problem and apply evidence to address the issues." Supervisors had similar comments, with one stating that "the greatest strength was the graduate's ability to critically appraise information and use reflective thinking skills."

In summary, on reviewing the strengths of graduates listed in Table 61, while there are strengths in interpersonal and communication skills and rapport, it seems likely that the graduates entered the PT program with these strengths. Enthusiasm is likely inherent to the majority of new graduates of any program. The remaining items, EBP, Knowledge Base, Lifelong Learning, MSK Clinical Specialty, and Problem-solving Skills, are the strengths which could actually be attributed back to the PT educational programs.

Weaknesses of graduates

Looking back at Table 60, we can see that only one of the weaknesses listed most often is mentioned by more than one group: Manual Therapy (MT). The eight weaknesses most often listed are: Business Skills, Caseload Management, MT, MSK Skills, Paediatrics, Professional Roles, Teamwork, and, Treatment & Progression of Treatment. While the top strengths were listed by over 20% of each respondent group, most of the top weaknesses were not mentioned that often. The only weakness which was mentioned by over 20% of a respondent group was MSK skills, mentioned by 21% of the graduates, though Treatment & Progression of Treatment and MT Skills were both close behind at 19% (Table 32).

Some graduates felt that the problems with their MSK skills, selecting appropriate treatments and progressing treatments were related to the short placement lengths. One graduate stated that "at the time of graduation I had a lot of difficulty with treatment progression, discharge goals and planning. I think this was due to the fact that placements were only 4 weeks which is insufficient to follow through with patients." Another graduate felt that the position of the placement relative to graduation was the problem. One stated that she "only had one placement on [orthopaedics] – my first year", while another stated that "[I] did not feel I had enough placement time in outpatient ortho – we learned a lot in school ... but because I couldn't practice what I had learned I did not feel confident with my skills." Finally, one graduate reported that the emphasis in the clinical courses was misplaced: "much emphasis was placed on assessments (i.e. ortho, cardio, neuro) but I don't feel that enough instruction was given re choosing treatment programmes." This view was supported by one supervisor, who felt that the programs were "too narrow in approach to modalities or alternative treatment options"

but then went on to point out that "some blame lies with undergraduate program, some with muddled science & tradition, but much takes time in a mixed experience environment." In other words, further experience at treating clients will sort out this problem.

Some of the areas listed as weaknesses can easily be explained by lack of experience, and in fact, it would be surprising if they were not weaknesses. These include: Business Skills, MT Skills, and Paediatrics. All three of these areas might easily be considered specialty areas where further education or experience are needed to ensure strong skills. In spite of this, MT and Business Skills were both mentioned again when respondents were asked to suggest prerequisites which it would be appropriate to add to admission criteria, as well as what should be added to the programs. For prerequisites, both graduates and supervisors suggested business courses (5% and 20% respectively) (Tables 38 and 41). In suggesting what should be added to the program, all three groups mentioned both MT and Business Skills. Business Skills was suggested by 26%, 30% and 25% and MT by 18%, 20% and 25% of faculty, graduates and supervisors, respectively (Tables 42, 43 and 44). Among supervisors, these were the only two topics mentioned by a significant number of respondents: among faculty, these were the top two topics listed; and, among graduates, these were two of the top three topics suggested for addition to the programs. These responses clearly indicate a weakness and a need for improvement in these areas. Both topics will be dealt with in more depth later in this chapter.

Other areas listed as weaknesses by the graduates include: dealing with Insurance and Legal Issues, Integration and Complex Patients, and dealing with psychosocial issues and difficult patients (Table 32). Again, these are all areas where time and experience will bring improvement.

Other listed weaknesses are more of a concern. Caseload management was listed by supervisors. It would be ideal, from a cost efficiency point of view, if new graduates were able to step into a full caseload immediately upon graduation. In fact, few if any of the final year students have been required to carry a full caseload. One of the points to consider is the reason for the clinical placements. The main purpose of the placements is for the students to learn. Since they are novices, assessing and treating takes them longer than experienced therapists. Students should have this time available and use it to their benefit. Extra time allows them to go off and look up information they might need to best treat the patient, plan treatment sessions in advance, even observe other health professionals at work to gain a better understanding of the roles of each team member. Assigning a full caseload to students would not necessarily improve their performance after graduation; in fact, it might lead them to try shortcuts which could be inappropriate, simply to cope with fitting everything into the day.

Also of concern is the fact that graduates list all three major clinical specialties as weaknesses, as well as Treatment & Progression of Treatment (Table 32). This covers the entire range of PT clinical practice, and it is certainly worrisome to think that graduates are unprepared for clinical work; however, we are unable to verify this weakness. Faculty do not mention treatment or any of the clinical specialties as weaknesses of the graduates. The only two clinical areas mentioned by supervisors are MT and paediatrics, and as mentioned earlier these are specialty areas which require extra time to learn. If we go back to the factor scales, we see that the graduates scored themselves lower on the Treatment Factor than either of the other groups (Table 11). The same is true of the scales chosen for ANOVA testing (Table 14); graduates rate themselves lower than either the faculty members or the supervisors in the Cardiorespiratory,

MSK, Neurology and Treatment Scales. As discussed in the literature review, it is not uncommon for graduates to rate themselves lower than supervisors.

Given that, according to the respondents, it takes 6-12 months for the majority of graduates to get up to speed, worrying about these short-term weaknesses may be inappropriate. In other health professions, graduates have set periods during which they are considered learners, even though they have graduated from school. Medicine has a minimum residency period of two years. RNs (Registered Nurses) are "Graduate Nurses" until they pass the licensing examination. During this time, the new graduates consolidate their knowledge and gain additional practical experience while under supervision. Perhaps new PT graduates are simply nervous and lacking confidence. Being in the workplace brings home to them, not how much they learned in school, but rather, how much they still need to learn. Graduates may be expecting more of themselves than is reasonable.

Teamwork was mentioned as a weakness by both faculty members and supervisors. This is also a concern. With the changes occurring in the health care system, working in multidisciplinary teams is becoming an increasingly important skill. While the numbers here are certainly smaller than for the other weaknesses mentioned (11% of faculty members, and 7% of supervisors), this is still an area which must be considered important. It is interesting that 10% of graduates mentioned teamwork as a strength, so there is definitely a difference of opinion on this topic. One supervisor summed this up by saying that the graduate "does not access all resources when planning treatment. Vision tends to be too physio specific focussed without full use of multidisciplinary and community resources."

It might be worth asking whether the reported weakness in teamwork is only present in physical therapy graduates or if teamwork is a problem for other health professionals as well. One assumption in the literature on teamwork is that team members have a shared understanding of the roles, norms and values within the team; however, a literature review on teamwork has not confirmed this assumption (Cott, 1995). A study by Stanton (1985), as described in Ritchey (1989), tested resident physicians about their knowledge of physical therapy. The residents scored low on this test. Addressing the same topic with a different health profession, Cox (1996) investigated whether medical students were aware of the role occupational therapists play in the health care system. Only 17% of the medical students reported that they knew enough about the profession to use it appropriately. It is quite possible that all of the many professionals who work in the health care system have holes in their knowledge about the roles and functions of the other members of the team, so perhaps the physical therapy graduates are simply on par with their peers. This in no way implies that this situation is appropriate, only that it may be the current norm.

Where does this leave us in identifying the weaknesses of new graduates? While each respondent group lists various areas as weaknesses of new graduates, there is little that is verified by other groups or other data. The only two topics where respondents seem to agree on weaknesses are MT Skills and Business Skills. Other than these areas, the main problem seems to be lack of experience. As one graduate stated, "[I] never realized there were so many different techniques and alternative approaches to therapy out there." It is important to note that this lack of experience seems to sort itself out within about one year of starting work.

Differences among the groups

Significant differences were noted in the responses of the three respondent groups to all four factor scales and all eight selected scales subjected to ANOVA. In 10 of the 12 comparisons, graduates rated themselves lower than either the faculty or supervisor groups and in 8 of the 12 comparisons, supervisors rated graduates higher than either faculty or graduate groups (Tables 11 & 14). This pattern of the supervisors rating the graduates highest and the graduates rating themselves lowest is also evident if the entire list of scales is examined (Table 10). This pattern is consistent as well with the reported "up to speed" times listed by the respondent groups, where the supervisors report the least time and the graduates report taking longer to feel up to speed. Graduates appear to lack confidence in their own abilities.

In spite of these differences, certain areas were consistently rated higher than others. The EBP Factor Scale was rated highest by all of the groups and the Treatment Factor Scale was rated second. In the scales, both graduates and supervisors rated the Knowledge Scale number one and the MSK Scale number two, while faculty rated the MSK Scale number one. This shows some consistency in the groups' opinions of the strengths of the graduates.

In the short answer questions there were also differences among the three respondent groups, with little overlap among the topics listed as strengths and weaknesses of graduates. Only four strengths were mentioned by all three groups: Enthusiasm, Knowledge Base, Lifelong Learning and Problem-solving Skills. Faculty members had no other topics in common with either graduates or supervisors. A further eight topics were listed by both graduates and supervisors (Table 56).

Asked about weaknesses, graduates listed more than either faculty members or supervisors. While four weaknesses were mentioned by more than one group (Table 57), not one was listed by all three groups. At the same time, all three groups did mention both MT and Business Skills as topics which should be added to the programs, so here again consistency is noted.

The graduates quite consistently rated themselves lower than either faculty members or clinical supervisors did. While it is true that each group approached evaluation of the graduates from a different perspective, it is striking that the graduates had such a low opinion of themselves. This trend of graduates rating themselves lower than other respondent groups has been noted elsewhere (Arnold, 1981; Arnold et al., 1985; Cochran & Spears, 1980; Linn et al., 1975; Paiva, 1979; Paiva, 1981; Stuart et al., 1980; Woodward, 1981).

Since ratings by the supervisors are the highest in most cases, it appears that they do not perceive serious problems in the new graduates' work abilities. At the same time, it is has been suggested that supervisor ratings may suffer from a halo effect (Paiva, 1981; Wakefield, 1985; Woodward, 1981). This could lead supervisors to give higher ratings to graduates than are truly appropriate. It is also possible that the supervisors are being lenient in their appraisal of the graduates. It has been noted that students are, almost without exception, rated "above average." At one medical school this situation is so pronounced that if a student receives a rating of "average" on a clinical placement, the student is investigated to "see what is wrong" (Norman, 1995 personal communication). In another situation a medical student was given a mark of 72% on a placement while the written comments indicated that the student should fail. When confronted with this dichotomy, the supervisor said he didn't want to hamper the student by

giving a poor mark and that to him, 72% was a failing mark (Cohen, 1994 personal communication). In spite of these problems, ratings by the supervisors may be considered the most realistic of the three groups. Since ultimately the expectation of the job would be that the new graduate attain the level of the experienced therapist, and since supervisors would have the clearest picture of the abilities of experienced therapists, the supervisors may be providing the most valid assessment of the graduates' abilities.

The graduates' low self ratings may be showing a lack of confidence in their treatment skills. This indicates either an inability to accurately assess their current abilities or an unrealistic assessment of what is expected of a new graduate. As mentioned in the literature review, research has indicated that self-ratings are not accurate, which could explain the low ratings. Since graduates consistently rate themselves lower than the other respondent groups rate them, their perception is that they are not living up to their own standards of what they should be able to do on graduation. The issue of whether their expectations are realistic was not addressed in this research. Research suggests that if students are given clear instructions regarding what is expected, their ability to carry out a self-evaluation is enhanced (Calhoun, TenHaken, & Wolliscroft, 1990). Perhaps if graduates were more clearly informed of what is expected of a new graduate in the first few months or years, they would be better able to rate their own abilities. The suggestion that graduates be kept informed about the expectations of employers has been made before (Rush & Evers 1986, as quoted in Smith 1991 p. 72).

Whose opinion should be considered most valid? This may be a moot point. Since the three groups are in general agreement in their ranking of the top few strengths of graduates, there is not much problem with accepting these findings. The lack of agreement on weaknesses

may indicate a different perception of what knowledge and skills are truly needed at the time of graduation versus what can be picked up later, as well as what can reasonably be taught in an educational program versus what must be learned by experience. Finally, the consistency in identifying both MT and Business Skills as subjects to be added to the programs makes it easy to accept these as areas which are not currently covered in enough depth.

Differences by university

When the results of the ANOVAs were examined to identify university differences, graduates of University A had the highest means in the Interpersonal Skills, EBP and Life Long Learning Factors, and faculty rated them significantly higher in EBP. In addition, supervisors rated the graduates of University A highest in the EBP Factor and faculty rated them highest in the Lifelong Learning Factor; however, these were not statistically significant. University A runs a PBL program which emphasizes independent learning: therefore, the graduates need to develop strong skills for finding information. This ability to use resources to search out information is a part of the Lifelong Learning Factor. The students are encouraged to make their own decisions regarding information they find. Some graduates found this to be a problem. One graduate summed this up as a "refusal to directly answer questions." This approach to teaching forced the students to use the information they had gathered, evaluate it and make their own decisions: in other words, use EBP. The fact that all three respondent groups rated this university high in this factor supports the impression that these graduates are truly stronger than graduates from other universities in using EBP.

While graduates did not mention EBP as a strength, critical thinking, which is a component of EBP, was mentioned at a higher rate by University A graduates. Perhaps the learning environment forces the students to work on deciding for themselves which information is most relevant to their situation and which clinical procedures are reliable and valid. Both of these decisions are a large part of EBP.

As for interpersonal skills, selection of applicants to the program includes interviews, which are often used in assessing interpersonal skills. Small group work is an important part in the program, which would also foster good interpersonal skills. Along with the ANOVA results showing that University A graduates rate themselves higher on the Interpersonal Skills Factor than graduates of the other universities (Table 12), these graduates also listed Interpersonal Skills, Communication Skills and Rapport as strengths more often than graduates of the other universities did (Table 25). It is interesting to remember no differences were noted among universities in the supervisor ratings of the graduates for any of the four factors and there was no significant difference in the faculty ratings for the Interpersonal Skills Factor. It may be that the graduates perceive a difference where none exists.

Finally, the University A graduates rated themselves significantly higher than graduates of the other universities on the Lifelong Learning Factor (Table 12). Faculty also rated them highest, though this result did not reach significance. Both graduates and faculty of University A rated the graduates' problem-solving skills significantly higher than the other universities rated those of their graduates (Table 15). In neither case did the supervisors' ratings concur. At the same time, when asked to list strengths, neither graduates nor supervisors of University A

graduates listed either Lifelong Learning or Problem-solving at a higher rate than respondents from other universities (Tables 25 and 28).

University A did not have any low values in the four factors. The faculty gave the graduates a significantly lower mean in the Knowledge Scale (Table 15); however, their supervisors rated them reasonably well in this area. Although the graduates rated themselves lowest in this scale, the difference was not significant. At the same time, anatomy, physiology, biomechanics, and the hard sciences were all listed as suggested prerequisites by the graduates of University A at a much higher rate than by graduates from other universities (Table 39). As mentioned earlier, it is possible that because they lacked a strong science background, these students were not able to gain as much out of some of their physical therapy courses. While this did not affect the Knowledge Scale for the graduates, faculty may have noticed gaps in the students' knowledge, or that it was more difficult for the students to pick up information, and this may have caused faculty to feel that the students' knowledge was lacking.

The Treatment Scale was rated quite low by the supervisors (Table 15); but this does not match the faculty members, where there was no difference among the groups, or the graduates, where University A graduates rated themselves higher than graduates of the other programs, though the difference was not significant. The graduates did list the cardiorespiratory area as being very weak (Table 35); however, in the neurology and MSK areas, they reported weaknesses at the same rate as the other universities.

Comments on the cardiorespiratory area focused largely on ICU and suctioning. One graduate stated she "had never 'bagged' someone for oxygen . . . patient desaturated and I had to call for help" and another stated that "suctioning was a skill that was discussed in school but I

wasn't given an opportunity to practice it in clinical placement. Not knowing the skill made me feel very anxious / inadequate in the ICU setting."

Supervisors definitely mentioned MT as a weakness of the University A graduates at a high rate (Table 36), while the graduates mentioned it at a low rate (Table 35).

University B supervisors listed two areas of particular strength. First, they rated the graduates highly in personality, rapport and maturity (Table 28), all interrelated points. The second area was MSK skills and treatment skills. The graduates also rated themselves highly in rapport (Table 25). Other evidence to support the reported strength in the MSK area comes from the list of what to keep in the program. Graduates mentioned the MSK course and MT at a much higher rate than graduates of other universities (Table 30) and the mean for the MSK Scale was shown to be significantly higher in the ANOVA (Table 15). Both these things suggest that the MSK area is indeed a strength for University B. It is not possible to verify a strength in treatment skills. None of the respondent groups rated University B graduates high on the Treatment Scale (Table 15), not did graduates mention it as an area of strength (Tables 25).

University B graduates were rated the lowest in both the Integration and Problem-solving Scales by faculty (Table 15). Factor 3, EBP, was rated lowest by the supervisors (Table 12), although the difference among the means was not significant. None of these findings were duplicated by a second respondent group. It is interesting to note that the graduates listed psychology / psychosocial issues / difficult patients as a weakness (Table 35), while earlier they had listed rapport and maturity as strengths. It might be expected that therapists who have good rapport with their clients would have an easier time dealing with psychological issues, yet this does not seem to be the case with these respondents.

Describing the University C graduates, supervisors listed teamwork as a strength (Table 28) and this would seem to work with the high (though not significant) rating by the supervisors in the Interpersonal Skills Factor (Table 12). Supervisors rated these graduates highest in both the Lifelong Learning and Treatment Factors, and these were significant differences

(Table 12). This does coincide with the graduates of University C mentioning Lifelong Learning as a strength more often than graduates of other universities did (Table 25). Neither of these findings is supported by the rankings of the factor scales (Table 12), where University C graduates rated themselves in the middle in all four factors. Supervisors also listed Knowledge Base as a strength more often for these graduates (Table 28) and rated them highest in seven of the eight scales (Table 15), though only in the Knowledge and Treatment Scales was the difference significant. Faculty rated these graduates higher in three of the scales (MSK, Neurology and Treatment Scales).

The high ratings given by the supervisors seem to be substantiated by University C graduates reporting weaknesses in MSK and neurology skills at a lower rate than graduates of the other universities, plus the cardiorespiratory area is mentioned at a low (but not the lowest) rate (Table 35). Thirty percent of the University C graduates also suggest retaining the specialized electives provided in their final year (Table 30) in the curriculum. It seems reasonable that if they have had the opportunity to take specialized courses, their knowledge base ought to be greater and this would show in their clinical work. There does not appear to be any one area that stands out, yet the impression is that these graduates are strong overall.

University C graduates indicated weaknesses in MT skills, and Treatment & Progression of Treatment (Table 35), although they did not rate themselves lowest in the Treatment Scale (Table 15), nor was there any difference among the university groups in the Treatment Factor. As well, both faculty and supervisors rated University C graduates highest in the Treatment Scale (Table 15), and the difference in supervisor means was significant. It would seem that University C graduates do not have a weakness in the treatment area.

Graduates of University C rated themselves significantly lower in the Ethics Scale, but supervisors rated them highest . There were three other areas in which the preponderance of respondents mentioning the topic came from this university. All five who mentioned functional anatomy, five of the six graduates who mentioned integration, and five of the six who mentioned EBP as weaknesses were from University C. Overall, however, there does not seem to be an area where there is a particular weakness.

The first area of strength for University D, as listed by the supervisors, was the combined interpersonal skills / communication skills / rapport category, as well as interpersonal skills alone (Table 28). This is partially contradicted by the supervisors rating these graduates the lowest in the Interpersonal Skills Factor (Table 12). While graduates mentioned interpersonal skills, communication skills and rapport at a rate similar to the others, they mentioned empathy at a higher rate (Table 25) and this could be what the supervisors were seeing and why they listed interpersonal skills as a strength of these graduates. Faculty rated these graduates highest in the Interpersonal Skills Factor, although the difference was not significant. In spite of the low rating on the Interpersonal Skills Factor, all three respondent groups seem to agree on a strength in the area of interpersonal skills.

Graduates of University D mentioned Flexibility more than graduates of other universities and essentially tied with University B on mentioning Organizational skills (Table 25). Supervisors also mentioned these areas as strengths (Table 28).

Faculty rated graduates of University D highest in the Knowledge Scale (with a significant difference among the means); graduates also rated themselves highest in the Knowledge Scale (Table 15) and listed Knowledge Base as a strength more often than graduates of the other universities (Table 25). While supervisors did not mention Knowledge Base as a strength, they did mention Problem-solving Skills as a strength most often for the University D graduates (Table 28). A high Knowledge Base would be consistent with strong Problem-solving skills.

In terms of weaknesses, University D graduates listed Manual Therapy Skills as a weakness at a higher rate than graduates of the other universities (Table 35). Supervisors reported Lifelong Learning as a strength of University D graduates much less often than supervisors of the other universities' graduates did (Table 28), as well as rating these graduates the lowest in the Lifelong Learning Factor (Table 12). None of these findings were supported by another respondent group.

Strengths and weaknesses of each university's graduates are summarized in Table 62. University A, with the PBL curriculum, follows other literature with a trend to weakness in Knowledge Base. Treatment skills have not generally been shown to be weak in PBL curricula and it is reasonable to expect a curriculum which stresses independent learning to have a strength in EBP, as indicated here. University B has strengths indicated in MSK Skills and in patient rapport, University D in Interpersonal skills, Knowledge Base, Flexibility, and Organization, and

University C seems to produce graduates who are strong overall. Neither University B, C or D has any weakness which stands out.

Table 62 Summary of the university strengths and weaknesses

University	Strength	Weakness
A	EBP	Trend to a weakness in Knowledge Base and possibly Treatment Skills
B	MSK Skills Rapport	Nothing stands out
C	Overall Strength	Nothing stands out
D	Interpersonal skills, Knowledge Base, Flexibility, Organization	Nothing stands out

Differences by Year

The only difference between the two years' cohorts in the quantitative data was in the Ethics Scale, where the supervisors gave the 1994 graduates a significantly higher mean than the 1992 graduates (Table 21). It is reasonable to expect an improvement in both knowledge and the application of knowledge in ethical issues with practical experience, yet the 1994 graduates were rated higher in this area; therefore the possibility exists that the educational programs have increased the amount of time or emphasis placed on ethics. This would be consistent with a threefold general trend in health care: more consideration of ethical issues, the change in referring to "clients" rather than "patients," and a focus on client-centred care.

As shown in Table 27, there were clearly areas where the supervisors considered either the 1994 or the 1992 graduates stronger. Some differences are easy to explain. Supervisors listed Knowledge Base and Lifelong Learning more often for the 1992 graduates. This makes sense because they have had time to take more postgraduate courses, read more articles, discuss more issues with their peers, and generally increase their knowledge base.

Supervisors rated the 1994 graduates higher in Problem-solving Skills (Table 27). It might be that the 1994 graduates have to do more problem-solving, whereas the 1992 graduates, due to their greater experience, are "experts" and have no need to problem-solve. This is consistent with current thinking about the differences between novices and experts: that what is important is content knowledge and therefore experts have no need to problem-solve; they have seen the situation before and can use a nonanalytic decision-making process based on pattern recognition. These graduates recall whole prior episodes and can also simply recall what solution is appropriate to the situation (Norman, 1988; Regehr & Norman, 1996).

A few differences were also noted between what graduates of the two cohorts reported. Teaching and critical thinking were listed more often as strengths by the 1992 graduates (Table 24). This is reasonable, since they have had more experience at working and would be more likely to have taken courses, provided in-service sessions to their peers, and been involved in other sessions in their workplace which would have improved their teaching ability, as well as more involved with supervising students. Critical thinking, as defined in the questionnaire, was the ability to identify the issues that are pertinent to a problem. This would be related to their experience and the fact that as "experts" they would be able to see the issues more clearly than the newer graduates.

The 1994 graduates listed Organization Skills as a strength more often than the 1992 graduates (Table 24); supervisors also listed this as a strength of the 1994 graduates (Table 27). At the same time, supervisors mentioned caseload management as a weakness (Table 36). It is difficult to understand how the graduates could be strong in time management, yet not be able to effectively carry a full caseload.

MT was listed as a strength more often by 1994 graduates, though the numbers were small (Table 24); however, it was listed more often as a weakness, with 27% of 1994 graduates and 16% of 1992 graduates mentioning it (Table 33).

As mentioned in the last chapter, a greater number of weaknesses were reported by only the 1994 graduates (page 116). It was also noted that supervisors of 1994 graduates mentioned more topics than supervisors of 1992 graduates (page 119). This is consistent with previous studies that have shown that more recent graduates tend to report more weaknesses than those who have been working for longer periods of time (Woodward & Ferrier, 1982).

As well as 1994 graduates listing more weaknesses, there were nine areas where the preponderance of graduates mentioning a weakness were from 1994 (Table 34). The top four areas mentioned were: Treatment & Progression of Treatment; MT Skills; Insurance & Legal Issues; and Integration & Complex Patients & MVA patients. Of these four, three are not surprising. MT skills is still considered a post graduate skill, though basic levels are covered in all programs. This topic will be revisited later in this chapter. Few students would have had the opportunity to deal with insurance agencies or write any letters related to legal matters; these would certainly have been dealt with by their supervising therapist. In fact, student placements are so short that it is unlikely that any opportunities would have arisen among their clients.

Integration and dealing with complex patients is another learned skill. It is one thing to deal with a client who has a single injury, but dealing with patients who have multiple injuries is more complex. This requires strong skills in integration of the three main functional areas (MSK, neurology and cardiorespiratory), as well as a strong ability to prioritize the needs of the patient. Since complex injuries tend to be more severe, it is also likely that many of the graduates had not seen patients of this type in their student placements, or had not been able to follow the patient for much of their hospital stay. Students are provided with less complex situations until they show readiness to deal with more complex issues. Since students may have only one placement in a particular setting, they may never reach the point of dealing with complex patients. This practice is in line with research related to problem-solving that indicates that students "organize their knowledge in long-term memory according to clear examples, referred to as prototypes and prototype function is fostered by limiting their initial exposure to typical or representative disorders in each category (or system) rather than presenting the broad spectrum of disorders" (Bordage, 1986 and Bordage & Zacks, 1984 as quoted in Spooner et al., 1986b).

The fourth topic mentioned more often by the 1994 graduates was Treatment & Progression of Treatment. A typical comment was "At the time of graduation I had a lot of difficulty with treatment progress, discharge goals and planning. I think this was due to the fact that placements were only four weeks [long], which is insufficient to follow through with patients." More than one graduate said that they could assess well but then could not proceed from there: [Too] "much emphasis was placed on assessments (i.e., ortho, cardio, neuro) but I don't feel that enough instruction was given [regarding] choosing treatment programmes." Since supervisor lists of weaknesses did not distinguish between the 1992 and 1994 graduates, and the

1992 graduates did not mention the Treatment & Progression of Treatment areas as often as the 1994 graduates, we could safely assume that this problem resolves itself within about four years of graduation.

Considering the various comments by the respondents, there are few notable differences between the cohorts. A greater number of weaknesses are reported by both the 1994 graduates and their supervisors, but many of them are listed only a few times. Overall, the supervisors did not distinguish between the cohorts in any area of weakness and the areas listed by graduates are often easily explained by a lack of experience and resolve readily with time. Similarly, most areas in which supervisors listed strengths in one cohort at a greater rate can be explained on the basis of experience. None of these areas were critical to the performance of the graduates. The only significant difference found was that of the ratings in the Ethics Scale by supervisors, which likely indicates an increased awareness of, and improvement in the teaching of, this topic.

Manual Therapy and Specialization

A significant proportion of all three respondent groups suggested the addition of MT to the programs, as well as indicating that advanced levels should be required for entry level practice. This section will discuss both the place of specialization and MT within the physical therapy profession and their place in entry-to-practice-level educational programs.

PT is at a point where a major change in the thrust of professional practice is occurring. The role of the therapist is changing from being almost exclusively a clinical practitioner role to one that includes, among other things, more consulting work, more direction of staff who are able to carry out simpler tasks (i.e., the use of the PTA), and a clinical shift to carrying out

treatments which require a higher level of skill. What does this mean to the educational programs? One of the questions being discussed at this time is specialization: should educational programs be graduating generalist therapists or should graduates be equipped with more extensive specialized knowledge in one area? Although it is possible to become a specialist in any of the three major clinical areas (cardiorespiratory care, neurology or the MSK field), specialization will be discussed by looking at respondents' views on MT.

MT was chosen for inclusion in the questionnaire because it was the only specific treatment skill which was mentioned by graduate and supervisor participants in the FGIs; faculty members did not mention any one clinical technique. MT is a treatment area with a longer history than other currently promoted treatment techniques. There has been, for many years, a formalized program leading to certification as a Manual Therapist available in both Canada and the United States. In Australia, there is a graduate degree specifically focused on MT. As well, over half of physical therapy practice is related to orthopaedics (ACT, 1996 p. 11; Alliance of Physiotherapy Regulatory Boards, 1997 p. 3-4; Parker-Taillon, Cornwall, Cohen, & Rothman, 1992), a large proportion of jobs are in clinical settings where these skills are important (both private practice clinics and as out-patient departments in hospitals), in addition to which considerable time is already spent on orthopaedics in the undergraduate programs.

The first step is to consider whether the current level of MT knowledge upon graduation is sufficient. What were the respondents' thoughts on MT? Over half of the faculty believed that graduates should have at least E2V2 level skills (Table 54). Graduates and supervisors did not have quite as high expectations; over half of each group chose E1V1 as a minimum standard. However, a quarter of each group did select E2V2 as the choice for basic entry-level practice.

As one graduate wrote, "I don't think I was unprepared for my work in orthopaedics. I am however, under prepared given that we as new grads must compete with therapists having Part A & B skills as well as chiropractors. I am suitably prepared to treat 80% of the clients who are in my clinic but industry changes could seriously affect my ability to treat spinal patients without having manipulative skills." Another graduate had a slightly different view, stating that on graduation she felt a "lack [of] MT skills," and that the program adopted "too simplistic [an] approach to orthopaedic assessment." There is much ambivalence on this topic, and another graduate provided an opposing view: "I find that E1V1 / E2V2 etc. are fine to be learned post graduation (maybe it would be too much to grasp on top of everything else to learn – we need to learn the basic first which is the school education goal. Then it is up to the graduate to choose post [graduation] courses)."

Overall, the opinion of the respondents adds up to a suggestion for a greater level of MT skill than graduates currently have on completion of their programs while maintaining generalist programs.

What were the thoughts of the respondents on specialization? Very few felt that specialization should be the focus of undergraduate programs (Table 53). Over 90% of faculty felt that a generalist focus should be maintained. Graduates were split on this topic, with 50% saying generalist and 41% indicating they were not sure. Supervisors leaned towards generalist, with 75% selecting this option. These results give the impression that a generalist program is preferred.

The next step is to ask whether specialization might be in the best interest of the profession. When the amount of knowledge possessed by the profession is greater than one

practitioner can learn and use, then specialization will tend to happen (Moore, 1970), even if this is an informal process. Many therapists currently do consider themselves a specialist in one of the major clinical specialties. This may occur as a result of their job placement or out of interest in a particular area. As Moore states, "valiant resistance to specialization can only result in growing incompetence relative to changing standards set by superior performers" (1970 p. 81). If the body of knowledge in physical therapy can be learned and applied by all practitioners, then specialization is not necessary. All health professions have had an exponential growth in their knowledge bases during the latter part of this century and physical therapy is no exception. It would be hard to argue that any one therapist could learn all there is to know related to physical therapy practice. Following this train of thought, specialization is inevitable.

This brings us back to the questions of where physical therapy is as a profession and what is required by the workplace. With the cutbacks in the hospital sector, more therapists are going into private practice or independent work situations. Direct access allows the public to walk into a clinic without a medical referral. Therapists must be able to do very thorough assessments and carry out appropriate treatment. Fewer than one-third of the supervisors listed strong assessment skills as the reason that graduates were ready for direct access (Table 47). If having the MT skills would allow a more comprehensive and accurate assessment, perhaps further exposure to these techniques in school is appropriate. On the topic of direct access, one graduate stated that "With my [post graduate] manual therapy courses I feel I can pick up the red flags and refer on as needed." What if this graduate had not taken MT courses? Would she still have been able to pick out clients for whom physical therapy was not appropriate?

Even in hospitals, with the change to program management there is often no direct physical therapy supervisor and new graduates have fewer opportunities to develop a supportive relationship with other, more experienced, therapists. This decreases the ability of new graduates to obtain information in a timely manner and could affect their treatment decisions. And, while the programs included in this study are all in Ontario, our graduates often move to other parts of the country, where skill levels may be superior. One graduate mentioned that her "first job out of school was in private practice in Edmonton working with University of Alberta grads (who are E3V3 level) and I felt that I was unable to provide treatment to my patients that would benefit them the most due to my sub E1V1 knowledge level (especially back / cervical patients)." Another graduate had similar comments regarding her level as compared to University of British Columbia graduates and at one FGI a supervisor bluntly stated he would not hire a new graduate who had not completed at least E2V2, and preferably E3V3 MT courses: specialization was expected. One supervisor supported this opinion, stating that "It takes years to become proficient in MT and all new grads are unprepared for theory versus real-life."

Within hospital settings, therapists are becoming more focussed in one clinical area. Many hospitals no longer have rotating positions, where all therapists spend 4-8 months on one service and then rotate to another service. This type of rotating position allowed new graduates exposure to the full range of clinical practice present in a hospital (eg., neurology, surgery, medicine, outpatients). With program management, therapists are more likely to be hired onto one service and to stay there for a prolonged period. When applying for such a job, it would be in the graduates' best interest to be able to state that they have a specialty that is appropriate for that service. At the same time, if a job is not available in their specialty area then a generalist

background leaves open more possibilities for employment. It can also be argued that until graduates have had a chance to work in multiple settings, they are not in a position to select a specialty area. Work experiences may change their minds about which area is of most interest. A similar situation, with the tug-of-war between generalist and specialist education has been present in nursing for some time; educators wanting to prepare graduates with a broad education, while employers wish to hire nurses who have specialist skills appropriate to their particular setting (Bajnok, 1998).

While maintaining a broad-based generalist education is important, it seems that, for the health of the profession, allowing for advanced preparation in an area of interest to the student would be beneficial. With a large focus of professional clinical work being in the MSK area, a higher level of MT skills for entry level practice would also be of use.

Business / Management Skills

Business skills were the second area that both graduates and supervisors suggested be included as a prerequisite and that all three respondent groups suggested adding to the educational programs. The great increase in private practices and consulting work means that fewer new graduates are entering what used to be considered traditional entry-level jobs: rotating hospital positions. Such positions have all but disappeared from many hospitals. Over one-third of new graduates reported a private practice clinic as their primary place of employment, and a further 28% reported this as their second or third job. In total, over 60% of new graduates are working at least part time in clinics. Respondents suggested that graduates are not prepared for the business aspects of these jobs.

One supervisor remarked that the graduate was "unable to rationalize clinical expenditures / capital equipment purchases." A faculty member pointed out that when asked to assess and provide documentation regarding insurance claims, a "new graduate [is] unsure of ethical, legal issues and appropriate documentation. Lack of standardized reporting has ramifications for [the] individual and for [the] profession. [A] new [graduate] is not prepared for these pressures." Graduates had many comments along these same lines; they are not prepared to run a business.

Other physical therapy groups are also indicating that this is an area for development. The Westgate Division of the OPA, in their 1998 Annual General Meeting, listed five areas which they felt should be a priority for the attention of the OPA. One of these was "to change physiotherapist's focus from clinician to entrepreneur" (Basilio, 1998). Business and management skills would be skills needed by entrepreneurs. Physical Therapy is not alone in needing more knowledge in the business field. The business of health care is affecting the practice of health care and as such is an important consideration for all health professionals. The majority of physicians are self-employed and graduates of at least one medical school mentioned in a study that their Practice Management skills were weak (Woodward & Ferrier, 1983). In an effort to deal with this situation, 12 of the 16 Canadian medical schools have instituted a Practice Management Curriculum (Faloon, Smith, & O'Neill, 1998; Smith, Khan, Faloon, & O'Neill, 1998).

Another aspect of business / management skills is the ability to supervise others. This is not only important in private practice, but with the increasing use of PTAs, supervision of other staff has become an everyday activity for PTs. With the increasing use of PTAs in hospitals and

other health-care facilities as a means of increasing treatment time while keeping costs down, new graduates will frequently be in a supervisory position. All three respondent groups mentioned the inability of the new graduates to adequately use the services of a PTA. One supervisor noted that the "lack of knowledge of supervision of PTAs resulted in misuse & disuse of personnel creating personnel conflicts." The problem with supervising PTAs appears to be more pervasive than simply the inexperience of the new graduates. A recent survey sent to PTAs who graduated from one PTA program in Toronto, Ontario, inquired about the tasks PTAs were trained for and the tasks which they were assigned to perform. (Apostolatos & Paulenko, 1998). PTAs reported they were trained to perform 15 of 23 assessment tasks, 27 of 36 treatment tasks and 15 of 17 administrative tasks listed in the survey; however, PTs were only assigning the PTAs 5 of the 15 assessment tasks they were trained for, 18 of the 27 treatment tasks they were trained for and 12 of the 15 administrative tasks they were trained to carry out. This clearly indicates that therapists in general are inadequately informed of the level of training PTAs receive and the tasks they are able to perform. Supervision is then a problem for all therapists, not just new graduates.

How much business or management knowledge is expected of a new graduate? The curriculum document under which the therapists surveyed in this study would have been educated, (Canadian Physiotherapy Association, 1985) mentions little in this area, stating only that graduates are expected to be able to discuss the principles of management. Using this as a guideline would suggest that business skills are not expected of new graduates. More recently, the revised Entry-Level Curriculum for Canadian Physical Therapy Programs (The Council of Directors of Physical Therapy Academic Programs and the Canadian Physiotherapy Association,

June 1995 Section 5.2, p.3) states that "skills and behaviours in administration and management are developed and refined with experience gained following graduation, and are not expected to be well developed in the entry-level practitioner." It goes on to say that new graduates are expected to know where to find information, mentors and resources related to administration and management functions. It clearly states that management skills are not expected to be well developed in the entry-level practitioner. (The Council of Directors of Physical Therapy Academic Programs and the Canadian Physiotherapy Association, June 1995 Section 5.2.2.2). It would appear that business skills and supervision skills are areas where supervisors and new graduates may have higher expectations than is reasonable.

Competency profile of entry-level physical therapists

A recent publication "Competency profile for the entry-level physiotherapist in Canada" (Canadian Alliance of Physiotherapy Regulators, Canadian Physiotherapy Association, and Canadian University Physical Therapy Academic Council, 1998) outlines the competencies expected in a new physical therapy graduate. This publication was a result of a study overseen by the three main physical therapy organizations in Canada (who were also the publishers of record). In 1997, after the study presented in this thesis had been designed and carried out, the three professional bodies collaborated to develop this competency profile. Thirteen potential applications for the profile are listed in the introduction (p. 1), including use as a self-evaluation guide for physiotherapists, as an aide to developing and assessing basic standards of practice, as an aid in developing entry-level curriculum standards for the profession, and as a description of

performance standards for entry-level practice. The list of these applications indicates that the profession is interested in research to determine whether new graduates are at the expected level.

Many topics that were raised by the focus groups in the present research and others that were raised in the questionnaires were also listed in the profile. In some cases, this thesis indicates that new graduates are at the level specified in the competency profile, while in other cases they are not. The questionnaire used in the present research did not cover all the topics listed in the competency profile, so a full comparison is neither possible nor within the scope of this thesis; however, a few comparisons will be made.

One assumption in the competency profile is that therapists will maintain competencies by building on their specialized body of knowledge (p. 3) and that therapists will show a commitment to lifelong learning and professional development (performance criteria 1.4.2). No minimum standards are outlined in the profile. Results presented in this thesis show that the vast majority of graduates do continue to read journal articles (Table 51) and continue to take postgraduate courses (Table 52). Performance criteria 2.3.1 states that evidence-based assessment methods should be used. Respondents in the present study agreed that evidence-based practice was a strength of the new graduates in this study. Performance criteria 2.3.4 indicates that standardized tests are to be used where available. The first step in using standardized tests is knowing they exist. Outcome measures are standardized tests. The majority of graduates in this study were able to list four or more outcome measures (Table 48). These comparisons show some areas where new graduates are within the stated competency profile.

Two areas mentioned in the profile are not seen is such a positive light. One performance criterion states that entry-level therapists should be able to reassess the client and modify the treatment accordingly (4.2.7). However, respondents in this research indicated that many new graduates had problems with progression of treatment. In addition, one of the two weaknesses mentioned by all three respondent groups, manual therapy, is listed in performance criteria 4.1.3. The cue[2] to selecting appropriate interventions states that interventions may include manual therapy techniques, including manipulation. If manual therapy and manipulation are considered entry-level skills, then it would be reasonable to expect new graduates to be able to use these techniques in their treatments. Yet, not only did respondents make it clear that this was an area of weakness, but the College of Physical Therapists of Alberta is currently funding a study to determine the specific competencies needed to safely perform spinal manipulation (College of Physical Therapists of Alberta, 1998). It may be that advanced levels of training are required before a PT is competent to use these techniques. The Alberta study may provide evidence that the educational programs need to increase the amount of instruction in this treatment technique so that graduates will meet the expectations of the competency profile.

The collaboration of the three PT organizations in producing this competency profile shows the commitment of the profession to defining standards for new graduates. The profile provides a framework for further study of new graduates.

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[2]Cues are provided in the competency profile to provide examples of how to apply certain performance criteria to actual practice situations.

Summary of Findings

The strengths identified in new graduates which can be attributed to the educational programs are EBP, Knowledge Base, Lifelong Learning, MSK Clinical Specialty and Problem-solving skills. Other areas of strength identified include enthusiasm, which is likely inherent to any new graduate, and interpersonal skills, communication skills & rapport, which the graduates most likely possessed before entering the programs. While many weaknesses are listed by the respondent groups, there is little consensus, and the majority of the items listed simply relate to lack of experience. The only two topics on which the respondents agree is the need for more Manual Therapy Skills and Business Skills.

When the groups are compared, the three respondent groups clearly differ in their ratings of most areas, with the graduates rating themselves the lowest and supervisors giving the highest ratings in most cases. In spite of this, the three groups are in reasonable agreement on the top strengths and the areas needing most work. University differences do exist, with each university having one or more areas of strength relative to the others. Only one difference among the universities is noted with respect to a weakness. As for the two cohorts, the more recent graduates and their supervisors list a greater number of weaknesses than the group with more experience. Most of the items listed as weaknesses were only mentioned by a few respondents. In the strengths, some items were listed by larger numbers of supervisors and differences between the cohorts have a rational explanation related to experience. None seriously affected the performance of the graduates. One difference was found in the scales, where supervisors

rated graduates of the two cohorts differently on the Ethics Scale, favouring the more recent graduates.

Overall, the majority of graduates are "up to speed" in about one year.

Chapter 7 – Conclusions

Recommendations and Suggestions for Further Research

Since the majority of the weaknesses that were listed related to lack of experience, the first recommendation is that programs do not decrease the clinical hours component of their programs. If possible, increasing the time spent in clinical situations would be beneficial. This would help to improve both the graduates' confidence and skill levels. One way of providing additional clinical time would be to institute a short residency period of four to six months. A residency period would allow graduates a chance to assume greater responsibility than they were given as students and at the same time provide supervision that would help them through the initial adjustment period in the work setting. In Ontario this is close to the current situation. The majority of graduates finish school in the spring, usually June, yet can not sit the Physiotherapy National Examination until the Fall, and do not receive the results until approximately 12 weeks later, in late December. During this six-month period, graduates work under a supervised license.

Since either increasing the time spent in clinical placements or adding a residency program have financial implications for both universities and clinical sites, it would be important to assess the impact of either of these changes on the perceptions of the graduates and supervisors of the graduates' readiness for professional activities. Repeating a survey similar to the one reported here and comparing the results would be one way of assessing change.

The second recommendation is that the amount of Manual Therapy included in the entry-level programs be increased to a minimum standard of E1V1, with serious consideration given to reaching E2V2 levels of skills. Along with this, once the basic knowledge has been covered, it is recommended that an option be made available for students to take advanced courses in an area of interest to them. As with the first recommendation above, evaluating the outcome of increasing the Manual Therapy coverage within the educational programs would be advisable. Again, a survey of both graduates and their supervisors regarding graduates' strengths and weaknesses would help to ascertain whether there has been any change in the respondents' perceptions of a weakness in this clinical area.

The perceived lack of skills in the business / management area also needs to be addressed. It is important to consider how much knowledge in this area is necessary, given that there are professionals with commerce degrees who can be consulted on business matters. Since the current curriculum guidelines state that new graduates are expected to know where to find information related to administration and management functions, a reasonable option would be to institute a survey course to introduce students to relevant topics. With that as a base, they would be able to pursue whatever further knowledge and experience was appropriate for their particular situation. Prior to the addition of a course it would be advisable to identify areas that are of particular concern to the stakeholders. Are supervisors concerned with graduates' abilities to supervise and work with PTAs? Is one issue the ability to rationalize clinic expenditures? Is dealing with third-party insurers something new graduates need to be able to do? What legal issues related to advertising or malpractice insurance are important to independent or clinic practitioners? These, and many other topics, might be appropriate to include in such a course.

Identifying relevant topics could be done by focus groups or surveys with supervisors and graduates.

On a more global level, it is imperative that programs institute, or continue with, programs that monitor new graduates. It is most important that the information gathered be used to both inform future curriculum changes and evaluate previous changes. Some past surveys have focussed on specific features of a particular program, such as what graduates thought about a particular course. While course evaluation is one aspect of program evaluation, a broader perspective that addresses whether a program has prepared graduates for their professional lives would be a much-needed addition to the literature on program evaluation. In Lederman's study (1990), major curriculum changes had not led to any change in what graduates reported as their strengths and weaknesses. Flinders (1986) took the concepts of explicit and implicit curricula from Elliott Eisner. The explicit curriculum is the publicly announced program of study. This is what we presume is being measured when we ask graduates and other stakeholders to evaluate the program of study. In fact, it may be that the implicit curriculum, the values and expectations that are not included in the formal curriculum, but are learned by students, has a greater effect on the ultimate ability of graduates to adapt to the work environment. Continued work in evaluating the effect of change in the explicit curriculum, as well as an effort to identify components of the implicit curriculum, would be a welcome addition to program evaluation literature. The "Competency profile for the entry-level physiotherapist in Canada" (Canadian Alliance of Physiotherapy Regulators et al., 1998) can be used to provide a framework for future studies of graduate readiness for professional activities.

Finally, a number of questions arise out of this research that could be investigated for further understanding of both the development of competence and the validity and reliability of self-ratings. One of these questions would involve considering precisely how long it actually takes graduates to gain the experience needed to meet the expectations of the workplace and be "up to speed." Repeated surveys of graduates and their supervisors at short intervals after graduation and following them for 6 — 12 months would help to determine how long it takes new graduates to adapt to the work situation and be optimally productive. This information could then be used to inform the decision-making process regarding a suitable residency period.

Other questions worth addressing: Does age, gender, previous degree, or work experience of the graduate have a relationship to their feelings of competence and their self-ratings? For the graduate and supervisor pairs, do the graduate and supervisor ratings correlate with each other? Do male and female supervisors or faculty members have the same opinion of the graduates? Do the graduates' current work settings (inpatients, clinic, etc.) or their evaluation of their clinical placements as students affect either their self-ratings or their supervisor ratings? Re-analysis of the current data could address some of these questions.

Limitations of the study

This study has certain limitations. While one-third of the national Physical Therapy Programs were included (4 of 13 national programs), all four programs reside in one province. Each Physical Therapy Program could well be educating students for the needs of the local community. All the graduates included in this survey studied in Ontario, yet some are working in

other provinces or other countries. It could not necessarily be expected that their education would meet the needs of the health care systems in other locations.

Since three of the universities accepted applicants from high school along with applicants who had some university experience, up to and including graduate degrees, their incoming students would have a broad range of educational backgrounds. It might be expected that graduates who were at different levels on entering the programs would take away different amounts of knowledge at the end. Research into learning suggests that new learning must be added on to an existing knowledge framework for the new knowledge to be integrated. Those students coming in with higher levels of education would have a greater likelihood of having enough previous knowledge in relevant areas to make learning the new information easier. At the end of the program, it might be expected that those who entered at different levels would also exit at different levels. This possibility was not tested for in this thesis.

In the statistical analysis, many comparisons were done to investigate differences among the respondent groups (by year, by university and by faculty, graduate or supervisor). It is possible that some of the statistical analyses reached significance by chance. In spite of this, the analytical data created a picture that made sense. As discussed in the results and discussion sections, patterns of responses across the three respondent groups were similar and could be logically explained.

In the use of any questionnaire there is an assumption that respondents will give honest, correct answers to the questions. However, in any situation where a subjective opinion is used as the basis for a rating, there is some potential for bias to influence the responses. Since respondents approach the questionnaire from different perspectives, their responses may not be a

totally accurate reflection of the situation (Streiner & Norman, 1995). Different types of bias could have affected the results of this research, systematically affecting ratings either positively or negatively.

The questionnaires asked graduates for a self-report. Graduates attended particular programs and, having spent two to four years at that university, could reasonably be expected to have positive feelings about their program and about the education and preparation they received. Faculty members' opinions may also be based on a feeling that "my university is good, so I/ the graduates must be good in this area." This would have affected all graduates and faculty members in the same way and might have led them to systematically overrate the abilities and strengths of the graduates or downplay their weaknesses. Supervisors would be less likely to have a leaning in favour of a particular university, yet they might, in some cases, be graduates of the same university as the graduate they were evaluating, and so might tend to rate the graduate higher. This potential bias was addressed in the methodology by triangulation; including three respondent groups, to aid in determining graduates' strengths and weaknesses. Since all three respondent groups listed the same strengths and weaknesses, this type of bias was not a confounding factor in the results.

Another possible source of bias for the supervisors would be any previously existing opinions they had concerning the university. This type of bias could affect even supervisors who had not graduated from any of the programs included in this study. The general PT population holds opinions about the quality of each PT program and harbours expectations for the graduates of each program. These perceptions, which may or may not represent the truth, are openly discussed among therapists, and hence would be familiar to all local supervisors. This could

conceivably lead supervisors to report what they expected to see, i.e., the strengths and weaknesses as perceived by the PT population, rather than those actually observed by individual supervisors in individual graduates. For example, one supervisor made it clear that, in general, she did not like the graduates from a particular university, and listed the reasons for her opinion. She then went on to say that the particular graduate she was asked to evaluate rated highly and was not like other graduates of that university. When all the data had been analyzed, the perceived weaknesses seen in graduates of this university, as listed by this supervisor, were not supported by the data. This supervisor may have been in contact with one or two weaker students or graduates who coloured her opinion, or may have been influenced by a broader perception of that university that was ultimately not supported by the data.

Examining the effect of previously held perceptions on supervisor ratings might be possible in a future study by comparing results from local supervisors and supervisors from other locations. In this study the number of supervisors from outside Ontario was too small to allow this analysis to be done.

The time factor in the relationships between graduates and their supervisors may have led the supervisors to different perceptions of the graduates' ability. The questionnaire did not ask whether this was the graduate's first job, their second, or even their third. Even where graduates were still in their original jobs, their duties might have changed since starting the job or they might have changed supervisors. This was more likely to be true for graduates who had been working close to four years. Supervisors had also known the graduates for varying lengths of time, and there were a few supervisors who were not physical therapists. The questionnaire asked each supervisor for an assessment of the graduate at the time of the survey. A supervisor

who had not seen the graduate directly out of school, but had met the graduate a year or two later, could have seen a more confident and more polished graduate and therefore might have rated the graduate more favourably. Supervisors who were rating graduates still in their first job might have been influenced by their recollections of the graduates in the earliest weeks of employment. Detailed questions regarding the graduates' employment history and their relationship with the supervisor were not asked in this study.

Time distorts memory. The further away we are from an event the hazier the picture. Graduates who were further from their educational experience might have forgotten certain details or dwelled on others so they were remembered better. These graduates' comments about their programs might then be suspected of being slightly less accurate than those of more recent graduates. In spite of this possibility, there were remarkably few differences in the opinions of the two cohorts. This is in agreement with studies mentioned earlier (pages 21 to 24), which have also shown little difference in graduate opinions over time.

Inclusion criteria for faculty respondents stated that the faculty member must be a PT and must have been at the university for over one year. As the graduates had left the programs up to four years earlier, some of the faculty respondents had not been at the university when these particular graduates were present as students. It would be impossible for these faculty to evaluate those specific cohorts of students. An assumption was made by this researcher that after one year at a program, faculty would have a good feel for the quality of the program and the graduates. Faculty were not asked to evaluate the specific cohorts of graduates included in the study. Still, faculty who had a longer history at a university might well remember some or even many individuals in the particular cohorts included in this study. Their opinions might have

proved more focussed and accurate. While the number of faculty in these programs was too small to allow for this type of subanalysis, faculty responses appeared to be cohesive and were similar to those of the other respondent groups.

Conclusions

Recent graduates from the four physical therapy educational programs that participated in this project entered the workforce reasonably able to take on professional activities required of them in their first jobs. Each university had at least one area of greater strength relative to the other programs. Some of the differences among the universities appear to be related to the PBL curriculum that is used by one program. Respondents noted weaknesses in many areas, more so in the more recent graduates, but these weaknesses were generally not verified by a second respondent group. Graduates tended to be "up to speed" in about 6 — 12 months of practice. A need for greater knowledge in the areas of Manual Therapy and Business / Management Skills was reported. Recommendations included increasing the content covered in these two topics, as well as continuing follow-up studies with graduates and using the information gained from these studies to both evaluate and inform curriculum changes.

To summarize the areas in which this thesis has contributed to the literature: 1) The results contribute to the literature on curriculum evaluation by showing that different curricula do lead to different strengths and weaknesses in the graduates of PT programs. The most notable differences are related to the PBL curriculum, and are similar to those differences noted in the medical education literature. 2) A questionnaire has been developed that is focussed on identifying strengths and weaknesses of graduates as related to their specific work environments.

This questionnaire was tested on respondents from four PT programs and is now available for use by any program wishing to conduct a detailed follow up survey of its graduates. 3) Finally, a detailed list of strengths and weaknesses of PT graduates has been identified and verified by obtaining the opinions of three respondent groups (graduates, their supervisors, and faculty). This list has led to specific recommendations to the PT programs involved, recommendations that may also be generalizable to other programs not directly involved with the study.

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Appendices

Appendix 1 — Areas addressed in alumni surveys

Whipple & Muflo (1982) Theoretical discussion of what to include	Thomae-Forgues (1983) senior medical students	Woodward and Ferrier (1982) medical graduates	Woodward and Ferrier (1983) medical graduates	Moden and Williford (1988) all university graduates
amount of structure in the curriculum (flexible/rigid)	basic sciences	amount of class feeling	basic science information	ability to think analytically
attention to programs (undergraduate/ graduate emphasis)	behavioral sciences	anxiety level created	behavioral science information	ability to use the political process, organize and supervise the work of others
enrichment activities (available/unavailable)	care of ambulatory patients	clinical teaching	clinical science information	acquire new skills and understanding
evaluation procedures (fair/unfair)	care of hospital patients	early patient contact	data-gathering skills	apply knowledge from the major field to new problems
faculty orientation to student needs (concerned/indifferent)	care of the elderly	electives	diagnostic skills	be sensitive to the feelings and perceptions of others
faculty attitudes (indifferent/dedicated)	clinical sciences	evaluation system used	drug effects	communicate orally
framework of the program (theoretical/practical)	diagnostic skills	faculty advisor	follow-up medical care	convey meaning through artistic and creative expression
level of program (easy/difficult)	drug effects and clinical pharmacology	faculty commitment	in-patient care	cope with complex moral and ethical issues

Whipple & Muflo (1982) Theoretical discussion of what to include	Thomae-Forgues (1983) senior medical students	Woodward and Ferrier (1982) medical graduates	Woodward and Ferrier (1983) medical graduates	Moden and Williford (1988) all university graduates
orientation of course work (detailed/general)	education	flexibility of the program	medical emergencies	evaluate and choose between alternative courses of action
overall satisfaction (very/not at all)	emotional problems	independent study	medical record-keeping	formulate original ideas and solutions
preparation for professional life (not/very helpful)	interviewing skills	learning resources available	practice management skills	place current problems in historical, cultural and philosophical perspective
program's match to student abilities (challenging/not challenging)	management of patients' socioeconomic problems	lack of definition of core material	preparation for independent learning	use the computer as an analytical tool
providing credentials for employment (emphasized/ignored)	medical care cost control	mix of students	preventive care	write well
quality of Academic advising (low/high)	medical record-keeping	problem based learning	problem solving	
quality of instruction (high/low)	nutrition	self-assessment / evaluation	public health information	
quality of vocational counselling (low/high)	patient follow-up	self-directed learning	research techniques	
required courses (integrated/unrelated)	practice management skills	small group tutorials	self-evaluation techniques	

Whipple & Muflo (1982) Theoretical discussion of what to include	**Thomae-Forgues (1983) senior medical students**	**Woodward and Ferrier (1982) medical graduates**	**Woodward and Ferrier (1983) medical graduates**	**Moden and Williford (1988) all university graduates**
student/faculty contact (impossible/possible)	preventive care		social-emotional problems of patients	
student Attitudes (indifferent/dedicated)	public health and community medicine		therapeutic management	
texts and instructional materials (poor/good)	research techniques			
value of program (worthwhile/useless)	self-evaluation and independent learning			
variety of courses offered (few/many)	team work with other health professionals			
	therapeutic management			

Appendix 2 — Letter to universities confirming their participation

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FAX: 905-677-1639 (c/o Irwin Nayer)

DATE

FIELD(Name)
FIELD(Title)
FIELD(University)
FIELD(Address)

Dear FIELD(Salutation),

This letter is to confirm our earlier discussions regarding your participation in my thesis research. I will briefly outline the proposed research.

The question to be addressed in this research project is: What are the strengths and weaknesses of physical therapy graduates? This question will be approached from three directions. A mail survey will go out to recent graduates, asking them for their perceptions of their readiness for professional activities. Supervisors of the graduates as well as clinical faculty at the participating universities will be surveyed with parallel questionnaires.

To help develop the questionnaire, focus group interviews will be conducted with the education committees, and any other interested faculty members, at the participating universities. These interviews will basically ask what the faculty feel are the strengths and weaknesses of their graduates, and what information they would want in order to help them evaluate the current curriculum? Focus group interviews with the graduates and clinical supervisors will explore the perceived strengths and weaknesses of the new graduates. The focus group interviews will be audiotaped and may be transcribed. Codes will be used, rather than names, in the transcriptions.

Once a draft questionnaire is developed, it will be returned to the education committees and participating faculty for review and comments. After the questionnaire has been revised, it will be pilot-tested on a sample of participants and revised as needed. The complete survey will include a sample of two cohorts of graduates; those who have been out of school for two and four years. Responses from the graduates and their supervisors will be paired for analysis purposes; however

individual responses will be anonymous. In the reporting process universities will be identified only by a code.

The purpose of the research is to provide useful feedback to the individual university programs, which may be used for evaluating the curriculum. I would like to emphasize that the purpose is not to rank the universities. You will receive a copy of the report once the data has been analyzed. If your faculty members decide that they would rather not participate in this research, they may withdraw at any time.

Should you have any further questions regarding this research, please feel free to contact me at any time.

Yours very truly,

Marla Nayer
BSc (Phys Ther), MEd, PhD (candidate)

Appendix 3 — Letter of invitation sent to clinical supervisors, graduates and faculty

(printed on OISE stationary)

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DATE

FIELD(First Name) FIELD(Last Name)
FIELD(Department)
FIELD(Hospital)
FAX: FIELD(fax)

Dear FIELD(First Name)

Your name was provided to me by KEYBOARD(reference). This letter is to invite you to participate in a focus group interview which will examine the strengths and weaknesses of recent graduates of physical therapy programs in Ontario. I will briefly outline the proposed research.

The question to be addressed in this research project is: What are the strengths and weaknesses of physical therapy graduates? This question will be approached from three directions. A mail survey will go out to recent graduates, asking them for their perceptions of their readiness for professional activities. Supervisors of the graduates as well as clinical faculty at the participating universities will be surveyed with parallel questionnaires.

To help develop the questionnaire, focus group interviews will be conducted with the faculty members at the participating universities. These interviews will ask what the faculty feel are the strengths and weaknesses of their graduates, and what information they would want in order to help them evaluate the current curriculum? Focus group interviews with the graduates and clinical supervisors will explore the perceived strengths and weaknesses of the new graduates. The focus group interviews will be audiotaped and may be transcribed. Codes will be used, rather than names, in any transcriptions.

Once a draft questionnaire is developed, it will be returned to the faculty members for review and comments. After the questionnaire has been revised, it will be pilot-tested on a sample of participants and revised as needed. The complete survey will include a sample of two cohorts of graduates; those who have been out of school for two and four years. Responses from the graduates and their supervisors will be paired for analysis purposes; however individual responses will be anonymous. In the reporting process universities will be identified only by a code.

The purpose of the research is to provide useful feedback to the individual university programs, which may be used for evaluating the curriculum. I would like to emphasize that the purpose is not to rank the universities.

The focus group interview for recent graduates will be conducted at the **University of Western Ontario, Elborn College, Room 1440, Monday July 24, 5:30 - 7:00 p.m.**

I would appreciate it very much if you would be able to attend. Please call me, collect, if you have any questions, or to let me know if you will be able to come to the group interview.

Should you have any further questions regarding this research, please feel free to contact me at any time.

Yours very truly,

Marla Nayer
BSc (Phys Ther), MEd, PhD (candidate)

Appendix 4 — Pre questionnaire focus group interviews

Introduction

Describe the purpose of the interview: To collect data to assist in the preparation of a survey tool which will be used to collect data from faculty, clinical supervisors and recent graduates. The tool will address the question "Are new graduates of physical therapy programs well prepared for their professional activities?"

Research Questions

How do graduates of the physical therapy programs perceive the effectiveness of their educational program?

How do faculty at the physical therapy programs perceive the effectiveness of their educational program?

How do clinical supervisors perceive the preparation of the graduates in terms of their ability to begin professional activities?

Issues

What are the strengths of new graduates?
What are the weaknesses of new graduates?
What changes might be recommended to the universities?
Are there areas in which the graduates are educated, yet are not able to put their education into practice due to constraints of the workplace or health-care system?

Focus Group Interview Guide — Graduates

1. Preliminaries
   a. Introduction - As the interviewer, I introduce myself. Provide a brief explanation of the research project and ground rules - eg. I am going to spend the next hour asking questions designed to get a picture of what you think is important in finding out how well the curriculum from your university has provided you with the skills you need in the workplace. The points raised will be incorporated into a questionnaire, which will then be used to collect data from clinical supervisors, faculty and recent graduates. I ask that you speak one at a time. Please regard this tape recorder simply as an extension of my memory, so that I can incorporate the points raised into the survey tool I will be developing. Everything you say is, of course, is confidential.

   b. Does anyone have any questions about how we are going to proceed?

2. Issues and Related Discussion Questions
   a. The first issue to discuss is what you feel were your strengths when you first started working.
      i. Let's begin by going around the table and making introductions. Tell me your name, when you graduated from ABC university, and what you are doing now.

      (allow interviewees to respond one by one)
      ii. You were asked to bring with you a list of three areas in which you felt strong and prepared for professional activities. Will you tell me about the one which stands out most as you reflect back on your early work experiences and explain why this particular activity was a strong point for you?

      (allow interviewees to respond one by one)
      Is there anything else you'd like to add?
      (allow interviewees to respond one by one)
      Summarize, then ask:
      Is there anything I have said that I ought to say differently?
   b. The next issue to discuss is what you feel were your weaknesses when you first started working.
      i. You were asked to bring with you a list of three areas in which you felt unprepared for your professional activities. Will you tell me about the one which stands out most and explain why you perceive this particular activity to be your weakness?

      (allow interviewees to respond one by one)
      Is there anything else you'd like to add?
      (allow interviewees to respond one by one)
      Summarize, then ask:

Is there anything I have said that I ought to say differently?

c. The next issue to discuss is whether there are areas in which you were educated, but found you were not able to put that education to use in your work setting.
   i. Are there areas in which you feel that you were educated but in which you are not able to put that education to use, due to constraints of the workplace settings?

(allow interviewees to respond one by one)
Is there anything else you'd like to add?
(Allow interviewees to respond one by one)
Summarize
Is there anything I have said that I ought to say differently?

d. The next issue is what *you* think I should be asking the new graduates.
   i. What questions do you think I should be asking recent graduates to find out whether or not they were prepared for their professional activities?
   ii. How would that question help to determine whether or not the graduates were ready for practice?

(allow interviewees to respond one by one)
Is there anything else you'd like to add?
(Allow interviewees to respond one by one)
Summarize, then ask:
Is there anything I have said that I ought to say differently?

e. The final issue is what changes you think might be required in the educational programs to ensure that future graduates are prepared for their professional activities.
   i. Based on what you remember of the program and what you have used from it since graduating, what kinds of changes, if any, would you suggest?

(Allow interviewees to respond one by one)
Summarize, then ask:
Is there anything I have said that I ought to say differently?

3. Closing
   a. Inform the participants that the interview is completed. Ask if there are any comments or questions related to the research project. Thank the participants for their time.

Appendix 5 — Grids for development of questionnaire
Grid — Graduate Version

Alphabetical Order

Merged topics from literature & FGIs, duplicates deleted	Item in the questionnaire which addressed this issue (Graduate Version)
Assessment skills	10a, 10b, 10h, 10m
charting/documenting skills	10mm
clinical placements	9
clinical reasoning	10d, 10i, 10n
communication	8a, 10gg
commitment	22, 23, 26, 27
confidence	10rr, 17, 19, 28, 29
critical thinking	10u, 10ee
critical appraisal	10ee, 10oo
demographics	1, 2, 3, 4, 5, 6, 7
electrotherapy	10s
enthusiasm	18, 27
ergonomics	10bb
ethics	10cc, 10dd
evidence based practice	10pp, 32
gerontology	10z
integration & problem solving	10t, 10u
interpersonal skills	8c, 10hh
knowledge - applied sciences	10y
knowledge - basic sciences	10x
leadership	8b, 24
learning curve	19

Merged topics from literature & FGIs, duplicates deleted	Item in the questionnaire which addressed this issue (Graduate Version)
library use & resources	10w, 32, 34
life-long learning	27, 30, 31, 32, 34
management skills	10jj
maturity	2, 3, 4
outcome measures	33
overall satisfaction	20, 21, 35, 36
pediatrics	10aa
preparation for practice	17, 20, 21, 25
priorization skills	10nn
problem solving skills	10t, 10u, 10ff
research	10ii, 15
role boundaries	28, 29
self-directed	10rr
self-evaluation	10qq
specialization (aspect of learning)	11, 12, 13
supervision	8b, 10kk
supervision of students	14
teamwork	10ll, 29
time management	10v
treatment progression	10g, 10l, 10q
treatment planning	10e, 10j, 10o
treatment	10c, 10f, 10k, 10p, 10x, 10s
writing skills	10ss

Numerical Order

Items in numerical order (more or less) (Graduate Version)	Topic addressed
1, 2, 3, 4, 5, 6, 7	demographics
2, 3, 4	maturity
8a, 10gg	communication
8b, 10kk	supervision
8b, 24	leadership
8c, 10hh	interpersonal skills
9	clinical placements
10a, 10b, 10h, 10m	Assessment skills
10bb	ergonomics
10cc, 10dd	ethics
10c, 10f, 10k, 10p, 10x, 10s	treatment
10d, 10i, 10n	clinical reasoning
10ee, 10oo	critical appraisal
10u, 10ee	critical thinking
10e, 10j, 10o	treatment planning
10t, 10u, 10ff	problem solving skills
10g, 10l, 10q	treatment progression
10ii, 15	research
10jj	management skills
10ll, 29	teamwork
10mm	charting/documenting skills
10nn	priorization skills
10qq	self-evaluation
10rr, 17, 19, 28, 29	confidence

Items in numerical order (more or less) (Graduate Version)	Topic addressed
10rr	self-directed
10ss	writing skills
10s	electrotherapy
10t, 10u	integration & problem solving
10v	time management
10w, 32, 34	library use & resources
10x	knowledge - basic sciences
10y	knowledge - applied sciences
10z	gerontology
10aa	pediatrics
11, 12, 13	specialization (aspect of learning)
14	supervision of students
17, 20, 21, 25	preparation for practice
18, 27	enthusiasm
19	learning curve
20, 21, 35, 36	overall satisfaction
22, 23, 26, 27	commitment
27, 30, 31, 32, 34	life long learning
28, 29	role boundaries
10pp, 32	evidence based practice
33	outcome measures

Grid — Faculty Version

Alphabetical Order

Merged topics from literature & FGIs, duplicates deleted	Item in the questionnaire which addressed this issue (Faculty version)
Assessment skills	12a, 12b, 12h, 12m
charting/documenting skills	12mm
clinical placements	8, 9, 10
clinical reasoning	12d, 12i, 12n
communication	7a, 12gg
commitment	23a, 23f, 23g, 23h, 23l
confidence	24
critical thinking	12u, 12ee
critical appraisal	12ee, 12oo
demographics	1, 2, 3, 4, 5, 6
electrotherapy	12s
enthusiasm	18
ergonomics	12bb
ethics	12cc, 12dd
evidence based practice	12pp
gerontology	12z
integration & problem solving	12t, 12u
interpersonal skills	7c, 12hh
knowledge - applied sciences	12y
knowledge - basic sciences	12x
leadership	7b, 23a
learning curve	19

Merged topics from literature & FGIs, duplicates deleted	Item in the questionnaire which addressed this issue (Faculty version)
library use & resources	12w
life long learning	23c, 23d, 23e, 23j
management skills	12jj
maturity	11
outcome measures	23i
overall satisfaction	20, 21, 22, 23k, 26
pediatrics	12aa
preparation for practice	17, 20, 22
priorization skills	12nn
problem solving skills	12t, 12u, 12ff
research	12ii, 23b
role boundaries	24, 25
self-directed	12rr
self-evaluation	12qq
specialization (aspect of learning)	13, 14, 15
supervision	7b, 12kk
supervision of students	16
teamwork	12ll, 25
time management	12v
treatment progression	12g, 12l, 12q
treatment planning	12e, 12j, 12o
treatment	12c, 12f, 12k, 12p, 12r, 12s
writing skills	12ss

Numerical Order

Item in the questionnaire which addressed this issue (Faculty version)	Merged topics from literature & FGIs, duplicates deleted
1, 2, 3, 4, 5, 6	demographics
7a, 12gg	communication
7b, 12kk	supervision
7b, 23a	leadership
7c, 12hh	interpersonal skills
8, 9, 10	clinical placements
11	maturity
12a, 12b, 12h, 12m	Assessment skills
12aa	pediatrics
12bb	ergonomics
12c, 12f, 12k, 12p, 12r, 12s	treatment
12cc, 12dd	ethics
12d, 12i, 12n	clinical reasoning
12e, 12j, 12o	treatment planning
12ee, 12oo	critical appraisal
12g, 12l, 12q	treatment progression
12ii, 23b	research
12jj	management skills
12ll, 25	teamwork
12mm	charting/documenting skills
12nn	priorization skills
12pp	evidence based practice
12qq	self-evaluation
12rr	self-directed

Item in the questionnaire which addressed this issue (Faculty version)	Merged topics from literature & FGIs, duplicates deleted
12s	electrotherapy
12ss	writing skills
12t, 12u, 12ff	problem solving skills
12t, 12u	integration & problem solving
12u, 12ee	critical thinking
12v	time management
12w	library use & resources
12x	knowledge - basic sciences
12y	knowledge - applied sciences
12z	gerontology
13, 14, 15	specialization (aspect of learning)
16	supervision of students
17, 20, 22	preparation for practice
18	enthusiasm
19	learning curve
20, 21, 22, 23k, 26	overall satisfaction
23a, 23f, 23g, 23h, 23l	commitment
23c, 23d, 23e, 23j	life long learning
23i	outcome measures
24, 25	role boundaries
24	confidence

Grid — Supervisor Version

Alphabetical Order

Merged topics from literature & FGIs, duplicates deleted	Item in the questionnaire which addressed this issue (Supervisor Version)
Assessment skills	7a, 7b, 7h, 7m
charting/documenting skills	7mm
clinical placements	n/a
clinical reasoning	7d, 7i, 7n
communication	7gg
commitment	11
confidence	7rr
critical thinking	7u, 7ee
critical appraisal	7ee, 7oo
demographics	1, 2, 3, 4, 5, 6
electrotherapy	7s
enthusiasm	15
ergonomics	7bb
ethics	7cc
evidence based practice	7pp, 11
gerontology	7z
integration & problem solving	7t, 7u
interpersonal skills	7hh
knowledge - applied sciences	7y
knowledge - basic sciences	7x
leadership	8b, 21
learning curve	16

Merged topics from literature & FGIs, duplicates deleted	Item in the questionnaire which addressed this issue (Supervisor Version)
library use & resources	7w
life long learning	12, 13
management skills	7jj
maturity	21
outcome measures	n/a
overall satisfaction	17, 18, 23, 24
pediatrics	7aa
preparation for practice	14, 17, 18, 19
priorization skills	7nn
problem solving skills	7t, 7u, 7ff
research	7ii
role boundaries	20, 22
self-directed	7rr
self-evaluation	7qq
specialization (aspect of learning)	8, 9
supervision	7kk
supervision of students	10
teamwork	7ll, 22
time management	7v
treatment progression	7g, 7l, 7q
treatment planning	7e, 7j, 7o
treatment	7c, ;7f, 7k, 7p, 7x, 7s
writing skills	7ss

Numerical Order

Item in the questionnaire which addressed this issue (Supervisor Version)	Merged topics from literature & FGIs, duplicates deleted
1, 2, 3, 4, 5, 6	demographics
7a, 7b, 7h, 7m	Assessment skills
7aa	pediatrics
7bb	ergonomics
7c, ;7f, 7k, 7p, 7x, 7s	treatment
7cc	ethics
7d, 7i, 7n	clinical reasoning
7e, 7j, 7o	treatment planning
7ee, 7oo	critical appraisal
7g, 7l, 7q	treatment progression
7gg	communication
7hh	interpersonal skills
7ii	research
7jj	management skills
7kk	supervision
7ll, 22	teamwork
7mm	charting/documenting skills
7nn	priorization skills
7pp, 11	evidence based practice
7qq	self-evaluation
7rr	self-directed
7rr	confidence
7s	electrotherapy

Item in the questionnaire which addressed this issue (Supervisor Version)	Merged topics from literature & FGIs, duplicates deleted
7ss	writing skills
7t, 7u, 7ff	problem solving skills
7t, 7u	integration & problem solving
7u, 7ee	critical thinking
7v	time management
7w	library use & resources
7x	knowledge - basic sciences
7y	knowledge - applied sciences
7z	gerontology
8, 9	specialization (aspect of learning)
8b, 21	leadership
10	supervision of students
11	commitment
12, 13	life long learning
14, 17, 18, 19	preparation for practice
15	enthusiasm
16	learning curve
17, 18, 23, 24	overall satisfaction
20, 22	role boundaries
21	maturity
n/a	outcome measures
n/a	clinical placements

Appendix 6 — Cover letter from pilot study

Marla Nayer
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FAX: 905-820-9761 or
905-677-1639 (c/o Irwin Nayer)

DATE

FIELD(firstname) FIELD(lastname)
FIELD(address)

Dear FIELD(firstname),

This letter is to ask you to participate in the pilot test of a questionnaire which I am developing. The questionnaire will examine the strengths and weaknesses of recent graduates of physical therapy programs in Ontario. I will briefly outline the research.

The question to be addressed in this research project is: What are the strengths and weaknesses of physical therapy graduates? This question will be approached from three directions. A mail survey will go out to recent graduates, asking them for their perceptions of their readiness for professional activities. Supervisors of the graduates as well as clinical faculty at the participating universities will be surveyed with parallel questionnaires.

This summer, focus group interviews were conducted with the faculty members at the participating universities (University of Toronto, Queen's University, McMaster University and University of Western Ontario). These interviews asked what the faculty feel are the strengths and weaknesses of their graduates, and what information they would want in order to help them evaluate their current curriculum? Focus group interviews with some graduates and clinical supervisors also explored the perceived strengths and weaknesses of the new graduates.

The enclosed questionnaire was developed from the information gathered at the focus group interviews. Early in 1996 the questionnaire will be sent out to two years of graduates of the participating schools (1992 and 1994). At this time it is necessary to conduct a pilot-test of the questionnaire with a few supervisors. I would appreciate it very much if you would complete the questionnaire and return it to me in the stamped, addressed, envelope which has been provided. It will be easiest to fill out the questionnaire if you keep a particular graduate in mind, however it is not necessary to identify the graduate to me.

I am particularly interested in your comments about the questions themselves, not just your responses. For example: Did you find any questions particularly difficult to answer, and if so, what made them difficult; Did you find any questions irrelevant and if so why? As well, I would like to know how long it took to fill out the questionnaire. I anticipate that it will take 30-45 minutes to complete.

Individual responses on the questionnaire will be anonymous, and will not be pooled with the rest of the data collected next year. Revisions to the questionnaire may be made, based on your responses. As only a very few supervisors are being contacted for the pilot study, it is very important that you return the questionnaire.

The purpose of the research is to provide useful feedback to the individual university programs, which may be used for evaluating the curriculum. I would like to emphasize that the purpose is not to rank the universities, and that all four universities named are participating in and supporting this research.

Should you have any further questions regarding this research, please feel free to contact me at any time.

Yours very truly,

Marla Nayer
BSc (Phys Ther), MEd, PhD (candidate)

Appendix 7 — Questionnaires

Physical Therapy Graduates' Preparation for Professional Activities Questionnaire
Graduates' Version

Please answer some questions about how prepared you felt for the work environment when you graduated as a Physical Therapist. We are interested in your honest opinions, whether they are positive or negative. *Please answer all of the questions.* We also welcome your comments and suggestions. Thank you very much, we appreciate your help.

Instructions:

1. This survey should be filled out by a graduate of one of the following Physical Therapy Programs: McMaster University, Queen's University, University of Toronto, or University of Western Ontario.

2. Only those who graduated in either 1992 or 1994 are included in this survey.

3. On the following pages there are questions related to the activities physical therapists are expected to undertake in the work environment and the skills they are expected to have. Please answer *every* question. Some questions may look similar, but each one should be answered separately.

4. Answer the questions either by circling the appropriate number or by filling in the answer, as required.

5. When you have completed the survey, please return it in the pre-addressed stamped envelope provided.

Thank you for taking time to complete this survey!

Physical Therapy Graduates' Preparation for Professional Activities Questionnaire
c/o Marla Nayer, BScPT, MEd, PhD (candidate)
Higher Education Group, 9th floor
Ontario Institute for Studies in Education
252 Bloor St. W.
Toronto, Ontario
M5S 1V6

DEMOGRAPHIC DATA (Please circle the appropriate number to the right of the question.)

1. Gender:

   a. Female 1
   b. Male 2

2. Please describe your background when you entered the physical therapy program. (Choose only one of the following.)

   a. Directly out of high school. 1
   b. 1-2 years of Community College 2
      (diploma program and subject studied _____)
   c. Completed a Community College Diploma 3
      (diploma and subject studied _____)
   d. 1-3 years of university (did not complete a degree) 4
      (subject studied _____)
   e. Completed an undergraduate degree 5
      (degree and subject studied _____)
   f. Enrolled in a graduate program 6
      (level and subject studied _____)
   g. Completed a graduate program 7
      (degree & subject studied _____)

3. If you had been out of school before entering the physical therapy program, and in the workforce:

   a. How long had you been in the workforce? _____ yrs_____ months
   b. What type of work had you been doing? _____

4. Age on graduating with your degree in physical therapy: _____ years

5. University Physical Therapy Program

   a. McMaster University 1
   b. Queen's University 2
   c. University of Toronto 3
   d. University of Western Ontario 4

6. Year of Graduation from Physical Therapy
   a. 1994 1
   b. 1992 2

7. What setting(s) best describe(s) your current area(s) of work? (Mark as many as necessary, and rank them with number 1 accounting for the most hours worked per year, 2 the second highest number of hours, etc.)

Addiction Facility 1
Arthritis Society 2
Community Centre 3
Consulting Firm/Agency, Rehab. 4
Consulting Firm, Other . . . 5
Facility for the Aged . . . 6
Facility for Mentally Challenged 7
General Hospital 8
Govt/Other Official Agency 9
Industry (please describe, briefly, type of work) . . . 10
Long Term Care Hospital/Facility 11
Nursing Home 12
Paediatric Hospital/Facility 13
Private Practice/Clinic . . 14
Psychiatric Facility 15
Rehabilitation Hospital/Facility 16
School Board 17
Student, Doctoral level . 18
Student, Masters level . . 19
University/Educational Institution 20
Visiting Agency, Home Care 21
Visiting Agency, Other . . 22
WCB Facility 23
Not currently working in physical therapy 24
Other (please describe) . 25

8. How would you rate yourself in the following skills, at the time you entered the physical therapy program? (Circle the appropriate rating.)

1 = very poor / very weak 3 = average 5 = very high / very strong
DK = do not know; cannot judge

Area of activity/ function/ skill		Rating					
a.	Communication skills (ability to express yourself so that others understand what you mean)	1	2	3	4	5	DK
b.	Leadership ability (i.e. being able to direct others)	1	2	3	4	5	DK
c.	Interpersonal skills (i.e. being able to establish a rapport with people)	1	2	3	4	5	DK

CLINICAL EXPERIENCES

9. Please list all your clinical placements during your education. Include the timing within your education (during second year, at the end of third year, beginning of 4th year, final internship etc.), the length of the placement and the focus of the placement (orthopaedic in-patients, neurology rehab, etc.).

Timing of placement within your education (end of first year, middle of 3rd year, etc.)	Was this a mandatory or an elective placement? M = Mandatory E = Elective	Length of placement (number of weeks)	Focus of Placement (For example: rehab neuro, outpatient orthopaedics, inpatient cardioresp, administration, or research)	At this placement, were you observed			How well were the expectations of your supervisor made clear to you? DK = don't remember 5 = very well 3 = adequately 1 = not well at all	Were the expectations of you at this placement appropriate? DK = don't remember 5 = much too low 3 = appropriate 1 = much too high
				Taking a history?	Conducting a physical assessment?	Conducting a treatment?		
	M E			Y N	Y N	Y N	1 2 3 4 5 DK	1 2 3 4 5 DK
	M E			Y N	Y N	Y N	1 2 3 4 5 DK	1 2 3 4 5 DK
	M E			Y N	Y N	Y N	1 2 3 4 5 DK	1 2 3 4 5 DK
	M E			Y N	Y N	Y N	1 2 3 4 5 DK	1 2 3 4 5 DK
	M E			Y N	Y N	Y N	1 2 3 4 5 DK	1 2 3 4 5 DK
	M E			Y N	Y N	Y N	1 2 3 4 5 DK	1 2 3 4 5 DK
	M E			Y N	Y N	Y N	1 2 3 4 5 DK	1 2 3 4 5 DK
	M E			Y N	Y N	Y N	1 2 3 4 5 DK	1 2 3 4 5 DK
	M E			Y N	Y N	Y N	1 2 3 4 5 DK	1 2 3 4 5 DK
	M E			Y N	Y N	Y N	1 2 3 4 5 DK	1 2 3 4 5 DK
	M E			Y N	Y N	Y N	1 2 3 4 5 DK	1 2 3 4 5 DK

POST GRADUATE WORK EXPERIENCES

10. For each of the areas listed, please indicate by circling the proper code:
a) your perception of the relative strength of your academic preparation for that activity;
b) the relative portion of time which this activity occupies in your current job, and
c) whether you believe the indicated skill is vital to the profession, regardless of the amount of time you spend at it.
Add any activities not listed which you feel belong in the list.

	Use the following definitions for the codes provided:		
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Current Job Duties M = Major portion of current job A =Average portion of job I = mInor portion of current job N = Not part of current job	Vital skill for a Physical Therapist? Y = Yes N = No DK = Do not know, cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation (this includes class work as well as placements)	How much is this skill a part of your job duties?	Do you consider this to be a vital skill for a physical therapist?
Cardiorespiratory			
a. Cardiorespiratory assessments	1 2 3 4 5 DK	M A I N	Y N DK
b. Auscultation	1 2 3 4 5 DK	M A I N	Y N DK
c. Suctioning	1 2 3 4 5 DK	M A I N	Y N DK
d. Identifying relevant problems in patients with cardiorespiratory problems (eg. the A in SOAP charting)	1 2 3 4 5 DK	M A I N	Y N DK
e. Planning treatment for patients with cardiorespiratory problems (eg. the P in SOAP charting)	1 2 3 4 5 DK	M A I N	Y N DK

	Use the following definitions for the codes provided:		
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Current Job Duties M = Major portion of current job A =Average portion of job I = mInor portion of current job N = Not part of current job	Vital skill for a Physical Therapist? Y = Yes N = No DK = Do not know, cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation (this includes class work as well as placements)	How much is this skill a part of your job duties?	Do you consider this to be a vital skill for a physical therapist?
f. Carrying out the treatment for patients with cardiorespiratory problems	1 2 3 4 5 DK	M A I N	Y N DK
g. Reassessing and progressing treatment for patients with cardiorespiratory problems	1 2 3 4 5 DK	M A I N	Y N DK
Neurology			
h. Neurological assessments	1 2 3 4 5 DK	M A I N	Y N DK
i. Identifying relevant problems in patients with neurological problems (eg. the A in SOAP charting)	1 2 3 4 5 DK	M A I N	Y N DK
j. Planning treatment for patients with neurological problems (eg. the P in SOAP charting)	1 2 3 4 5 DK	M A I N	Y N DK
k. Carrying out the treatment for patients with neurological problems	1 2 3 4 5 DK	M A I N	Y N DK

	Use the following definitions for the codes provided:		
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Current Job Duties M = Major portion of current job A =Average portion of job I = mInor portion of current job N = Not part of current job	Vital skill for a Physical Therapist? Y = Yes N = No DK = Do not know, cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation (this includes class work as well as placements)	How much is this skill a part of your job duties?	Do you consider this to be a vital skill for a physical therapist?
l. Reassessing and progressing treatment for patients with neurological problems	1 2 3 4 5 DK	M A I N	Y N DK
Musculoskeletal			
m. Musculoskeletal assessments	1 2 3 4 5 DK	M A I N	Y N DK
n. Identifying relevant problems in patients with musculoskeletal problems (eg. the A in SOAP charting)	1 2 3 4 5 DK	M A I N	Y N DK
o. Planning treatment for patients with musculoskeletal problems (eg. the P in SOAP charting)	1 2 3 4 5 DK	M A I N	Y N DK
p. Carrying out the treatment for patients with musculoskeletal problems	1 2 3 4 5 DK	M A I N	Y N DK
q. Reassessing and progressing treatment for patients with musculoskeletal problems	1 2 3 4 5 DK	M A I N	Y N DK
r. Manual Therapy techniques	1 2 3 4 5 DK	M A I N	Y N DK

	Use the following definitions for the codes provided:		
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Current Job Duties M = Major portion of current job A =Average portion of job I = mInor portion of current job N = Not part of current job	Vital skill for a Physical Therapist? Y = Yes N = No DK = Do not know, cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation (this includes class work as well as placements)	How much is this skill a part of your job duties?	Do you consider this to be a vital skill for a physical therapist?
s. Electrotherapy treatments	1 2 3 4 5 DK	M A I N	Y N DK
Other skills/areas			
t. Ability to integrate systems (eg. client with both neurological and musculoskeletal problems)	1 2 3 4 5 DK	M A I N	Y N DK
u. Ability to identify multi-system problems in areas other than the primary diagnosis (eg. recognize an MSK problem in a patient presenting with neurological signs)	1 2 3 4 5 DK	M A I N	Y N DK
v. Ability to manage time (eg. seeing a full case load, finishing paperwork without staying late)	1 2 3 4 5 DK	M A I N	Y N DK
w. Knowing where to find information (eg. use of the library, use of other health professionals)	1 2 3 4 5 DK	M A I N	Y N DK
x. Basic science knowledge (eg. anatomy, physiology)	1 2 3 4 5 DK	M A I N	Y N DK

		Use the following definitions for the codes provided:		
		Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Current Job Duties M = Major portion of current job A =Average portion of job I = mInor portion of current job N = Not part of current job	Vital skill for a Physical Therapist? Y = Yes N = No DK = Do not know, cannot judge
Area of activity/ function/ skill/knowledge		Strength of Professional Preparation (this includes class work as well as placements)	How much is this skill a part of your job duties?	Do you consider this to be a vital skill for a physical therapist?
y.	Applied science knowledge (eg. medical science, pathology, biomechanics)	1 2 3 4 5 DK	M A I N	Y N DK
z.	Geriatrics	1 2 3 4 5 DK	M A I N	Y N DK
aa.	Paediatrics	1 2 3 4 5 DK	M A I N	Y N DK
bb.	Body mechanics & safety issues	1 2 3 4 5 DK	M A I N	Y N DK
cc.	Knowledge of ethical issues	1 2 3 4 5 DK	M A I N	Y N DK
dd.	Ability to deal with ethical issues in practice	1 2 3 4 5 DK	M A I N	Y N DK
ee.	Critical thinking (eg. identifying the issues that are pertinent to a problem)	1 2 3 4 5 DK	M A I N	Y N DK
ff.	Problem solving	1 2 3 4 5 DK	M A I N	Y N DK
gg.	Communication skills (i.e. ability to express yourself so that others understand what you mean)	1 2 3 4 5 DK	M A I N	Y N DK

		Use the following definitions for the codes provided:		
		Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Current Job Duties M = Major portion of current job A =Average portion of job I = mInor portion of current job N = Not part of current job	Vital skill for a Physical Therapist? Y = Yes N = No DK = Do not know, cannot judge
Area of activity/ function/ skill/knowledge		Strength of Professional Preparation (this includes class work as well as placements)	How much is this skill a part of your job duties?	Do you consider this to be a vital skill for a physical therapist?
hh.	Interpersonal skills (i.e. ability to establish a rapport with clients and other professionals)	1 2 3 4 5 DK	M A I N	Y N DK
ii.	Research skills (i.e. designing, carrying out, analyzing and reporting a project)	1 2 3 4 5 DK	M A I N	Y N DK
jj.	Administration skills	1 2 3 4 5 DK	M A I N	Y N DK
kk.	Ability to supervise Physical Therapy Assistants	1 2 3 4 5 DK	M A I N	Y N DK
ll.	Ability to work within a team (multi professional approach)	1 2 3 4 5 DK	M A I N	Y N DK
mm.	Charting ability	1 2 3 4 5 DK	M A I N	Y N DK
nn.	Prioritizing skills (eg. deciding who to put on a weekend list or which parts of a treatment to perform if time is limited)	1 2 3 4 5 DK	M A I N	Y N DK

	Use the following definitions for the codes provided:		
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Current Job Duties M = Major portion of current job A =Average portion of job I = mInor portion of current job N = Not part of current job	Vital skill for a Physical Therapist? Y = Yes N = No DK = Do not know, cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation (this includes class work as well as placements)	How much is this skill a part of your job duties?	Do you consider this to be a vital skill for a physical therapist?
oo. Critical appraisal (i.e. the ability to evaluate the worth of a research article and its findings)	1 2 3 4 5 DK	M A I N	Y N DK
pp. Ability to use evidence based practice (i.e. the ability to integrate findings of current research into clinical practice)	1 2 3 4 5 DK	M A I N	Y N DK
qq. Ability to accurately evaluate your current level of knowledge and skill	1 2 3 4 5 DK	M A I N	Y N DK
rr. Ability to work without direction (i.e. recognizing a need and addressing the situation without being explicitly asked to do so)	1 2 3 4 5 DK	M A I N	Y N DK
ss. Writing skills (eg. ability to write a hospital report or a short article for a professional newsletter)	1 2 3 4 5 DK	M A I N	Y N DK
	1 2 3 4 5 DK	M A I N	Y N DK
	1 2 3 4 5 DK	M A I N	Y N DK

11. Did you study Manual Therapy skills in your undergraduate Physical Therapy Program?

a. Yes 1
b. No 2

12. Which of the following statements do you consider to be more appropriate:

a. Manual Therapy should be taught in undergraduate training. 1
If so, to what level (E1/V1, E2/V2, E3/V3) _____
b. Manual therapy should be taught only in post graduate courses. 2
c. Not sure 3

13. Which of the following statements do you consider to be more appropriate:

a. Undergraduate programs should focus on a generalist education. 1
b. Undergraduate programs should allow for specialization. 2
c. Not sure 3

14. Have you been asked to supervise a physical therapy student?

a. No 1
b. Yes 2
i. If yes, how long after you graduated did you supervise your first student?

ii. _____

iii. What level was the student (first placement, final internship, etc.)

_____

iv. Did you feel prepared for the role of Supervisor?
(1) Yes 1
(2) No 2

15. Have you been involved in any research projects since graduation?
a. No 1
b. Yes 2
If so, please describe the project (1-2 sentences).

16. Have you presented at any conferences or continuing education workshops since graduation? If so, please list the title of the conference or workshop.
    a. No 1
    b. Yes 2

17. In what areas do you feel you were unprepared for your present practice?

    a. Please describe one or more important incidents which demonstrate why you feel that you were unprepared for your present practice when you graduated. Describe as well the consequences of not knowing something or not being able to do something.

18. What do you think are the greatest strengths you bring to the job environment?

19. Approximately how many months/years of work do you estimate it took for you to become comfortable and "up to speed" with expectations in the work place.

    _____ Month(s) _____ Year(s) _____ Not there yet

20. Were there subjects or areas covered in your program which you now feel were unnecessary? Please list such topics and explain why you think they are not needed.

21. Are there courses that you wish you had taken prior to entering the physical therapy program? If so, please list them here.

22. Are you currently a member of the CPA?

a. Yes 1
b. No 2

23. Have you attended any OPA/CPA district meetings in the past year?

a. Yes 1
b. No 2

24. Please list the names of any professional in which you have been involved since graduation. For example, professional committees might include CPA, OPA, College of Physiotherapy or Specialty Division committees; while in hospital committees might include Audit, Quality Assurance or Education committees .

25. Were there subjects or areas or concepts you were taught that are not relevant to your current practice? If so, please describe one or more such areas, and explain why you are not able to put this education to use. For example, are the reasons related to your job type, location, or financial constraints of the workplace?

26. Do you think you will still be working in Physical Therapy five years from now?

a. Yes 1
b. No 2
c. Not sure 3

Please explain the reasons for your answer.

27. Would you consider pursuing further education towards a graduate degree?

a. No 1
b. Yes 2

i. If Yes, what field would interest you? _____

Please explain the reasons for your answer.

28. Are you comfortable treating clients who do not have a referral from a medical doctor (direct access)?

a. Yes 1
b. No 2

Please explain why you answered in this way.

29. Are you comfortable in your knowledge of when to refer patients to other health practitioners?

a. Yes 1
b. No 2

30. Please list any professionally related and continuing education post graduate courses you have taken, including the length of the course.

Course	Length of course (number of days or hours)

31. Have you conducted any in-service education sessions during the past year?

a. Yes 1
b. No 2

32. If you are considering trying a new treatment technique, but want to determine its potential usefulness prior to using it with a patient, how would you go about doing this?

33. Please list four to five (4-5) outcome measures (regardless of whether you use them on a regular basis).

34. In which journal(s) have you read an article in the past 6 months? Please circle the appropriate number(s).

- American Journal of Sports Medicine 1
- American Journal of Respiratory and Critical Care Medicine 2
- Archives in Physical Medicine and Rehabilitation 3
- Australian Journal of Physical Therapy 4
- Brain 5
- Chest 6
- Clinics in Sports Medicine 7
- Critical Care Medicine 8
- Journal of Orthopaedics and Sports Physical Therapy 9
- Physiotherapy 10
- Physiotherapy Canada 11
- Physical Therapy 12
- Respiration 13
- Stroke 15
- Have not read any journal articles in the past 6 months 16
- Other journal(s)(please give name)17

_____

35. Would you recommend the physical therapy program you graduated from to someone else considering entering the profession?

a. Yes 1
b. No 2
c. Not sure 3

Please explain why you would or would not recommend the program, or why you are not sure.

36. In Summary, keeping in mind what your physical therapy program was like when you were there, what three things would you suggest they discontinue, what three things would you suggest the program introduce, and what three things would you suggest be kept as it was?

i. Three things to discontinue:
(1)
(2)
(3)

ii. Three things to introduce:
(1)
(2)
(3)

iii. Three things to keep:
(1)
(2)
(3)

37. Any further comments:

Thank you for taking the time to respond to this survey!

Please return the questionnaire, in the envelope provided, to
Marla Nayer, Graduate Student, Higher Education Group, Ontario Institute for Studies in Education, 252 Bloor St. W., 9th Floor, Toronto, Ontario, M5S 1V6

Notes regarding the research project

Three groups of respondents are being used in this research project. Recent graduates of four Ontario University physical therapy programs comprise one group (the University of Toronto, McMaster University, Queen's University and the University of Western Ontario). The second group is made up of the clinical faculty members of the four programs. The third group which we would like to include in the survey are the supervisors of the responding graduates. For the purposes of this study, the person asked to fill out the questionnaire need not be a direct supervisor, if the supervisor is not a physical therapists (for example, in a hospital run under a program management model). A mentor, discipline leader, professional colleague or administrative manager may be more appropriate. Ideally, the person asked to fill out the Supervisor Questionnaire would be a physical therapist.

Responses of the graduate and their supervisor will be paired for analysis purposes. Neither questionnaire will have any reference which will allow identification of the individual respondents. Numbering will be used for pairing purposes only. Once the questionnaires are returned, the names and address lists of the respondents will be destroyed.

The sheet with the information regarding the supervisor will be split from the questionnaire before data entry.

If you are willing to allow contact with your supervisor, please give your supervisor the accompanying envelope and supervisor's questionnaire, and complete the following information.

Supervisor's name:
Address:

Your Name:

Please return the questionnaire, even if you are not willing to allow contact with your supervisor.

If follow-up group or individual interviews were to be conducted to expand on the issues raised in this study, would you be interested in participating?

Yes 1
Please include your name & phone number

No 2

If you are interested in receiving a copy of a summary of the research findings, please include your name and address:

Physical Therapy Graduates' Preparation for Professional Activities Questionnaire
Faculty Version

Please answer some questions about how prepared you feel your graduates are when they enter the work environment. Faculty responses will be compared with graduate responses. *Please answer all of the questions.* Thank you very much, we appreciate your help.

Instructions:

1. This survey should be filled out by faculty who are Physical Therapists, and who have been teaching at their current university for a minimum of one year.

2. When answering, please keep in mind that the survey will only go out to those who graduated in either 1992 or 1994.

3. On the following pages there are questions related to the activities physical therapists are expected to undertake in the work environment, and the skills they are expected to have. Please answer *every* question. Some questions may look similar, but each one should be answered separately.

4. Answer the questions either by circling the appropriate number or by filling in the answer, as required.

5. When you have completed the survey, please return it, via IUTS, in the pre-addressed envelope provided.

Thank you for taking time to complete this survey!

Physical Therapy Graduates' Preparation for Professional Activities Questionnaire
c/o Marla Nayer, BScPT, MEd, PhD (candidate)
Higher Education Group
Ontario Institute for Studies in Education
252 Bloor St. W., 9th floor
Toronto, Ontario
M5S 1V6

DEMOGRAPHIC DATA (Please circle the appropriate number to the right of the question.)

1. Gender:
   a. Female 1
   b. Male 2

2. University Physical Therapy Program
   a. McMaster University 1
   b. Queen's University 2
   c. University of Toronto 3
   d. University of Western Ontario 4

3. Status
   a. Full Time faculty 1
   b. Part Time faculty 2
   c. Lecturer 3
   d. Status Appointment 4
   e. Other (please specify) _____ 5

4. Length of time teaching in a university physical therapy program?
   a. 1-5 years 1
   b. over five and up to 10 years 2
   c. over 10 and up to 15 years 3
   d. over 15 years 4

5. Do you currently maintain a clinical practice?
   a. Yes 1
   b. No 2

6. Which setting(s) do you believe the graduates enter in their first 4 years out of the physical therapy program? (Mark as many as necessary, and rank them with number 1 accounting for the most common place of employment, number 2 the second most common place of employment, etc.)

Addiction Facility 1
Arthritis Society 2
Community Centre 3
Consulting Firm/Agency, Rehab. 4
Consulting Firm, Other . . . 5
Facility for the Aged . . . 6
Facility for Mentally Challenged 7
General Hospital 8
Govt/Other Official Agency 9
Industry (please describe, briefly, type of work) . . . 10
Long Term Care Hospital/Facility 11
Nursing Home 12
Paediatric Hospital/Facility 13
Private Practice/Clinic . . 14
Psychiatric Facility 15
Rehabilitation Hospital/Facility 16
School Board 17
Student, Doctoral level . 18
Student, Masters level . . 19
University/Educational Institution 20
Visiting Agency, Home Care 21
Visiting Agency, Other . . 22
WCB Facility 23
Not currently working in physical therapy 24
Other (please describe) . 25

7. How would you rate your students in the following skills, at the time they ENTERED the physical therapy program?

1 = very poor / very weak 3 = average 5 = very high / very strong
DK = do not know; cannot judge

Area of activity/ function/ skill		Rating					
a.	Communication skills (ability to express themselves so that others understand what they mean)	1	2	3	4	5	DK
b.	Leadership ability (i.e. being able to direct others)	1	2	3	4	5	DK
c.	Interpersonal skills (i.e. being able to establish a rapport with people)	1	2	3	4	5	DK

CLINICAL EXPERIENCES

8. At what percentage of the students' clinical placements do you believe they are observed (please check the appropriate box):

	0-20%	21-40%	41-60%	61-80%	81-100%
a. Taking a history					
b. Conducting a physical exam					
c. Carrying out a treatment					

9. How well are expectations for student performance at their placements made clear to the students?
(Please circle the appropriate number.)

Not well at all		Adequately		Very well	Don't Know
1	2	3	4	5	DK

10. How appropriate are the expectations for student performance at their placements?
(Please circle the appropriate number.)

Much too high		Appropriate		Much too low	Don't Know
1	2	3	4	5	DK

11. How would you rate the students' maturity level on graduation from the Physical Therapy program? (Please circle the appropriate number.)

Very low		Average		Very high	Don't Know
1	2	3	4	5	DK

POST GRADUATE WORK EXPERIENCES

12. For each of the areas listed, please indicate by circling the proper code:
a) your perception of the relative strength of your graduates' academic preparation for that activity;
b) whether you believe the indicated skill is vital to the profession, regardless of the amount of time the graduates spend at it.

Add any activities not listed which you feel belong in the list.

	Use the following definitions for the codes provided:	
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Y = yes N = no DK = do not know; cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation (this includes class work as well as placements)	Do you consider this to be a vital skill for a physical therapist?
Cardiorespiratory		
a. Cardiorespiratory assessments	1 2 3 4 5 DK	Y N DK
b. Auscultation	1 2 3 4 5 DK	Y N DK
c. Suctioning	1 2 3 4 5 DK	Y N DK
d. Identifying relevant problems in patients with cardiorespiratory problems (eg. the A in SOAP charting)	1 2 3 4 5 DK	Y N DK
e. Planning treatment for patients with cardiorespiratory problems (eg. the P in SOAP charting)	1 2 3 4 5 DK	Y N DK

	Use the following definitions for the codes provided:	
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Y = yes N = no DK = do not know; cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation (this includes class work as well as placements)	Do you consider this to be a vital skill for a physical therapist?
f. Carrying out the treatment for patients with cardiorespiratory problems	1 2 3 4 5 DK	Y N DK
g. Reassessing and progressing treatment for patients with cardiorespiratory problems	1 2 3 4 5 DK	Y N DK
Neurology		
h. Neurological assessments	1 2 3 4 5 DK	Y N DK
i. Identifying relevant problems in patients with neurological problems (eg. the A in SOAP charting)	1 2 3 4 5 DK	Y N DK
j. Planning treatment for patients with neurological problems (eg. the P in SOAP charting)	1 2 3 4 5 DK	Y N DK
k. Carrying out the treatment for patients with neurological problems	1 2 3 4 5 DK	Y N DK

	Use the following definitions for the codes provided:	
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Y = yes N = no DK = do not know; cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation (this includes class work as well as placements)	Do you consider this to be a vital skill for a physical therapist?
l. Reassessing and progressing treatment for patients with neurological problems	1 2 3 4 5 DK	Y N DK
Musculoskeletal		
m. Musculoskeletal assessments	1 2 3 4 5 DK	Y N DK
n. Identifying relevant problems in patients with musculoskeletal problems (eg. the A in SOAP charting)	1 2 3 4 5 DK	Y N DK
o. Planning treatment for patients with musculoskeletal problems (eg. the P in SOAP charting)	1 2 3 4 5 DK	Y N DK
p. Carrying out the treatment for patients with musculoskeletal problems	1 2 3 4 5 DK	Y N DK
q. Reassessing and progressing treatment for patients with musculoskeletal problems	1 2 3 4 5 DK	Y N DK
r. Manual Therapy techniques	1 2 3 4 5 DK	Y N DK

	Use the following definitions for the codes provided:	
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Y = yes N = no DK = do not know; cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation (this includes class work as well as placements)	Do you consider this to be a vital skill for a physical therapist?
s. Electrotherapy treatments	1 2 3 4 5 DK	Y N DK
Other skills/areas		
t. Ability to integrate systems (eg. client with both neurological and musculoskeletal problems)	1 2 3 4 5 DK	Y N DK
u. Ability to identify multi-system problems in areas other than the primary diagnosis (eg. recognize an MSK problem in a patient presenting with neurological signs)	1 2 3 4 5 DK	Y N DK
v. Ability to manage time (eg. seeing a full case load, finishing paperwork without staying late)	1 2 3 4 5 DK	Y N DK
w. Knowing where to find information (eg. use of the library, use of other health professionals)	1 2 3 4 5 DK	Y N DK
x. Basic science knowledge (eg. anatomy, physiology)	1 2 3 4 5 DK	Y N DK
y. Applied science knowledge (eg. medical science, pathology, biomechanics)	1 2 3 4 5 DK	Y N DK

	Use the following definitions for the codes provided:	
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Y = yes N = no DK = do not know; cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation (this includes class work as well as placements)	Do you consider this to be a vital skill for a physical therapist?
z. Geriatrics	1 2 3 4 5 DK	Y N DK
aa. Paediatrics	1 2 3 4 5 DK	Y N DK
bb. Body mechanics & safety issues	1 2 3 4 5 DK	Y N DK
cc. Knowledge of ethical issues	1 2 3 4 5 DK	Y N DK
dd. Ability to deal with ethical issues in practice	1 2 3 4 5 DK	Y N DK
ee. Critical thinking (eg. identifying the issues that are pertinent to a problem)	1 2 3 4 5 DK	Y N DK
ff. Problem solving	1 2 3 4 5 DK	Y N DK
gg. Communication skills (eg. ability to explain themselves so that others understand what they mean)	1 2 3 4 5 DK	Y N DK
hh. Interpersonal skills (i.e. ability to establish a rapport with clients or other professionals)	1 2 3 4 5 DK	Y N DK
ii. Research skills (eg. designing, carrying out, analyzing and reporting a project)	1 2 3 4 5 DK	Y N DK

		Use the following definitions for the codes provided:	
		Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Y = yes N = no DK = do not know; cannot judge
Area of activity/ function/ skill/knowledge		Strength of Professional Preparation (this includes class work as well as placements)	Do you consider this to be a vital skill for a physical therapist?
jj.	Administration skills	1 2 3 4 5 DK	Y N DK
kk.	Ability to supervise Physical Therapy Assistants	1 2 3 4 5 DK	Y N DK
ll.	Ability to work within a team (multi professional approach)	1 2 3 4 5 DK	Y N DK
mm.	Charting ability	1 2 3 4 5 DK	Y N DK
nn.	Prioritizing skills (eg. deciding who to put on a weekend list or which parts of a treatment to perform if time is limited)	1 2 3 4 5 DK	Y N DK
oo.	Critical appraisal (i.e. the ability to evaluate the worth of a research article and its findings)	1 2 3 4 5 DK	Y N DK
pp.	Ability to use evidence based practice (i.e. the ability to integrate findings of current research into clinical practice)	1 2 3 4 5 DK	Y N DK
qq.	Ability to accurately evaluate their current level of knowledge and skill	1 2 3 4 5 DK	Y N DK
rr.	Ability to work without direction (i.e. recognizing a need and addressing the situation without being explicitly asked to do so)	1 2 3 4 5 DK	Y N DK

	Use the following definitions for the codes provided:	
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Y = yes N = no DK = do not know; cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation (this includes class work as well as placements)	Do you consider this to be a vital skill for a physical therapist?
ss. Writing skills (eg. ability to write a hospital report or a short article for a professional newsletter)	1 2 3 4 5 DK	Y N DK
	1 2 3 4 5 DK	Y N DK
	1 2 3 4 5 DK	Y N DK
	1 2 3 4 5 DK	Y N DK

13. Note: Question 13 should be answered by those faculty who are involved with the musculoskeletal courses of the program.
Does your program teach Manual Therapy skills?

a. Yes 1
b. No 2

14. Which of the following statements do you consider to be more appropriate:
a. Manual Therapy should be taught in undergraduate training. 1
If yes, to what level (E1/V1, E2/V2, E3/V3) _____
b. Manual Therapy should be taught only in post graduate courses. 2
c. Not sure 3

15. Which of the following statements do you consider to be more appropriate:
a. Undergraduate programs should focus on a generalist education. 1
b. Undergraduate programs should allow for specialization. 2
c. Not sure 3

16. How soon after graduation do you think the graduates are being asked to supervise their first student?

_____

a. Do you feel that the graduates are prepared for the role of supervisor?
i. Yes 1
ii. No 2

17. In what areas do you feel the graduates are unprepared for their present practice?

a. Please describe one or more important incidents which would demonstrate why you feel that the graduates are unprepared for their present practice. Include in your description a brief statement of what the consequences were of their not knowing something or not being able to do something.

18. What do you consider to be the greatest strengths which the graduates bring to the job environment?

19. Approximately how many months/years of work do you estimate it takes for the graduates to become comfortable and "up to speed" with expectations in the work place?

_____ Months _____ Years

20. Are there subjects or areas covered in your program which you feel are unnecessary? Please list such topics and explain why you think they are not needed.

21. Are there courses that you feel the students should be taking prior to entering the physical therapy program? If so, please list them here.

22. Are there subjects or areas or concepts that are taught in the program which you believe are not relevant to the graduates' current practice? If so, please describe one or more such areas, and explain why the graduates are not able to put this education to use. For example, are the reasons related to job type, location, or financial constraints of the workplace?

23. What percentage of the graduates do you believe are involved in the following activities? (Please put a check in the appropriate box.)

	Activity	0-20%	21-40%	41-60%	61-80%	81-100%
a.	Involved with any professional committees. (Either in-hospital or external to the immediate work environment.)					
b.	Are involved with a research project within the first four years after graduation?					
c.	Take post graduate courses in the first four years out of school?					
d.	Would consider pursuing their education towards a graduate degree in an area related to rehabilitation medicine?					
e.	Have presented at a conference or continuing education workshop within the first 4 years after graduation?					
f.	Are members of the CPA?					
g.	Attend at least one district meeting (OPA/CPA) a year?					
h.	Are members of professional committees? (For example, professional committees might include CPA, OPA, College of Physiotherapy committees or Specialty Division committees, while in-hospital committees might include Audit, Quality Assurance or Education committees .)					
i.	Can list 4-5 outcome measures?					
j.	Have read at least one journal article in the past six months?					
k.	Would recommend your physical therapy program to others thinking of entering the profession?					
l.	Expect to be working in physical therapy in another 5 years?					

24. Do you think that recent graduates would be comfortable treating clients who do not have a referral from a medical doctor (direct access)?
    a. Yes 1
    b. No 2

25. Do you think that recent graduates would know when to refer patients to other health practitioners?
    a. Yes 1
    b. No 2

26. In Summary, what three things would you suggest your physical therapy program discontinue, what three things would you suggest the program introduce, and what three things that the program currently does would you suggest be kept as is?

    i. Three things to discontinue:

    (1)
    (2)
    (3)

    ii. Three things to introduce:

    (1)
    (2)
    (3)

    iii. Three things to keep as is:

    (1)
    (2)
    (3)

27. Further comments:

Notes regarding the research project

28. If follow-up group or individual interviews were to be conducted to expand on the issues raised in this study, would you be interested in participating?

a. Yes 1
Please include your name & phone number

b. No 2

29. If you are interested in receiving of a summary of the research findings, please include your name and address below: (A copy will be provided automatically to each university program.)

Thank you for taking the time to respond to this survey!

Please return the questionnaire, in the envelope provided, to
Marla Nayer, Graduate Student, Higher Education Group, 9th Floor, Ontario Institute for Studies in Education, 252 Bloor St. W., Toronto, Ontario, M5S 1V6

Physical Therapy Graduates' Preparation for Professional Activities Questionnaire
Supervisor's Version

Please answer some questions about how prepared you felt the graduate who gave you this questionnaire was, on entering your work environment. We are interested in your honest opinions, whether they are positive or negative. *Please answer all of the questions.* We also welcome your comments and suggestions. Thank you very much, we appreciate your help.

Instructions:

1. The person who fills out this questionnaire should be in a position to make observations and judgements as to the competency level of the graduate who asked them to complete the questionnaire: for example, a supervisor who would be filling out a performance appraisal of the graduate. In most cases, this would be a clinical supervisor of the physical therapy graduate. If the direct supervisor of the graduate is not a physical therapist (as might be the case in a hospital run under the Program Management model), then a clinical associate or professional mentor to the graduate would be preferred to the direct supervisor.

2. Only therapists who graduated in either 1992 or 1994 are included in this survey.

3. On the following pages you will find questions related to activities physical therapists are expected to undertake in the work environment and skills they are expected to have. Please answer *every* question. Some questions may look similar, but each one should be answered separately.

4. Answer the questions either by circling the appropriate number or by filling in the answer, as required.

5. When you have completed the survey, please return it in the pre-addressed stamped envelope provided.

Thank you for taking time to complete this survey!

Physical Therapy Graduates' Preparation for Professional Activities Questionnaire
c/o Marla Nayer, BScPT, MEd, PhD (candidate)
Higher Education Group
Ontario Institute for Studies in Education
252 Bloor St. W., 9th floor
Toronto, Ontario
M5S 1V6

DEMOGRAPHIC DATA (Please circle the appropriate number to the right of the question.)

1. Gender:
   a. Female 1
   b. Male 2

2. Which of the following categories best describes your current situation:
   a. A Physical Therapist, currently registered with the College of Physiotherapists of Ontario 1
   b. Not a Physical Therapist (please describe your professional designation) 2

---

3. If you are a physical therapist, do you currently maintain a clinical practice?
   a. Yes 1
   b. No 2

4. Your age:
   a. 25 - 29 years 1
   b. 30 - 39 years 2
   c. 40 - 49 years 3
   d. over 50 years 4

5. Which of the following best describes your work relationship to the graduate?
   a. Direct clinical supervisor 1
   b. Mentor, professional colleague 2
   c. Administrative manager 3
   d. Professional leader 4
   e. Other (please describe) 5

---

6. How long have you worked with this graduate?
   a. under six months 1
   b. between six months and one year 2
   c. over one year but less than two years 3
   d. over two years but less than three years 4
   e. over three years 5

POST GRADUATE WORK EXPERIENCES

7. For each of the areas listed, please indicate by circling the proper code:
a) your perception of the relative strength of the graduate for that activity;
b) the relative proportion of time which this activity occupies in the graduate's present job, and
c) whether you believe the indicated skill is vital to the profession, regardless of the amount of time spent at it.
Add any activities not listed which you feel belong in the list.

	Use the following definitions for the codes provided:		
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Current Job Duties M = Major portion of current job A =Average portion of job I = minor portion of current job N = Not part of current job	Vital skill for a Physical Therapist? Y = Yes N = No DK = Do not know, cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation	How much is this skill a part of the graduate's job duties?	Do you consider this to be a vital skill for a physical therapist?
Cardiorespiratory			
a. Cardiorespiratory assessments	1 2 3 4 5 DK	M A I N	Y N DK
b. Auscultation	1 2 3 4 5 DK	M A I N	Y N DK
c. Suctioning	1 2 3 4 5 DK	M A I N	Y N DK
d. Identifying relevant problems in patients with cardiorespiratory problems (eg. the A in SOAP charting)	1 2 3 4 5 DK	M A I N	Y N DK
e. Planning treatment for patients with cardiorespiratory problems (eg. the P in SOAP charting)	1 2 3 4 5 DK	M A I N	Y N DK

	Use the following definitions for the codes provided:		
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Current Job Duties M = Major portion of current job A =Average portion of job I = mInor portion of current job N = Not part of current job	Vital skill for a Physical Therapist? Y = Yes N = No DK = Do not know, cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation	How much is this skill a part of the graduate's job duties?	Do you consider this to be a vital skill for a physical therapist?
f. Carrying out the treatment for patients with cardiorespiratory problems	1 2 3 4 5 DK	M A I N	Y N DK
g. Reassessing and progressing treatment for patients with cardiorespiratory problems	1 2 3 4 5 DK	M A I N	Y N DK
Neurology			
h. Neurological assessments	1 2 3 4 5 DK	M A I N	Y N DK
i. Identifying relevant problems in patients with neurological problems (eg. the A in SOAP charting)	1 2 3 4 5 DK	M A I N	Y N DK
j. Planning treatment for patients with neurological problems (eg. the P in SOAP charting)	1 2 3 4 5 DK	M A I N	Y N DK
k. Carrying out the treatment for patients with neurological problems	1 2 3 4 5 DK	M A I N	Y N DK

	Use the following definitions for the codes provided:		
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Current Job Duties M = Major portion of current job A =Average portion of job I = mInor portion of current job N = Not part of current job	Vital skill for a Physical Therapist? Y = Yes N = No DK = Do not know, cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation	How much is this skill a part of the graduate's job duties?	Do you consider this to be a vital skill for a physical therapist?
l. Reassessing and progressing treatment for patients with neurological problems	1 2 3 4 5 DK	M A I N	Y N DK
Musculoskeletal			
m. Musculoskeletal assessments	1 2 3 4 5 DK	M A I N	Y N DK
n. Identifying relevant problems in patients with musculoskeletal problems (eg. the A in SOAP charting)	1 2 3 4 5 DK	M A I N	Y N DK
o. Planning treatment for patients with musculoskeletal problems (eg. the P in SOAP charting)	1 2 3 4 5 DK	M A I N	Y N DK
p. Carrying out the treatment for patients with musculoskeletal problems	1 2 3 4 5 DK	M A I N	Y N DK
q. Reassessing and progressing treatment for patients with musculoskeletal problems	1 2 3 4 5 DK	M A I N	Y N DK
r. Manual Therapy techniques	1 2 3 4 5 DK	M A I N	Y N DK

	Use the following definitions for the codes provided:		
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Current Job Duties M = Major portion of current job A =Average portion of job I = mInor portion of current job N = Not part of current job	Vital skill for a Physical Therapist? Y = Yes N = No DK = Do not know, cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation	How much is this skill a part of the graduate's job duties?	Do you consider this to be a vital skill for a physical therapist?
s. Electrotherapy treatments	1 2 3 4 5 DK	M A I N	Y N DK
Other skills/areas			
t. Ability to integrate systems (eg. client with both neurological and musculoskeletal problems)	1 2 3 4 5 DK	M A I N	Y N DK
u. Ability to identify multi-system problems in areas other than the primary diagnosis (eg. recognize an MSK problem in a patient presenting with neurological signs)	1 2 3 4 5 DK	M A I N	Y N DK
v. Ability to manage time (eg. seeing a full case load, finishing paperwork without staying late)	1 2 3 4 5 DK	M A I N	Y N DK
w. Knowing where to find information (eg. use of the library, use of other health professionals)	1 2 3 4 5 DK	M A I N	Y N DK
x. Basic science knowledge (eg. anatomy, physiology)	1 2 3 4 5 DK	M A I N	Y N DK

	Use the following definitions for the codes provided:		
	Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Current Job Duties M = Major portion of current job A =Average portion of job I = minor portion of current job N = Not part of current job	Vital skill for a Physical Therapist? Y = Yes N = No DK = Do not know, cannot judge
Area of activity/ function/ skill/knowledge	Strength of Professional Preparation	How much is this skill a part of the graduate's job duties?	Do you consider this to be a vital skill for a physical therapist?
y. Applied science knowledge (eg. medical science, pathology, biomechanics)	1 2 3 4 5 DK	M A I N	Y N DK
z. Geriatrics	1 2 3 4 5 DK	M A I N	Y N DK
aa. Pediatrics	1 2 3 4 5 DK	M A I N	Y N DK
bb. Body mechanics & safety issues	1 2 3 4 5 DK	M A I N	Y N DK
cc. Knowledge of ethical issues	1 2 3 4 5 DK	M A I N	Y N DK
dd. Ability to deal with ethical issues in practice	1 2 3 4 5 DK	M A I N	Y N DK
ee. Critical thinking (eg. identifying the issues that are pertinent to a problem)	1 2 3 4 5 DK	M A I N	Y N DK
ff. Problem solving	1 2 3 4 5 DK	M A I N	Y N DK
gg. Communication skills (i.e. ability to explain oneself so that others understand)	1 2 3 4 5 DK	M A I N	Y N DK

		Use the following definitions for the codes provided:		
		Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Current Job Duties M = Major portion of current job A =Average portion of job I = mInor portion of current job N = Not part of current job	Vital skill for a Physical Therapist? Y = Yes N = No DK = Do not know, cannot judge
Area of activity/ function/ skill/knowledge		Strength of Professional Preparation	How much is this skill a part of the graduate's job duties?	Do you consider this to be a vital skill for a physical therapist?
hh.	Interpersonal skills (i.e. ability to establish a rapport with clients and other professionals)	1 2 3 4 5 DK	M A I N	Y N DK
ii.	Research skills (i.e. designing, carrying out, analyzing and reporting a project)	1 2 3 4 5 DK	M A I N	Y N DK
jj.	Administration skills	1 2 3 4 5 DK	M A I N	Y N DK
kk.	Ability to supervise Physical Therapy Assistants	1 2 3 4 5 DK	M A I N	Y N DK
ll.	Ability to work within a team (multi professional approach)	1 2 3 4 5 DK	M A I N	Y N DK
mm.	Charting ability	1 2 3 4 5 DK	M A I N	Y N DK
nn.	Prioritizing skills (eg. deciding who to put on a weekend list or which parts of a treatment to perform if time is limited)	1 2 3 4 5 DK	M A I N	Y N DK

		Use the following definitions for the codes provided:		
		Professional Preparation (including placements) 5 = very strong preparation 3 = average preparation 1 = very weak preparation DK = do not know; cannot judge	Current Job Duties M = Major portion of current job A =Average portion of job I = mInor portion of current job N = Not part of current job	Vital skill for a Physical Therapist? Y = Yes N = No DK = Do not know, cannot judge
Area of activity/ function/ skill/knowledge		Strength of Professional Preparation	How much is this skill a part of the graduate's job duties?	Do you consider this to be a vital skill for a physical therapist?
oo.	Critical appraisal (i.e. the ability to evaluate the worth of a research article and its findings)	1 2 3 4 5 DK	M A I N	Y N DK
pp.	Ability to use evidence based practice (i.e. the ability to integrate findings of current research into clinical practice)	1 2 3 4 5 DK	M A I N	Y N DK
qq.	Ability to accurately evaluate their current level of knowledge and skill	1 2 3 4 5 DK	M A I N	Y N DK
rr.	Ability to work without direction (i.e. recognizing a need and addressing the situation without being explicitly asked to do so)	1 2 3 4 5 DK	M A I N	Y N DK
ss.	Writing skills (eg. ability to write a hospital report or a short article for a professional newsletter)	1 2 3 4 5 DK	M A I N	Y N DK
		1 2 3 4 5 DK	M A I N	Y N DK
		1 2 3 4 5 DK	M A I N	Y N DK

8. Which of the following statements do you consider to be more appropriate:
   a. Manual Therapy should be taught in undergraduate training. 1
      If so, to what level (E1/V1, E2/V2, E3/V3) _____
   b. Manual Therapy should be taught only in post graduate courses. 2
   c. Not sure 3

9. Which of the following statements do you consider to be more appropriate:
   a. Undergraduate programs should focus on a generalist education. 1
   b. Undergraduate programs should allow for specialization. 2
   c. Not sure 3

10. While working for you, has this graduate had the opportunity to supervise a physical therapy student?
   a. No 1
   b. Yes 2
      i. If yes, do you feel that the graduate was prepared for this responsibility?
         (1) Yes 1
         (2) No 2
         Please explain your answer:

11. Has the graduate participated in any committee work while at your place of employment? (Either in-hospital or external to the immediate work environment.)
   a. Yes 1
   b. No 2
      Please list committees:

12. Has the graduate attended at least one physical therapy related post graduate course during the past year?
   a. Yes 1
   b. No 2

13. Has the graduate conducted any in-service education sessions during the past year?
   a. Yes 1
   b. No 2

14. In what areas do you feel the graduate was unprepared for their present practice upon graduation?

    a. Please describe one or more important incidents which would demonstrate why you feel that the graduate was unprepared for their present practice upon graduating. Include in your description a brief statement of what the consequences were of not knowing something or not being able to do something.

15. What do you see as the greatest strengths this graduate brings to the job environment?

16. Approximately how many months/years of work do you estimate it took for the graduate to become comfortable and "up to speed" with expectations in the work place.

    _____ Month(s) _____ Year(s) _____ Not there yet

17. Are there subjects or areas covered in undergraduate education which you feel are unnecessary? Please list such topics and explain why you think they were not needed.

18. Are there courses that you feel students should take prior to entering a physical therapy program? If so, please list them here.

19. Are there subjects or areas or concepts graduates are taught that are not relevant to the graduate's current practice? If so, please describe one or more such areas, and explain why they are not able to put this education to use. For example, are the reasons related to job type, location, or financial constraints of the workplace?

20. Do you feel that the graduate is comfortable in treating clients who have not been referred by a medical doctor (direct access)?
    a. Yes 1
    b. No 2
    Please explain why you answered in this way.

21. How would you rate the graduate's maturity level? (Please circle the appropriate number.)

Very Low		Average		Very high	Don't Know
1	2	3	4	5	DK

22. Does the graduate makes appropriate referrals to other health practitioners?
    a. Yes 1
    b. No 2

23. Would you recommend the physical therapy program in which this graduate studied to someone else considering entering the profession?

a. Yes 1
b. No 2
c. Not sure 3

Please explain why you answered in this way.

24. In Summary, keeping in mind this particular graduate and the university program in which they studied, please list three things you would suggest the physical therapy program discontinue, then three things would you suggest the program introduce, and three things the program currently does that you suggest be kept as they are.

i. Three things to discontinue:
(1)
(2)
(3)

ii. Three things to introduce:
(1)
(2)
(3)

iii. Three things to keep as they are:
(1)
(2)
(3)

25. Further comments:

Notes about the study:

26. If follow-up group or individual interviews were to be conducted to expand on the issues raised in this study, would you be interested in participating?

a. Yes 1
Please include your name & phone number

b. No 2

27. If you are interested in receiving a summary of the research findings, please include your name and address:

Thank you for taking the time to respond to this survey!

Please return the questionnaire, in the envelope provided, to
Marla Nayer, Graduate Student, Higher Education Group, Ontario Institute for Studies in Education, 252 Bloor St. W., 9th Floor, Toronto, Ontario, M5S 1V6

Appendix 8 — Maximizing questionnaire response rate

	Fugua (1982)	Linsky (1975)	Heberlin & Baumgartner (1978)	Boser (1990)
Follow Ups	definitely effective	effective, more effective than precontact	effective, 3 is the optimum number, including a copy of the questionnaire is not necessary	cost effective, post card at 2 weeks, or no card but a copy of the questionnairq at 3 weeks
Pre-contaqt	effeqtive	effective	not necessary if follow ups arq used	not necessary if follow ups are used
Personalization	no difference	uncertain	uncertain	
Postage	outgoing: no difference	Special delivery is better than regular which is better than bulk. SASE is effective	Certified mail for follow ups is effective. No difference for outgoing mail.	
Monetary incentive	effective	effective	effective	
Length		uncertain	no correlation	
Anonymity		uncertain		
Salience		uncertain	increased response	

Appendix 9 — Cover letters

Suggested Cover Letter from Chair of departments to all groups

Printed on departmental stationary & photocopied for one university, printed on departmental stationary at the other three universities.

Chair, Department of Physical Therapy
University Address

January 1996

Dear Graduates, Supervisors and Faculty,

We are participating in a research project titled *Perceptions of Physical Therapy Graduates' Readiness for Professional Activities, by the Graduates, their Supervisors and Faculty*. This project is looking at how the curriculum influenced the graduates of several physical therapy programs, and in particular how it may have affected their readiness to practice. Marla Nayer, a doctoral candidate at the Ontario Institute for Studies in Education, is conducting a survey by mail which includes our program's recent graduates, their supervisors, and faculty* at the university.

The results from this survey will be returned to the university, and may assist us in our curriculum planning process. Your opinions and observations regarding the education we provide to our students in the physical therapy program are important to us. Please take time to complete the attached survey.

Your co-operation and assistance would be greatly appreciated.

Yours very truly,

Chair, Department of Physical Therapy

**Faculty* refers to Physical Therapists who have paid teaching appointments at the university.

Cover letter from Researcher to Graduates

Printed on OISE Stationary

Marla Nayer
H. 905-820-6861
FAX: 905-820-9761
email: mnayer@oise.on.ca

DATE

FIELD(title) FIELD(first name) FIELD(last name)
FIELD(address)
FIELD(city), FIELD(province)
FIELD(Country) FIELD(Postal Code)

Dear FIELD(first name),

Health care is moving in new directions in response to the changing needs of our society. A few of the changes in recent years have included: an emphasis on earlier discharges from hospital and a greater use of community health care systems; an aging population with more health problems; greater emphasis on preventive health care and services; and increased use and complexity of technology. Additional pressures affecting physical therapists include the push toward conducting research, as well as recent legislative changes which allow direct access to therapists.

In order to ensure that graduates of physical therapy programs will be able to perform their duties competently in the workplace, whether in clinical work, research, teaching, or administration, the educational programs are also changing. This project, *Perceptions of Physical Therapy Graduates' Readiness for Professional Activities, by the Graduates, their Supervisors and Faculty*, is unique in that it will compare the perceptions of three groups: the graduates, their work supervisors, and the faculty at the universities where they studied. This triangulation should lead to a better understanding of the strengths and weaknesses of new graduates. This project is being undertaken as the research requirement of my doctoral level studies at OISE.

The enclosed questionnaire is aimed at assessing how well you feel your education prepared you for your current work environment. For details of the definition of a Supervisor and the supervisors' questionnaire, please see the last page of the Graduate Questionnaire. *Please return the Graduate Questionnaire, even if you are not willing to allow contact with a Supervisor or Professional Colleague*.
The questionnaires are anonymous and no results will be identified by name. Your questionnaire and your supervisor's questionnaire (if you agree to my contacting your supervisor, as discussed at the end of the questionnaire) will be paired for analysis purposes; however, the questionnaires will still be anonymous and the results will not be identified by name. The responses of the

graduates as a group will be compared with the results of groups of graduates from other universities. I would like to emphasize that universities will not be identified by name, and no ranking of the universities will be conducted using the results of this project.

Please take the 45 to 60 minutes needed to complete the questionnaire. Then return it in the addressed, postage paid envelope provided.

If you have any questions about the project, please feel free to contact me for further information. Thank you for taking time to complete the questionnaire.

Yours very truly,

Marla Nayer
BScPT, MEd, PhD (candidate)

Cover Letter from Researcher to Faculty

Marla Nayer
H. 905-820-6861
FAX: 905-820-9761
email: mnayer@oise.on.ca

February 16, 1996

FIELD(First name) FIELD(Last name)
FIELD(Program name)
FIELD(University)
FIELD(Address)

Dear FIELD(Salutation),

Health care is moving in new directions in response to the changing needs of our society. A few of the changes in recent years have included: an emphasis on earlier discharges from hospital and a greater use of community health care systems; an aging population with more health problems; greater emphasis on preventive health services; and increased use and complexity of technology. Additional pressures affecting physical therapists include the push toward conducting research as well as recent legislative changes which allow direct access to therapists.

In order to ensure that graduates of physical therapy programs will be able to perform their duties competently in the workplace, whether in clinical work, research, teaching, or administration, the educational programs are also changing. This project, *Perceptions of Physical Therapy Graduates' Readiness for Professional Activities, by the Graduates, their Supervisors and Faculty*, is unique in that it will compare the perceptions of three groups: the graduates, their work supervisors, and the faculty at the universities where they studied. This triangulation should lead to a better understanding of the strengths and weaknesses of new graduates. This project is being undertaken as the research requirement of my doctoral level studies at OISE.

The enclosed questionnaire is directed at assessing the strengths and weaknesses of the graduates from your point of view. Your responses will be compared with responses from graduates of your program, the supervisors of those graduates, and faculty at the other participating universities. Results will be provided to your university program. The questionnaires are anonymous and results will not be identified by name. I would like to emphasize that universities will not be identified by name either, and no ranking of the universities will be conducted using the results of this project.

Please take the 45-60 minutes needed to complete the questionnaire. Then return it through inter-university mail, in the envelope provided, by *March 15, 1996*.

If you have any questions about the project, please feel free to contact me for further information. Thank you for taking the time to complete the questionnaire.

Yours very truly,

Marla Nayer
BScPT, MEd, PhD (candidate)

Cover Letter from Researcher To Supervisors

Printed On OISE Stationary

Marla Nayer
H. 905-820-6861
FAX: 905-820-9761
email: mnayer@oise.on.ca

DATE

Dear Supervisor or Professional Colleague of FIELD(First Name) FIELD(Last Name),

Health care is moving in new directions in response to the changing needs of our society. A few of the changes in recent years have included: an emphasis on earlier discharges from hospital and a greater use of community health care systems; an aging population with more health problems; greater emphasis on preventive health services; and increased use and complexity of technology. Additional pressures affecting physical therapists include the push toward conducting research, as well as recent legislative changes which allow direct access to therapists.

In order to ensure that graduates of physical therapy programs will be able to perform their duties competently in the workplace, whether in clinical work, research, teaching, or administration, the educational programs are also changing. This project, *Perceptions of Physical Therapy Graduates' Readiness for Professional Activities, by the Graduates, their Supervisors and Faculty*, is unique in that it will compare the perceptions of three groups: the graduates, their work supervisors, and the faculty at the universities where they studied. This triangulation should lead to a better understanding of the strengths and weaknesses of new graduates. This project is being undertaken as the research requirement of my doctoral level studies at OISE.

The enclosed questionnaire is directed at assessing the strengths and weaknesses of the graduates.

Your responses will assist in providing feedback to FIELD(University), the university program from which FIELD(First Name) graduated. Please keep FIELD(First Name) in mind when completing the questionnaire. Your questionnaire and FIELD(First Name)'s questionnaire will be paired for analysis purposes; however questionnaires are anonymous and results will not be identified by name. The results of your group of clinical supervisors will be compared with those of clinical supervisors of graduates from other universities. I would like to emphasize that universities will not be identified by name, and no ranking of the universities will be made using the results of this project.

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Please take the time (45-60 minutes) to complete this questionnaire. Then return it in the addressed, postage paid envelope provided, within three weeks.

If you have any questions about the project, please feel free to contact me for further information. Thank you for taking time to complete the questionnaire.

Yours very truly,

Marla Nayer
BScPT, MEd, PhD (candidate)

Appendix 10 — Follow ups

First Follow Up to All Groups

(on OISE stationery)
Marla Nayer
Ontario Institute for Studies in Education
Higher Education Group - 9th floor
252 Bloor St. W.
Toronto, Ontario
M5S 1V6

DATE

FIELD(name)
FIELD(address)

Dear FIELD(salutation),

This is a follow up letter to the *Survey on the Perceptions of Physical Therapy Graduates' Readiness for Professional Activities* which was mailed to you two weeks ago. If you have already returned it, I would like to thank you for your participation in the survey. If you have not yet returned it, I would like to ask you to take the time to fill out the questionnaire and return it in the postage paid envelope which was provided with the questionnaire.

Thank you, again, for your time in completing the questionnaire.

Yours very truly,

Marla Nayer
BSc (Phys Ther), MEd, PhD (candidate)

Second Follow Up to All Groups

(on OISE stationery)
Marla Nayer
Ontario Institute for Studies in Education
Higher Education Group - 9th floor
252 Bloor St. W.
Toronto, Ontario
M5S 1V6

DATE

FIELD(name)
FIELD(address)

Dear FIELD(salutation),

A month ago you were mailed a *Survey on the Perceptions of Physical Therapy Graduates' Readiness for Professional Activities*. This survey has not been returned and as it is possible that it was never received by you or has been inadvertently misplaced, I am enclosing another copy of the questionnaire with an addressed, stamped, return envelope. The focus of the questionnaire is whether recent graduates of physical therapy programs feel that they were educated well, and are able to take on the responsibilities required of them in their first few years of professional activities.

There has been much research into educational matters in many health professions, with medicine being at the forefront of this research. I feel that it is necessary for the physiotherapy profession to begin to look into some of these educational areas. This survey will help to document where the profession is now, in terms of providing curricula appropriate to current work situations. This information could be of assistance to faculty in attempting to make changes which would improve the educational programs. I encourage you to fill out and return the questionnaire.

Yours very truly,

Marla Nayer
BSc (Phys Ther), MEd, PhD (candidate)

Third Follow Up to All Groups

(on OISE stationery)
Marla Nayer
Ontario Institute for Studies in Education
Higher Education Group - 9th floor
252 Bloor St. W.
Toronto, Ontario
M5S 1V6

DATE

FIELD(name)
FIELD(address)

Dear FIELD(salutation),

The questionnaire on the *Perceptions of Physical Therapy Graduates' Readiness for Professional Activities* which was sent to you earlier this year has not yet been returned. I am writing to try to clear up any concerns you may have as to why this information has been requested. I am a physical therapist (BSc PT, McGill, 1977) and a PhD student at the Ontario Institute for Studies in Education, currently working on my thesis.

As you are aware, the medical field has a very large fund of information available related to education matters, including at least four journals (Medical Teacher, Teaching and Learning in Medicine, Academic Medicine and Medical Education). There is very little information available on education related topics specific to physiotherapists. I feel that this is to our detriment. As a profession we must be able to defend not only our clinical practices with our scientific research, but our educational practices as well. With this in mind, I elected to pursue graduate work in the education field.

Due to the influence of a number of my co-students in both the masters and doctoral programmes who come from backgrounds in medicine, nursing and physiotherapy, I have become interested in the area of curriculum development and evaluation.

The first part of the research was designing the questionnaire, which you have seen. Focus group interviews were conducted with three groups: the education committees at the four participating university programs (the University of Toronto, Queen's University, McMaster University and the University of Western Ontario); clinical supervisors from the area around the universities; and recent graduates of each of the programs. Using the information obtained during the interviews, the questionnaire was designed by me with assistance from my advisors, and reviewed by the university faculty. Its main purpose is to collect information from graduates which can then be

used to improve the physical therapy program. None of the individual respondents will be identified in the reports which will be provided to the university programs. The information regarding your current supervisor, requested on the last page, will be split from the rest of the questionnaire prior to data entry. There will be no effort to cross check your comments with those of your supervisor. What is of interest here, is the opinions of the group of supervisors, as compared to the group of graduates, and finally the group of clinical faculty members.

I hope that I have cleared up any questions you may have had and that you will agree to return the completed questionnaire. Please feel free to contact me for further information.

Thank you for your time.

Yours very truly,

Marla Nayer
BSc (Phys Ther), MEd, PhD (candidate)

Appendix 11 — Costs of the study

Item	Cost (rounded)
computer paper (20)	180.00
labels - small (3 boxes)	50.00
labels - large (2 boxes)	40.00
OISE stationary	1500.00
photocopying	100.00
pilot test printing	60.00
postage	4000.00
printer	800.00
printer cartridges (8)	370.00
printing	2000.00
return envelopes	70.00
SPSS program & manuals	300.00
tape recorder	90.00
tapes for FGIs	40.00
Total	$ 9600.00

Appendix 12 — Calculation of scales

Numbers in italics after each item refer to the question number on the Graduate's Questionnaire. Question numbers for the Faculty and Supervisor questionnaire are different, however the questions are substantially the same and with reference to the grids and the questionnaires they may be identified without great difficulty.

Assessment Scale = Cardiorespiratory (CR) Assessment *(10a)* + Auscultation *(10b)* + Neurology (Neuro) Assessment *(10h)* + Musculoskeletal (MSK) Assessment *(10m)*

Cardioresp Scale = CR Assessment *(10a)* + Auscultation *(10b)* + Suctioning *(10c)* + CR identifying problems *(10d)* + CR treatment plan *(10e)* + CR Treatment *(10f)* +CR Reassessment & Treatment Progression *(10g)*

Clinical Reasoning Scale = Identifying relevant problems in all areas [CR *(10d)* + neuro *(10i)* + MSK *(10n)*]

Commitment Scale = CPA member *(22)* + attended OPA meeting *(23)* + still working in PT in 5 years *(26)* + committee work *(24)*

Communication Scale (Faculty & Graduates) = Entry level communication *(8a)* + communication strength *(10gg)*
Communication Scale (Supervisors) = communication strength

Critical Thinking Scale = ability to identify multi-system problems *(10u)* + critical thinking *(10ee)*

Critical Appraisal Scale = critical thinking *(10ee)* + critical appraisal *(10oo)*

Ethics Scale = knowledge of ethical issues *(10cc)* + ability to deal with ethical issues *(10dd)*

Evidence Based Practice Scale (Faculty and Graduates) = Outcome Measures *(33)*+ Evidence Based Practice *(10pp)*
Evidence Based Practice Scale (Supervisors) - Evidence Based Practice

Integration = integrating systems *(10t)* + identifying multi-system problems *(10u)*

Interpersonal Skills (Faculty & Graduates) = Entry interpersonal skills *(8c)* + interpersonal skill strength *(10hh)*
Interpersonal Skills (Supervisors) = interpersonal strength

Knowledge Scale = Applied Sciences *(10y)*+ Basic Sciences *(10x)*

Leadership Scale = Entry leadership level *(8b)* + committee work for grads & faculty *(24)*

Library / Resource Usage Scale = knowing where to find info *(w)* + number of journals read *(34)*

Life Long Learning Scale = number of courses taken since graduation *(30)* + conducted an in-service *(31)* + number of journals read in 6 months *(34)* + self directed *(10rr)* + self evaluation *(10qq)*

MSK Scale = MSK Assessment *(10m)* + MSK Identifying Problems *(10n)* + MSK Treatment Plan *(10o)* + MSK Treatment *(10p)* + MSK Reassessment & Treatment Progression *(10q)* + Manual Therapy *(10r)* + electrotherapy *(10s)*

Neuro Scale = Neuro Assessment *(10h)* + Neuro identifying problems *(10i)* + Neuro Treatment Plan *(10j)* + Neuro Treatment *(10k)* + Neuro Reassessment & Treatment Progression *(10l)*

Problem Solving Skills Scale = ability to integrate systems *(10t)* + problem solving *(10ff)*

Research Scale = Research Strengths *(10ii)* + involved with research *(15)* + writing skills *(10ss)*

Specialization Scale (Graduates) = level of manual therapy to be taught *(12)* + generalist / specialist preference *(13)* + taught manual therapy *(11)*

Specialization Scale (Faculty & Supervisors) = level of manual therapy to be taught +generalist / specialist preference

Supervision Scale (Graduates who had a student) = Entry level leadership *(8b)* + had a student *(14)* + supervise PTA *(10kk)* + prepared for student *(14b, iv)* + administration strength *(10jj)*

Supervision Scale (Graduates who have not had a student) = Entry level leadership + had a student + supervise PTA + administration strength *(10jj)*

Supervision Scale (Faculty) = Entry level leadership + supervise PTA + prepared for student + administration strength *(12jj)* + maturity *(11)*

Supervisor Scale (Supervisors, where Graduate had a student) = supervise PTA + had a student + prepared for student + administration strength *(7jj)* + maturity *(21)*

Supervision Scale (Supervisors, where Graduate did not have a student) = supervise PTA + had a student + administration strength *(7jj)* + maturity *(21)*

Teamwork & Role Boundaries Scale = direct access *(28)* + appropriate referrals *(29)* + teamwork *(10ll)*

Time Management scale = priorization skills *(10v)* + time management *(10nn)*

Treatment Scale = Suctioning *(10c)* + carrying out Treatment for all areas [CR *(10f)* + Neuro *(10k)* + MSK *(10p)*] + manual therapy *(10r)* + electro *(10s)* + body mechanics & safety *(10bb)* + charting *(10mm)*

Treatment Planning Scale = Planning Treatment for all three areas [CR *(10e)* + neuro *(10j)* + MSK *(10o)*]

Treatment Progression Scale = Reassessing and progressing treatment for all three areas [CR *(10g)* + neuro *(10l)* + MSK *(10q)*]

Appendix 13 — Percent of missing data from ratings of strengths and weaknesses

Item	Faculty		Graduates		Supervisors	
	#	%	#	%	#	%
Cardiorespiratory - Assessment	8	20.0	2	1.2	41	49.4
Auscultation	8	20.0	2	1.2	49	59.0
Suctioning	9	22.5	3	1.8	63	75.9
Cardiorespiratory - Identifying Relevant Problems	9	22.5	4	2.4	42	50.6
Cardiorespiratory - Planning Treatment	8	20.0	4	2.4	42	50.6
Cardiorespiratory - Treatment Skills	7	17.5	2	1.2	42	50.6
Cardiorespiratory - Reassessment & Progressing Treatment	8	20.0	2	1.2	42	50.6
Neurology - Assessment	6	15.0	1	1.2	29	34.9
Neurology - Identifying Relevant Problems	5	12.5	3	1.8	26	31.3
Neurology - Planning Treatment	5	12.5	3	1.8	28	33.7
Neurology - Treatment Skills	6	15.0	3	1.8	29	34.9
Neurology - Reassessment & Progressing Treatment	7	17.5	3	1.8	28	33.7
Musculoskeletal - Assessment	4	10.0	0	0	4	4.8
Musculoskeletal - Identifying Relevant Problem	3	7 .5	0	0	0	0
Musculoskeletal - Planning Treatment	2	5.0	0	0	4	4.8
Musculoskeletal - Treatment Skills	3	7.5	0	0	4	4.8
Musculoskeletal Reassessment & Progressing Treatment	3	7.5	1	.6	4	4.8
Manual Therapy Strength	4	10.0	1	.6	15	18.1
Electrotherapy	3	7.5	0	0	13	15.7
Musculoskeletal & Cardiorespiratory & Neurology	0	0	2	1.2	7	8.4
Identifying Multisystem Problems	3	7.5	0	0	8	9.6
Time Management	5	12.5	2	1.2	2	2.4
Using Resources	0	0	1	.6	2	2.4

Item	Faculty		Graduates		Supervisors	
	#	%	#	%	#	%
Basic Sciences	0	0	1	.6	2	2.4
Applied Sciences	0	0	0	0	5	6.0
Geriatrics	4	10.0	1	.6	22	24.8
Paediatrics	5	12.5	2	1.2	54	65.7
Safety & Body Mechanics	1	2.5	1	.6	4	4.8
Ethical Knowledge	1	2.5	0	0	6	7.2
Deals with Ethical Situations	2	5.0	3	1.8	6	7.2
Critical Thinking	0	0	2	1.2	4	4.8
Problem Solving	0	0	0	0	4	4.8
Communication Skills	1	2.5	3	1.8	4	4.8
Interpersonal Skills	0	0	5	3	5	6.0
Research	1	2.5	1	.6	38	45.8
Administration	7	17.5	1	.6	29	34.9
PTA Supervision	9	22.5	9	5.3	22	26.5
Teamwork	0	0	1	.6	6	7.2
Charting	4	10.0	1	.6	6	7.2
Priorizing	6	15.0	2	1.2	10	12.0
Critical Appraisal	0	0	1	.6	30	36.1
Evidence Based Practice	2	5.0	2	1.2	13	15.7
Self Evaluation	3	7.5	2	1.2	6	7.2
Works Independently	3	7.5	1	.6	2	2.4
Writing Skills	2	5.0	4	2.4	16	19.3

Appendix 14 — Mean and standard deviation for all scales

By Respondent Group	Faculty		Graduate		Supervisors	
	Mean	SD	Mean	SD	Mean	SD
Assessment Skills Scale	8.30	1.03	7.42	1.16	7.60	.80
Cardiorespiratory Scale	7.93	1.20	6.99	1.44	7.27	.72
Clinical Reasoning Scale	7.99	1.22	7.12	1.14	7.62	.88
Commitment Scale	5.72	1.38	8.56	1.07	8.39	2.32
Communication Scale	7.37	1.44	7.54	1.30	8.58	1.63
Critical Thinking Scale	6.90	1.60	6.42	1.63	7.18	2.11
Critical Appraisal Scale	7.88	1.54	6.74	1.85	6.37	2.65
Ethics Scale	6.38	1.88	6.41	2.03	7.25	2.57
Evidence Based Practice Scale	7.50	1.81	7.23	2.01	7.48	1.58
Integration Scale	6.72	1.29	6.08	1.66	7.29	1.61
Interpersonal Skills Scale	7.55	1.40	7.82	1.44	8.67	1.67
Knowledge Scale	7.50	1.40	7.50	1.44	8.28	1.44
Leadership Scale	8.30	2.03	7.25	1.50	6.65	2.34
Library / Resource Scale	8.15	1.49	5.83	1.84	8.53	1.88
Lifelong Learning Scale	7.25	1.29	5.44	1.27	7.67	1.18
Musculoskeletal Scale	8.03	1.29	7.28	1.43	7.80	1.38
Neurology Scale	7.28	1.20	6.33	1.73	7.27	1.28
Problem-solving Scale	7.40	1.30	6.71	1.63	7.75	1.47
Research Scale	4.99	1.06	6.24	1.68	7.49	1.55
Specialization Scale	4.63	1.21	6.04	1.24	5.36	1.49
Supervision scale	6.33	.87	5.76	1.31	7.52	1.08
Teamwork & Role Boundaries Scale	8.19	1.06	8.23	1.17	8.81	1.09
Time Management Scale	6.31	1.33	6.12	1.66	7.54	1.65

By Respondent Group	Faculty		Graduate		Supervisors	
	Mean	SD	Mean	SD	Mean	SD
Treatment Scale	7.42	1.18	6.76	1.07	7.51	0.85
Treatment Planning Scale	7.99	1.22	7.07	1.22	7.60	.98
Treatment Progression Scale	7.37	1.19	6.64	1.31	7.49	1.05

Faculty by University	A		B		C		D	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Assessment Skills Scale	8.03	1.11	7.89	.98	8.69	1.04	8.53	.75
Cardiorespiratory Scale	7.52	1.26	7.35	1.47	8.39	.84	8.48	.79
Clinical Reasoning Scale	8.21	1.09	7.39	1.66	8.25	1.09	8.02	.73
Commitment Scale	6.50	1.05	5.10	1.17	5.43	1.48	6.11	1.54
Communication Scale	8.99	1.07	6.50	.85	6.79	1.37	7.50	.55
Critical Appraisal Scale	9.60	.52	7.20	1.69	7.36	1.28	7.33	.82
Critical Thinking Scale	8.30	.95	5.70	1.57	6.86	1.29	6.67	1.63
Ethics Scale	6.90	1.60	6.20	.92	6.43	2.06	5.67	3.01
Evidence Based Practice Scale	8.90	1.20	7.00	1.70	7.04	2.04	7.08	1.27
Integration Scale	7.20	1.14	5.73	1.29	7.02	.94	6.88	1.61
Interpersonal Skills Scale	8.50	1.35	6.50	.85	7.43	1.45	8.00	.89
Knowledge Scale	6.40	1.35	7.80	1.23	7.79	1.25	8.17	1.33
Leadership Scale	9.00	2.24	7.43	1.88	8.57	2.17	7.92	1.25
Library / Resource Scale	9.40	1.07	7.40	1.17	7.64	1.50	8.51	1.37
Lifelong Learning Scale	7.70	1.01	7.51	.79	6.83	1.47	7.09	1.82
MSK Scale	7.49	1.81	8.11	1.44	8.32	.81	8.10	.91
Neurology Scale	7.50	1.25	6.65	1.18	7.75	1.18	6.88	.75

Faculty by University	A		B		C		D	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Problem Solving Scale	8.50	.71	6.30	1.16	7.36	1.15	7.50	1.22
Research Scale	5.30	1.16	5.10	1.29	4.83	1.00	4.68	.68
Specialization Scale	4.75	1.65	4.25	1.05	4.55	.79	5.21	1.46
Supervision Scale	6.59	.74	6.18	.89	6.00	.90	6.93	.71
Teamwork & Role Boundaries Scale	8.65	1.02	7.78	.91	8.02	1.17	8.52	.91
Time Management Scale	6.40	1.26	6.05	1.13	6.17	1.38	6.95	1.73
Treatment Scale	6.71	1.60	7.41	1.09	7.84	.79	7.63	.97
Treatment Planning Scale	7.97	1.37	7.26	1.32	8.56	.98	7.90	.78
Treatment Progression Scale	7.15	1.59	7.19	1.24	7.63	1.03	7.48	.80

Graduates by University	A		B		C		D	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Assessment Skills Scale	7.38	.97	7.20	1.29	7.51	1.13	7.59	1.16
Cardiorespiratory Scale	6.69	.90	7.07	1.13	6.52	1.08	6.76	1.02
Clinical Reasoning Scale	7.31	.93	7.25	1.30	6.93	1.11	7.10	1.12
Commitment Scale	8.59	1.12	8.28	.83	8.77	1.11	8.60	1.21
Communication Scale	8.38	1.14	7.39	1.30	7.30	1.34	7.51	1.14
Critical Thinking Scale	7.69	1.16	6.48	1.62	6.00	1.68	6.10	1.43
Critical Appraisal Scale	9.23	.86	6.25	1.58	6.36	1.72	6.23	1.48
Ethics Scale	8.15	1.62	6.44	1.98	5.84	1.83	6.05	2.05
Evidence Based Practice Scale	9.15	1.01	6.69	2.13	7.28	1.69	6.56	2.00
Integration Scale	6.42	1.60	6.19	1.85	5.98	1.57	5.88	1.58

Graduates by University	A		B		C		D	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Interpersonal Skills Scale	8.67	1.06	7.85	1.51	7.44	1.36	7.79	1.48
Knowledge Scale	7.19	1.52	7.65	1.33	7.41	1.47	7.67	1.47
Leadership Scale	7.86	1.29	6.82	1.39	7.32	1.52	7.29	1.60
Library / Resource Scale	6.86	1.64	5.24	1.48	5.77	1.96	5.97	1.95
Lifelong Learning Scale	6.19	1.22	5.13	1.04	5.42	1.24	5.34	1.43
MSK Scale	7.03	1.17	8.13	1.37	6.75	1.31	7.17	1.41
Neurology Scale	6.62	1.73	5.88	1.93	6.42	1.68	6.56	1.49
Problem Solving Scale	7.96	1.18	6.77	1.61	6.34	1.58	6.31	1.61
Research Scale	7.36	1.55	5.95	1.65	6.30	1.74	5.76	1.41
Specialization Scale	6.08	1.09	5.88	1.06	6.23	1.51	5.92	1.09
Supervision Scale	6.40	1.31	5.75	1.25	5.47	1.27	5.77	1.32
Teamwork & Boundaries Scale	9.14	.90	8.09	1.16	8.11	1.27	7.96	.91
Time Management Scale	6.73	1.56	6.33	1.56	5.66	1.63	6.11	1.76
Treatment Scale	6.69	4.60	6.19	1.85	5.98	1.57	5.88	1.58
Treatment Planning Scale	6.97	1.04	7.03	1.33	7.17	1.18	7.04	1.27
Treatment Progression Scale	6.87	1.03	6.60	1.38	6.55	1.30	6.64	1.42

Supervisors by University	A		B		C		D	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Assessment Skills Scale	7.71	.86	7.31	.84	7.79	.79	7.55	.64
Cardiorespiratory Scale	7.27	.65	6.94	.67	7.50	.84	7.25	.55
Clinical Reasoning Scale	7.45	.74	7.67	.98	7.86	.89	7.42	.88

Supervisors by University	A		B		C		D	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Commitment Scale	9.07	1.91	8.80	2.12	8.39	2.38	7.50	2.57
Communication Scale	8.70	1.36	8.21	1.65	8.78	1.36	8.65	2.16
Critical Thinking Scale	7.61	1.58	7.00	1.91	7.64	2.16	6.17	2.48
Critical Appraisal Scale	7.28	2.35	6.11	2.68	6.36	2.79	5.56	2.53
Ethics Scale	7.28	2.30	6.39	3.18	7.79	2.15	7.11	2.70
Evidence Based Practice Scale	7.83	1.46	7.22	1.70	7.88	1.35	6.63	1.60
Integration Scale	7.22	1.63	7.02	1.94	7.70	1.46	7.08	1.47
Interpersonal Skills Scale	8.82	1.69	8.71	1.36	9.17	1.47	7.86	1.95
Knowledge Scale	8.48	1.20	7.62	1.33	8.93	1.12	7.85	1.78
Leadership Scale	6.02	1.99	6.30	2.18	6.61	2.38	7.50	2.57
Library / Resource Scale	8.78	1.70	8.11	1.75	8.91	1.86	8.03	2.17
Lifelong Learning Scale	7.77	1.04	7.65	1.09	7.93	1.16	7.26	1.39
MSK Scale	7.49	1.28	7.96	1.16	8.16	1.19	7.51	1.70
Neurology Scale	7.01	1.00	7.66	1.57	7.30	1.35	7.27	.90
Problem Solving Scale	7.73	1.22	7.48	1.76	8.12	1.39	7.47	1.53
Research Scale	8.11	1.83	7.57	.83	7.27	1.69	7.13	1.56
Specialization Scale	5.69	1.15	5.42	1.66	4.96	1.46	5.63	1.67
Supervision scale	7.81	.83	7.33	.89	7.78	1.22	7.19	.87
Teamwork & Role Boundaries Scale	9.03	.95	8.55	1.00	9.13	1.14	8.45	1.03
Time Management Scale	7.54	1.76	7.32	1.42	8.00	1.78	7.14	1.48
Treatment Scale	7.22	.80	7.61	.73	7.88	.67	7.25	1.02
Treatment Progression Scale	7.39	.84	7.59	.99	7.62	1.18	7.42	1.02
Treatment Planning Scale	7.30	.73	7.68	1.01	7.81	1.14	7.56	.87

Graduates by Year	1992		1994	
	Mean	SD	Mean	SD
Assessment Skills Scale	7.51	1.15	7.36	1.17
Cardiorespiratory Scale	7.19	1.48	6.85	1.41
Clinical Reasoning Scale	7.02	1.20	7.18	1.11
Commitment Scale	8.56	1.16	8.57	1.01
Communication Scale	7.49	1.13	7.58	1.41
Critical Thinking Scale	6.17	1.77	6.60	1.50
Critical Appraisal Scale	6.56	1.97	6.87	1.75
Ethics Scale	6.31	1.86	6.49	2.16
Evidence Based Practice	7.12	2.23	7.31	1.83
Integration Scale	5.82	1.74	6.28	1.57
Interpersonal Skills Scale	7.79	1.30	7.85	1.53
Knowledge Scale	7.46	1.37	7.53	1.49
Leadership Scale	7.26	1.40	7.24	1.57
Library / Resource Scale	5.49	1.69	6.08	1.92
Lifelong Learning Scale	5.77	1.40	5.20	1.11
MSK Scale	7.17	1.32	7.36	1.52
Neurology Scale	6.13	1.84	6.48	1.64
Problem Solving Scale	6.46	1.80	6.86	1.49
Research Scale	6.08	1.77	6.36	1.62
Specialization Scale	5.87	1.29	6.15	1.20
Supervision scale	5.71	1.31	5.80	1.31
Teamwork & Role Boundaries Scale	8.22	1.19	8.23	1.16
Time Management Scale	5.96	1.71	6.24	1.62
Treatment Scale	6.73	1.13	6.78	1.03

Graduates by Year	1992		1994	
	Mean	SD	Mean	SD
Treatment Planning Scale	6.98	1.24	7.13	1.20
Treatment Progression Scale	6.57	1.25	6.69	1.35

Supervisors by Year	1992		1994	
	Mean	SD	Mean	SD
Assessment Skills Scale	7.61	.83	7.62	.78
Cardiorespiratory Scale	7.23	.77	7.30	.70
Clinical Reasoning Scale	7.66	.90	7.61	.88
Commitment Scale	9.03	2.01	7.97	2.43
Communication Scale	8.33	1.80	8.83	1.43
Confidence Scale	8.98	1.12	8.87	1.09
Critical Thinking Scale	6.86	2.43	7.41	1.83
Critical Appraisal Scale	6.08	3.02	6.52	2.31
Ethics Scale	6.22	3.28	8.00	1.43
Evidence Based practice Scale	7.28	1.39	7.58	1.70
Integration Scale	7.31	1.51	7.31	1.71
Interpersonal Skills Scale	8.52	1.79	8.84	1.55
Knowledge Scale	8.18	1.58	8.41	1.31
Leadership Scale	5.97	2.01	7.10	2.45
Library / Resource Scale	8.42	2.18	8.59	1.64
Lifelong Learning Scale	7.73	1.24	7.65	1.15
MSK Scale	7.77	1.51	7.87	1.21
Neurology Scale	7.36	1.38	7.27	1.14
Problem Solving Scale	7.72	1.58	7.78	1.41

Supervisors by Year	1992		1994	
	Mean	SD	Mean	SD
Research Scale	7.66	1.27	7.36	1.76
Specialization Scale	5.14	1.52	5.54	1.48
Supervision Scale	7.73	.95	7.42	1.06
Teamwork & Role Boundaries Scale	8.74	1.14	8.90	1.03
Time Management Scale	7.45	1.92	7.65	1.41
Treatment Scale	7.53	.87	7.54	.82
Treatment Progression Scale	7.45	1.17	7.57	.90
Treatment Planning Scale	7.52	1.15	7.69	.82

Appendix 15 — Principal components analysis

03 Nov 97 SPSS for MS WINDOWS Release 6.1

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Analysis number 1 Listwise deletion of cases with missing values

	Mean	Std Dev	Label
APRAI_SC	6.79110	2.11545	Critical Appraisal Scale
ASSES_SC	7.59216	1.09067	Assessment Skills Scale
CLINR_SC	7.37863	1.13355	Clinical Reasoning Scale
COMUN_SC	7.81168	1.49588	Communication Scale
CR_SC	7.19931	1.28079	Cardio-Respiratory Scale
CRIT_SC	6.70205	1.80214	Critical Thinking Scale
EBP_SC	7.34027	1.86665	Evidence Based Practice Scale
ETHIC_SC	6.64726	2.20486	Ethics Scale
INTEG_SC	6.51545	1.67994	Integration & problem solving scale
INTER_SC	8.02705	1.55383	Interpersonal Skills Scale
KNOW_SC	7.72336	1.47269	Knowledge Scale
LIBRA_SC	6.91868	2.21172	Resource Scale
LIFE_SC	6.32068	1.62373	Life Long Learning Scale
MSK_SC	7.53056	1.42158	MSK Scale
NEURO_SC	6.72786	1.61330	Neurology Scale
PS2_SC	7.09805	1.61008	problem solving & integration items (not
RES2_SC	6.42388	1.58648	research scale (with writing)
SUPAD_SC	6.33985	1.41620	supervision scale (with admin)
TEAMR_SC	8.38744	1.15790	Teamwork & Role Boundaries Scale
TIME_SC	6.55048	1.72854	Time Management Scale
TREAT_SC	7.06185	1.08743	Treatment Scale
TRPLA_SC	7.34404	1.20263	Treatment Planning Scale
TRPRO_SC	6.97998	1.28437	Treatment Progression Scale

Number of Cases = 292

Correlation Matrix:

	APRAI_SC	ASSES_SC	CLINR_SC	COMUN_SC	CR_SC	CRIT_SC	EBP_SC
APRAI_SC	1.00000						
ASSES_SC	.24784	1.00000					
CLINR_SC	.32189	.72354	1.00000				
COMUN_SC	.28392	.18094	.27304	1.00000			
CR_SC	.21068	.76970	.60588	.13929	1.00000		
CRIT_SC	.62722	.36462	.49222	.39194	.26569	1.00000	
EBP_SC	.53941	.18246	.33180	.27860	.20002	.40851	1.00000
ETHIC_SC	.36873	.17445	.23698	.30495	.18820	.51226	.36058
INTEG_SC	.32549	.42944	.53955	.37510	.31111	.73396	.31807
INTER_SC	.31344	.23222	.29360	.64968	.18348	.42740	.31956
KNOW_SC	.19297	.47198	.46230	.30188	.35331	.35833	.14270
LIBRA_SC	.29053	.24161	.32244	.32584	.18329	.37972	.31801
LIFE_SC	.28809	.25182	.35543	.38695	.23200	.40334	.31179
MSK_SC	.18879	.49725	.61136	.17645	.23884	.34910	.18980
NEURO_SC	.21589	.57390	.67081	.23641	.32274	.40183	.19344
PS2_SC	.51838	.41162	.58045	.48403	.29668	.76382	.41446
RES2_SC	.38417	.11780	.30237	.44836	.16144	.43651	.41860
SUPAD_SC	.25639	.22336	.32839	.45014	.20768	.40614	.24347
TEAMR_SC	.33363	.30063	.34412	.38262	.24464	.36262	.30431
TIME_SC	.31588	.37691	.48971	.42876	.36073	.52529	.30918
TREAT_SC	.24615	.64926	.68913	.26298	.58665	.43271	.25991
TRPLA_SC	.25428	.68991	.79994	.21915	.59309	.41090	.22652
TRPRO_SC	.26347	.68063	.70600	.29024	.57564	.46341	.26013

	ETHIC_SC	INTEG_SC	INTER_SC	KNOW_SC	LIBRA_SC	LIFE_SC	MSK_SC
ETHIC_SC	1.00000						
INTEG_SC	.28891	1.00000					
INTER_SC	.36989	.36940	1.00000				
KNOW_SC	.30006	.41102	.38513	1.00000			
LIBRA_SC	.28649	.39436	.30132	.27226	1.00000		
LIFE_SC	.27157	.47131	.34520	.33428	.73036	1.00000	
MSK_SC	.11604	.39416	.24338	.52207	.24487	.28378	1.00000
NEURO_SC	.17343	.51132	.22845	.32018	.29718	.31424	.30142
PS2_SC	.35201	.85119	.47217	.43587	.43593	.51013	.44937
RES2_SC	.39075	.43348	.41231	.36066	.38913	.45646	.22633
SUPAD_SC	.35164	.46705	.47867	.26620	.41149	.53476	.26671
TEAMR_SC	.36363	.36070	.45941	.33594	.30862	.35148	.20053
TIME_SC	.36872	.55971	.43917	.44110	.39805	.45935	.44424
TREAT_SC	.30143	.51394	.35552	.60541	.32615	.40405	.76047
TRPLA_SC	.16953	.49491	.22772	.47207	.31128	.32781	.65794
TRPRO_SC	.19029	.56217	.29489	.49398	.34187	.38516	.66699

	NEURO_SC	PS2_SC	RES2_SC	SUPAD_SC	TEAMR_SC	TIME_SC	TREAT_SC
NEURO_SC	1.00000						
PS2_SC	.49953	1.00000					
RES2_SC	.27237	.48099	1.00000				
SUPAD_SC	.33773	.48526	.51464	1.00000			
TEAMR_SC	.31324	.45394	.40591	.43742	1.00000		
TIME_SC	.38964	.57788	.52180	.55353	.44995	1.00000	
TREAT_SC	.54236	.53203	.41047	.42351	.35462	.63187	1.00000
TRPLA_SC	.70927	.54840	.24471	.30359	.30528	.45843	.72377
TRPRO_SC	.69865	.56848	.36287	.41902	.34759	.58873	.75323

	TRPLA_SC	TRPRO_SC
TRPLA_SC	1.00000	
TRPRO_SC	.81192	1.00000

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .71846
Bartlett Test of Sphericity = 5484.1353, Significance = .00000

Anti-image Correlation Matrix:

	APRAI_SC	ASSES_SC	CLINR_SC	COMUN_SC	CR_SC	CRIT_SC	EBP_SC
APRAI_SC	.79452						
ASSES_SC	-.06282	.59890					
CLINR_SC	.05935	.41116	.68379				
COMUN_SC	.04494	-.06491	-.05200	.89652			
CR_SC	-.03328	-.81959	-.69366	.05681	.39212		
CRIT_SC	-.48022	.02945	-.04125	.01302	-.02034	.88407	
EBP_SC	-.34662	.05982	-.09868	.01518	-.03234	.12664	.88599
ETHIC_SC	.07468	-.09733	-.07835	-.00389	.12187	-.38752	-.17283
INTEG_SC	.40444	-.07612	.01466	.08482	-.00062	-.40954	-.07996
INTER_SC	.04013	.02864	.05350	-.46869	-.05501	-.09008	-.10358
KNOW_SC	.01788	-.16911	-.04396	-.01246	.09754	.04132	.15387
LIBRA_SC	-.00925	-.09667	-.02819	.00546	.08421	-.02154	-.06940
LIFE_SC	.00307	.11113	.05870	-.07102	-.11287	.03378	-.02600
MSK_SC	-.02002	-.72344	-.71147	.05856	.93569	-.04963	-.03001
NEURO_SC	-.02121	-.73994	-.71651	.05197	.92051	-.02783	-.00093
PS2_SC	-.28562	.01923	-.08958	-.16159	.08063	-.11082	-.01498
RES2_SC	-.13618	.06889	-.13642	-.13883	.11895	.02982	-.16160
SUPAD_SC	-.01149	.04380	.02386	-.05226	-.02043	.06611	.11846
TEAMR_SC	-.07370	-.16423	-.09976	.02227	.13703	.10074	-.02926
TIME_SC	.01147	-.12368	-.22205	-.07540	.23094	-.08841	.01280
TREAT_SC	.04610	.59898	.59542	.02811	-.83351	.06832	.02312
TRPLA_SC	.00933	.53242	.28741	-.03382	-.66976	.06328	.05665
TRPRO_SC	.04865	.50962	.61410	-.06621	-.74789	-.01393	-.02265

	ETHIC_SC	INTEG_SC	INTER_SC	KNOW_SC	LIBRA_SC	LIFE_SC	MSK_SC
ETHIC_SC	.84322						
INTEG_SC	.15457	.86152					
INTER_SC	-.02511	.08513	.89042				
KNOW_SC	-.12799	-.05318	-.15576	.93767			
LIBRA_SC	-.06416	.00517	-.01754	.02540	.86624		
LIFE_SC	.05054	-.03336	.06712	-.08659	-.61835	.86712	
MSK_SC	.17090	.02522	-.05708	.04091	.05799	-.08919	.43455
NEURO_SC	.12685	-.03134	-.05630	.10733	.05604	-.09151	.92761
PS2_SC	.04705	-.62944	-.07374	-.01475	.01939	-.08516	.04297
RES2_SC	-.03896	-.07008	.03443	-.14981	-.03044	-.05479	.16038
SUPAD_SC	-.12471	-.09442	-.17737	.17242	.02807	-.23289	-.02600
TEAMR_SC	-.10082	.05044	-.16707	-.05312	.00805	-.02511	.14989
TIME_SC	.00945	-.05933	-.01591	.01402	-.03792	-.01263	.25778
TREAT_SC	-.19305	-.01414	.00436	-.15759	-.01626	.04557	-.87795
TRPLA_SC	-.09840	.07547	.09068	-.08232	-.09858	.09805	-.66824
TRPRO_SC	-.02815	-.02748	.07816	-.06479	-.04818	.08449	-.77437

	NEURO_SC	PS2_SC	RES2_SC	SUPAD_SC	TEAMR_SC	TIME_SC	TREAT_SC
NEURO_SC	.45451						
PS2_SC	.06832	.90781					
RES2_SC	.11504	.03869	.92217				
SUPAD_SC	-.03608	.01615	-.15885	.93635			
TEAMR_SC	.11376	-.11470	-.04950	-.11440	.92816		
TIME_SC	.26848	.01057	-.04349	-.15366	-.08275	.89813	
TREAT_SC	-.80573	-.04994	-.20128	-.00329	-.09451	-.35080	.61079
TRPLA_SC	-.69166	-.17439	-.01621	.04346	-.09799	-.10210	.52085
TRPRO_SC	-.78192	-.02988	-.16868	-.04019	-.10163	-.31915	.62321

	TRPLA_SC	TRPRO_SC
TRPLA_SC	.70803	
TRPRO_SC	.34182	.65803

Measures of Sampling Adequacy (MSA) are printed on the diagonal.

Extraction 1 for analysis 1, Principal Components Analysis (PC)

Initial Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
APRAI_SC	1.00000	*	1	9.89360	43.0	43.0
ASSES_SC	1.00000	*	2	2.69172	11.7	54.7
CLINR_SC	1.00000	*	3	1.29093	5.6	60.3
COMUN_SC	1.00000	*	4	1.11251	4.8	65.2
CR_SC	1.00000	*	5	.99320	4.3	69.5
CRIT_SC	1.00000	*	6	.91838	4.0	73.5
EBP_SC	1.00000	*	7	.75481	3.3	76.8
ETHIC_SC	1.00000	*	8	.73509	3.2	80.0
INTEG_SC	1.00000	*	9	.63155	2.7	82.7
INTER_SC	1.00000	*	10	.58823	2.6	85.3
KNOW_SC	1.00000	*	11	.54305	2.4	87.6
LIBRA_SC	1.00000	*	12	.46854	2.0	89.7
LIFE_SC	1.00000	*	13	.40282	1.8	91.4
MSK_SC	1.00000	*	14	.35433	1.5	93.0
NEURO_SC	1.00000	*	15	.30875	1.3	94.3
PS2_SC	1.00000	*	16	.26583	1.2	95.4
RES2_SC	1.00000	*	17	.24744	1.1	96.5
SUPAD_SC	1.00000	*	18	.23093	1.0	97.5
TEAMR_SC	1.00000	*	19	.18910	.8	98.4
TIME_SC	1.00000	*	20	.15707	.7	99.0
TREAT_SC	1.00000	*	21	.11887	.5	99.6
TRPLA_SC	1.00000	*	22	.09413	.4	100.0
TRPRO_SC	1.00000	*	23	.00911	.0	100.0

Hi-Res Chart # 1:Factor scree plot

PC extracted 4 factors.

Factor Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4
PS2_SC	.81880	.17929	.14752	-.17601
TRPRO_SC	.80845	-.38511	-.06462	-.05462
TREAT_SC	.80582	-.33675	-.14284	.11568
CLINR_SC	.78814	-.38320	.12913	-.02266
TRPLA_SC	.75961	-.49496	.03086	-.07088
INTEG_SC	.75916	.08755	.07664	-.25545
TIME_SC	.74689	.11587	-.18315	.06437
CRIT_SC	.72948	.26054	.36507	-.09670
ASSES_SC	.67331	-.52655	.12470	.13104
NEURO_SC	.65846	-.29904	.03572	-.20816
MSK_SC	.62739	-.36791	-.15452	.01210
KNOW_SC	.62304	-.13977	-.22074	.28486
LIFE_SC	.61919	.28840	-.29503	-.42340
SUPAD_SC	.61774	.32386	-.33813	-.03743
RES2_SC	.59564	.42088	-.11161	.03139
INTER_SC	.56851	.39128	-.18656	.41069
TEAMR_SC	.56796	.25704	-.06611	.26808
CR_SC	.56097	-.43645	.14868	.21972
LIBRA_SC	.55540	.27661	-.20985	-.46930
COMUN_SC	.53350	.42300	-.22748	.25518
EBP_SC	.47817	.32945	.45588	-.01187
ETHIC_SC	.47050	.38339	.20895	.28831
APRAI_SC	.51347	.33114	.58519	-.00184

Final Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
APRAI_SC	.71576	*	1	9.89360	43.0	43.0
ASSES_SC	.76333	*	2	2.69172	11.7	54.7
CLINR_SC	.78519	*	3	1.29093	5.6	60.3
COMUN_SC	.58041	*	4	1.11251	4.8	65.2
CR_SC	.57556	*				
CRIT_SC	.74266	*				
EBP_SC	.54515	*				
ETHIC_SC	.49513	*				
INTEG_SC	.65512	*				
INTER_SC	.67978	*				
KNOW_SC	.53759	*				
LIBRA_SC	.64926	*				
LIFE_SC	.73288	*				
MSK_SC	.55300	*				
NEURO_SC	.56760	*				
PS2_SC	.75532	*				
RES2_SC	.54537	*				
SUPAD_SC	.60223	*				
TEAMR_SC	.46489	*				
TIME_SC	.60896	*				
TREAT_SC	.79654	*				
TRPLA_SC	.82798	*				
TRPRO_SC	.80906	*				

Reproduced Correlation Matrix:

	APRAI_SC	ASSES_SC	CLINR_SC	COMUN_SC	CR_SC
APRAI_SC	.71576*	.00374	-.03151	.00350	-.01944
ASSES_SC	.24410	.76333*	-.02203	.03939	.11485
CLINR_SC	.35340	.74557	.78519*	.04982	-.01771
COMUN_SC	.28043	.14155	.22322	.58041*	.00239
CR_SC	.23012	.65485	.62359	.13690	.57556*
CRIT_SC	.67466	.38683	.52442	.39167	.32854
EBP_SC	.62142	.20378	.30976	.28773	.18963
ETHIC_SC	.49029	.17875	.24435	.43922	.19102
INTEG_SC	.46412	.44113	.58046	.35942	.34292
INTER_SC	.31156	.20731	.26473	.61605	.21065
KNOW_SC	.14393	.50290	.50964	.39617	.44028
LIBRA_SC	.25484	.14065	.31527	.34129	.05652
LIFE_SC	.24157	.17278	.34899	.41140	.08458
MSK_SC	.10988	.59847	.61523	.21732	.49221
NEURO_SC	.26036	.57798	.64287	.16355	.45947
PS2_SC	.56645	.45223	.59966	.43419	.36433
RES2_SC	.37984	.16963	.29304	.52920	.14075
SUPAD_SC	.22664	.19833	.31994	.53393	.14669
TEAMR_SC	.33758	.27395	.33452	.49518	.25550
TIME_SC	.31458	.42747	.51914	.50557	.35532
TREAT_SC	.21846	.71723	.74308	.34947	.60320
TRPLA_SC	.24433	.76664	.79394	.17077	.63116
TRPRO_SC	.24988	.73190	.77764	.26917	.59999

	CRIT_SC	EBP_SC	ETHIC_SC	INTEG_SC	INTER_SC
APRAI_SC	-.04744	-.08201	-.12155	-.13862	.00187
ASSES_SC	-.02221	-.02131	-.00430	-.01169	.02491
CLINR_SC	-.03221	.02204	-.00737	-.04090	.02887
COMUN_SC	.00027	-.00912	-.13427	.01568	.03363
CR_SC	-.06284	.01039	-.00282	-.03182	-.02717
CRIT_SC	.74266*	-.19372	.02075	.10467	.01856
EBP_SC	.60223	.54515*	-.08254	-.11175	.00873
ETHIC_SC	.49151	.44312	.49513*	-.04420	-.12703
INTEG_SC	.62929	.42982	.33311	.65512*	.02276
INTER_SC	.40885	.31083	.49692	.34664	.67978*
KNOW_SC	.30994	.14786	.27555	.37106	.45769
LIBRA_SC	.44599	.26661	.18821	.54965	.27040
LIFE_SC	.46006	.26162	.21818	.58086	.34602
MSK_SC	.30423	.10821	.12533	.42915	.24652
NEURO_SC	.43559	.23509	.14260	.52961	.16518
PS2_SC	.71489	.51993	.43406	.69356	.43584
RES2_SC	.50039	.37222	.42733	.47246	.53702
SUPAD_SC	.41519	.24838	.33337	.48096	.52563
TEAMR_SC	.43123	.32295	.42925	.38013	.54590
TIME_SC	.50195	.31106	.37612	.54667	.53056
TREAT_SC	.43676	.20789	.25353	.54177	.40051
TRPLA_SC	.44329	.21507	.15364	.55381	.20332
TRPRO_SC	.47111	.23090	.20348	.58903	.29856

	KNOW_SC	LIBRA_SC	LIFE_SC	MSK_SC	NEURO_SC
APRAI_SC	.04904	.03569	.04653	.07891	-.04447
ASSES_SC	-.03092	.10097	.07904	-.10122	-.00408
CLINR_SC	-.04734	.00717	.00645	-.00387	.02794
COMUN_SC	-.09429	-.01545	-.02445	-.04087	.07287
CR_SC	-.08697	.12677	.14742	-.25337	-.13672
CRIT_SC	.04839	-.06628	-.05673	.04486	-.03377
EBP_SC	-.00516	.05140	.05017	.08159	-.04166
ETHIC_SC	.02451	.09828	.05339	-.00929	.03083
INTEG_SC	.03996	-.15529	-.10955	-.03499	-.01829
INTER_SC	-.07256	.03092	-.00082	-.00314	.06327
KNOW_SC	.53759*	.05225	.04430	.04221	-.06468
LIBRA_SC	.22001	.64926*	.04608	-.02857	-.07600
LIFE_SC	.28998	.68428	.73288*	-.03906	-.08483
MSK_SC	.47987	.27343	.32283	.55300*	-.21367
NEURO_SC	.38486	.37319	.39907	.51509	.56760*
PS2_SC	.40238	.55600	.58970	.42282	.52744
RES2_SC	.34586	.45593	.50984	.23648	.25583
SUPAD_SC	.40359	.52120	.59151	.32021	.30562
TEAMR_SC	.40889	.27461	.33181	.27522	.23895
TIME_SC	.50791	.45510	.52267	.45504	.43721
TREAT_SC	.61361	.33009	.39500	.65293	.60212
TRPLA_SC	.51544	.31177	.34851	.65305	.66405
TRPRO_SC	.55623	.38169	.43171	.65823	.65656

	PS2_SC	RES2_SC	SUPAD_SC	TEAMR_SC	TIME_SC
APRAI_SC	-.04808	.00433	.02976	-.00394	.00129
ASSES_SC	-.04061	-.05183	.02503	.02668	-.05057
CLINR_SC	-.01921	.00933	.00844	.00959	-.02943
COMUN_SC	.04983	-.08085	-.08379	-.11256	-.07681
CR_SC	-.06765	.02069	.06099	-.01086	.00541
CRIT_SC	.04893	-.06387	-.00905	-.06861	.02335
EBP_SC	-.10547	.04638	-.00491	-.01864	-.00188
ETHIC_SC	-.08205	-.03658	.01828	-.06562	-.00740
INTEG_SC	.15763	-.03899	-.01391	-.01944	.01303
INTER_SC	.03633	-.12471	-.04695	-.08649	-.09139
KNOW_SC	.03349	.01480	-.13739	-.07296	-.06681
LIBRA_SC	-.12007	-.06680	-.10971	.03401	-.05705
LIFE_SC	-.07957	-.05338	-.05674	.01967	-.06332
MSK_SC	.02655	-.01015	-.05350	-.07470	-.01080
NEURO_SC	-.02791	.01654	.03211	.07429	-.04757
PS2_SC	.75532*	-.06019	-.03531	-.00026	-.01610
RES2_SC	.54118	.54537*	-.02619	-.05637	.00569
SUPAD_SC	.52058	.54083	.60223*	-.00900	-.00491
TEAMR_SC	.45420	.46228	.44642	.46489*	-.03340
TIME_SC	.59398	.51611	.55843	.48335	.60896*
TREAT_SC	.55800	.35783	.43270	.41157	.59645
TRPLA_SC	.55026	.23847	.30116	.28317	.49978
TRPRO_SC	.59300	.32497	.39859	.34981	.56752

	TREAT_SC	TRPLA_SC	TRPRO_SC
APRAI_SC	.02769	.00995	.01359
ASSES_SC	-.06797	-.07673	-.05127
CLINR_SC	-.05395	.00600	-.07163
COMUN_SC	-.08649	.04837	.02107
CR_SC	-.01655	-.03808	-.02435
CRIT_SC	-.00405	-.03238	-.00770
EBP_SC	.05203	.01145	.02923
ETHIC_SC	.04790	.01589	-.01319
INTEG_SC	-.02783	-.05890	-.02686
INTER_SC	-.04500	.02440	-.00367
KNOW_SC	-.00820	-.04337	-.06225
LIBRA_SC	-.00395	-.00049	-.03982
LIFE_SC	.00905	-.02069	-.04655
MSK_SC	.10754	.00489	.00876
NEURO_SC	-.05976	.04523	.04209
PS2_SC	-.02596	-.00186	-.02451
RES2_SC	.05264	.00624	.03790
SUPAD_SC	-.00919	.00243	.02043
TEAMR_SC	-.05695	.02212	-.00222
TIME_SC	.03542	-.04135	.02121
TREAT_SC	.79654*	-.04242	-.03084
TRPLA_SC	.76619	.82798*	.00532
TRPRO_SC	.78407	.80660	.80906*

The lower left triangle contains the reproduced correlation matrix; the diagonal, reproduced communalities; and the upper right triangle residuals between the observed correlations and the reproduced correlations.

There are 84 (33.0%) residuals (above diagonal) with absolute values > 0.05.

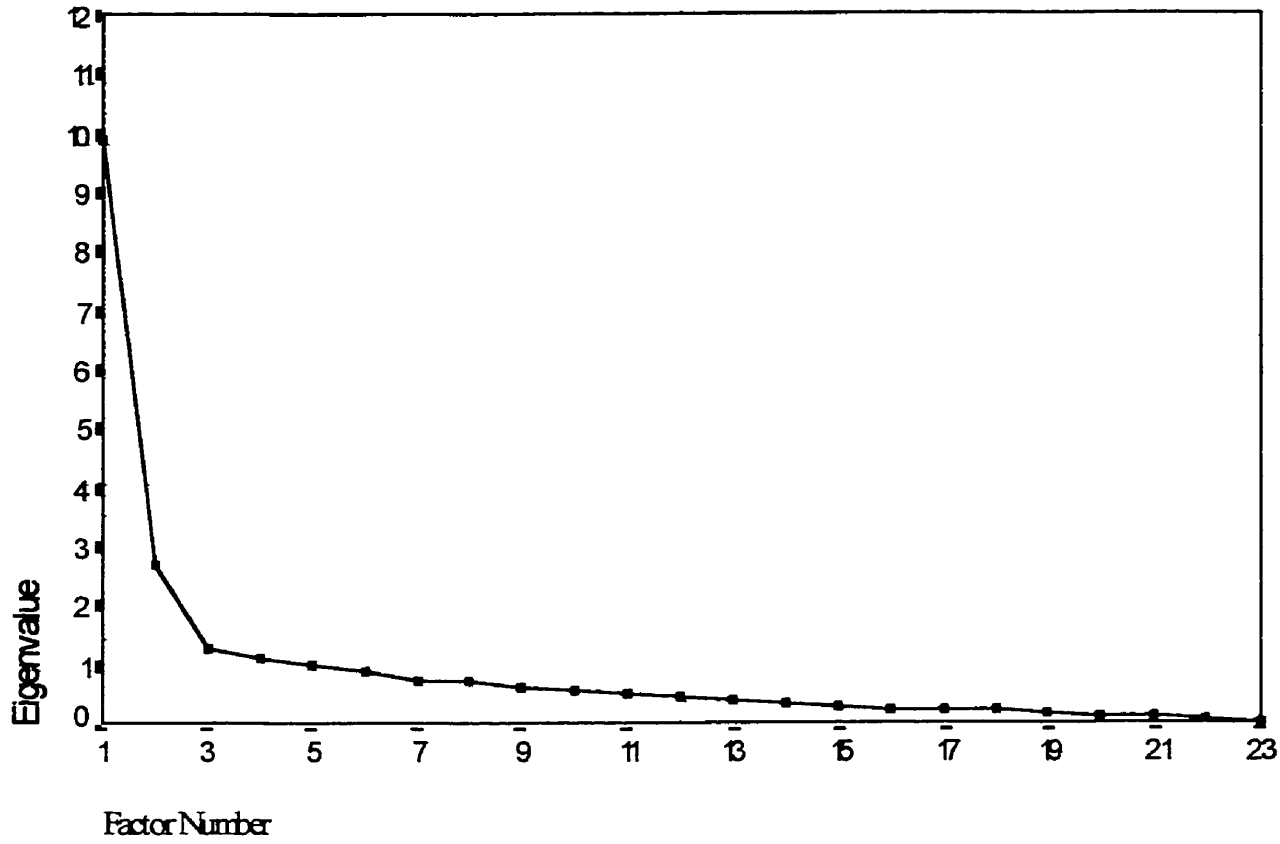
VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.

VARIMAX converged in 7 iterations.

Rotated Factor Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4
TRPLA_SC	**.87304**	.05071	.13712	.21074
ASSES_SC	**.85434**	.08570	.15944	-.02580
TRPRO_SC	**.82601**	.17459	.11709	.28738
CLINR_SC	**.81669**	.10978	.27045	.18170
TREAT_SC	**.80073**	.33500	.05997	.19887
CR_SC	**.71945**	.12437	.16538	-.12303
MSK_SC	**.69354**	.17735	-.02565	.19973
NEURO_SC	**.65114**	.01143	.18352	.33137
KNOW_SC	**.54444**	.48430	-.01045	.08067
INTER_SC	.13140	**.78368**	.19221	.10680
COMUN_SC	.07177	**.70137**	.16457	.23717
TEAMR_SC	.21983	**.58072**	.24934	.13100
SUPAD_SC	.17686	**.55133**	.08244	**.51009**
RES2_SC	.10059	**.54228**	.29676	.39130
TIME_SC	.42677	**.51211**	.17805	.36452
ETHIC_SC	.06797	**.50163**	.48868	.00883
APRAI_SC	.11973	.16472	**.81588**	.09290
CRIT_SC	.30715	.25671	**.69382**	.31786
EBP_SC	.09380	.19245	**.69375**	.13428
PS2_SC	.41715	.29414	**.51971**	.47401
LIFE_SC	.17477	.27481	.12595	**.78164**
LIBRA_SC	.13784	.17726	.17038	**.75485**
INTEG_SC	.43582	.20008	.40645	**.50985**

Figure 11 Scree plot for four factor solution



Appendix 16 — Calculation of factors scale scores

The scales which loaded on to each factor are listed below, along with rounded factor loadings. Under each list of scales is the more detailed list of items from the questionnaire which comprised the scales and which were added together to create Factor Scores. When an item was not included for a particular group of respondents, this is indicated by a letter in brackets after the item. For example (S) would mean that the item was not included for the Supervisor group. Similarly (G) or (F) indicates the item was not included for the Graduate or Faculty groups, respectively.

The method used to eliminate duplication of scale items from the factor scale score calculation will be demonstrated for Factor 1.

Step 1: Identify Scales that load over 0.5 on Factor 1
Factor Loadings for Factor 1 - Treatment Skills Factor

.87 Treatment Planning Scale
.85 Assessment Scale
.83 Treatment Progression Scale
.82 Clinical Reasoning Scale
.80 Treatment Scale
.72 Cardioresp Scale
.69 MSK Scale
.65 Neuro Scale
.54 Knowledge Scale

Step 2: Identify all items that are included in these scales
Scales included the following items:

Treatment Planning Scale = CR Treatment Planning + Neuro Treatment Planning + MSK Treatment Planning
Assessment Scale = Cardiorespiratory (CAR) Assessment + Auscultation + Neurology (Neuro) Assessment + Musculoskeletal (MSK) Assessment
Treatment Progression Scale = CR Reassessment & Treatment Progression + Neuro Reassessment & Treatment Progression + MSK Reassessment & Treatment Progression
Clinical Reasoning Scale = CR Identifying relevant problems + Neuro Identifying relevant problems + MSK Identifying relevant problems
Treatment Scale = Suctioning + CR Treatments + Neuro Treatments + MSK Treatments + Manual Therapy + Electrotherapy + Body Mechanics & Safety + Charting
Cardioresp Scale = CR Assessment + Auscultation + Suctioning + CR identifying relevant problems + CR Treatment planning + CR Treatment +CR Reassessment & Treatment Progression

MSK Scale = MSK Assessment + MSK Identifying Relevant Problems + MSK Treatment Planing + MSK Treatment + MSK Reassessment & Treatment Progression + Manual Therapy + Electrotherapy

Neuro Scale = Neuro Assessment + Neuro identifying Relevant problems + Neuro Treatment Planning + Neuro Treatment + Neuro Reassessment & Treatment Progression

Knowledge Scale = Applied Sciences + Basic Sciences

Step 3: List all items alphabetically and all items that are listed more than once are highlighted

Applied Sciences

Auscultation
Auscultation

Basic Sciences
Body Mechanics & Safety
Charting

Cardiorespiratory (CR) Assessment
CR Assessment

CR Reassessment & Treatment Progression
CR Reassessment & Treatment Progression

CR Treatment Planning
CR Treatment Planing

CR identifying Relevant Problems
CR Identifying relevant problems

CR Treatment
CR Treatments

Electrotherapy
Electrotherapy

Manual Therapy
Manual Therapy

MSK Treatments
MSK Treatment

MSK Reassessment & Treatment Progression
MSK Reassessment &Treatment Progression

MSK Treatment Planning
MSK Treatment Planning

MSK Identifying relevant Problems
MSK Identifying relevant Problems

Musculoskeletal (MSK) Assessment
MSK Assessment

Neuro Assessment
Neurology (Neuro) Assessment

Neuro identifying relevant problems
Neuro Identifying relevant problems

Neuro Reassessment & Treatment Progression
Neuro Reassessment & Treatment Progression

Neuro Treatments
Neuro Treatment

Neuro Treatment Planning
Neuro Treatment Planning

Suctioning
Suctioning

Step 4: All duplications are eliminated
The final Factor 1 Scale Score includes the items:

Applied Sciences
Auscultation
Basic Sciences
Body Mechanics & Safety
Charting
CR Assessment
CR Identifying relevant problems
CR Reassessment & Treatment Progression
CR Treatment
CR Treatment Planning
Electrotherapy
CR Identifying relevant problems
Manual Therapy
MSK Assessment
MSK Identifying relevant problems
MSK Reassessment and Treatment Progression
MSK Treatment
MSK Treatment Planning
Neuro Assessment
Neuro Identifying relevant problems
Neuro Reassessment and Treatment Progression
Neuro Treatment
Neuro Treatment Planning
Suctioning

Factor 2 - Interpersonal Skills Factor

.78 Interpersonal Skills Scale
.70 Communication Scale
.58 Teamwork & Role Boundaries Scale
.55 Supervision Scale
.54 Research Scale
.51 Time Management Scale
.50 Ethics Scale

This includes the following items:

entry level communication (S)
communication strength
entry interpersonal skills (S)
interpersonal skills strength
teamwork
appropriate referrals
direct access
entry leadership (S)
supervise PTA
had a student (F)
prepared for student
administration strength
maturity (G)
research strength
involved with research (S)
priorization skills
time management
knowledge of ethical issues
ability to deal with ethical issues

Factor 3 - Evidence Based Practice

.82 Critical Appraisal Scale
.69 Evidence Based Practice Scale
.69 Critical Thinking Scale
.51 Problem Solving Scale

This includes the following items:

critical thinking
critical appraisal
Evidence Based Practice
outcome measures (S)
identify multi-system problems
integrate systems
problem solving

Factor 4 - Life Long Learning Factor

.78 Life Long Learning Scale
.75 Library / Resource Scale
.51 Supervision Scale
.51 Integration Scale

This includes the following items:

courses
in-service (F)
journals (S)
self directed
self evaluation
knows where to find info
entry leadership (S)
supervise PTA
had a student (F)
prepared for student
administration strength
maturity (G)
integrating systems
identifying multi-system problem

Appendix 17 — Reliability analysis of factor scales

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R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
APPLIEDS	100.6656	205.9935	.5738	.9244
AUSCULTA	100.6039	208.9215	.4516	.9259
BASICSCI	100.1998	206.0947	.5297	.9250
CHARTING	100.5968	206.1777	.4683	.9259
CR_IDENT	100.6412	208.3588	.4849	.9255
CR_PLAN	100.5756	208.1345	.5161	.9252
CR_REAX	100.7754	206.4640	.5655	.9246
CR_TX	100.5728	208.7344	.5000	.9254
CRAX	100.3465	210.5494	.4021	.9265
CRITTHIN	100.5916	203.8027	.5633	.9245
ELECTRO	100.7086	207.8726	.3829	.9272
IDENTIFY	101.0603	202.8808	.6387	.9235
MSK_AX	100.2339	206.8981	.5459	.9248
MSK_CR_N	101.0129	203.6040	.6223	.9237
MSK_IDEN	100.3537	206.1682	.5796	.9244
MSK_PLAN	100.3748	204.2019	.6050	.9240
MSK_REAX	100.5608	202.9476	.6293	.9236
MSK_TX	100.4483	205.4259	.5568	.9246
MT_STREN	101.0235	204.0153	.4782	.9260
NEURO_ID	100.8201	204.7908	.5870	.9242
NEURO_PL	100.9166	204.3375	.5722	.9244
NEURO_RE	101.0769	202.9793	.6182	.9237
NEURO_TX	101.0297	204.2737	.5509	.9247
NEUROAX	100.8087	205.9505	.5055	.9253
PRIORIZI	100.9715	203.0125	.5858	.9242
PROBSOLV	100.4777	202.6046	.6024	.9239
SAFETY	100.3804	206.5574	.4869	.9255
SUCTIONI	101.3474	207.1696	.3857	.9273
TIMEMGMT	101.0667	202.0088	.5466	.9249

Reliability Coefficients
N of Cases = 292.0 N of Items = 29
Factor 1: Treatment Skills Factor Alpha = .9273

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R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
ENTRY_CO	90.9648	99.7124	.1258	.8644
COMMUNIC	90.6435	97.3679	.3182	.8573
ENTRY_IN	90.7898	96.8663	.3108	.8578
INTERPER	90.6398	96.4754	.3955	.8551
TEAMWORK	90.8648	96.3057	.4042	.8548
REFERRIN	92.6148	103.4240	-.0718	.8625
DIRECTAC	92.6192	103.6200	-.1006	.8628
ENTRY_LE	90.9648	95.7370	.3525	.8567
PTASUPER	92.3605	97.9206	.3308	.8568
PREP_STU	93.2148	103.9822	-.1099	.8654
ADMIN	91.6108	95.1506	.6094	.8504
MATURITY	90.3615	97.0396	.4379	.8543
RESEARCH	90.9257	96.3605	.3792	.8555
RESEARC2	93.1053	101.8021	.0531	.8636
PRIORIZI	91.3758	94.2374	.5164	.8515
TIMEMGMT	91.2898	95.3869	.4231	.8542
ETHICALK	91.0538	96.1432	.4130	.8546
DEALWETH	91.3058	95.3571	.4651	.8531
APPLIEDS	90.7648	93.8882	.6235	.8492
BASICSCI	90.7148	92.8866	.6470	.8480
SUCTIONI	91.0703	94.5927	.4546	.8533
CR_TX	90.3688	94.1569	.5785	.8501
NEURO_TX	91.0193	94.9677	.5671	.8509
MSK_TX	90.5435	94.2437	.5666	.8504
MT_STREN	90.8228	96.4000	.3276	.8574
ELECTRO	90.7063	93.1458	.4034	.8557
SAFETY	90.6180	95.3682	.4174	.8544
CHARTING	91.1008	93.4054	.5876	.8495
WRITING	91.2793	93.8498	.5355	.8509

Reliability Coefficients
N of Cases = 40.0 N of Items = 29
Factor 2: Interpersonal Skills Factor - Faculty Alpha = .8596

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R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
ENTRY_CO	84.7781	145.0640	.2504	.8640
COMMUNIC	84.6495	138.6669	.5993	.8553
ENTRY_IN	84.3406	144.2399	.2505	.8644
INTERPER	84.7509	134.9298	.7220	.8514
TEAMWORK	84.8584	137.2537	.5856	.8550
REFERRIN	86.4841	151.1215	.0279	.8656
DIRECTAC	86.6968	150.6757	.0374	.8661
ENTRY_LE	85.1263	142.3340	.3307	.8622
PTASUPER	86.2790	139.1091	.4785	.8579
HADSTUDE	86.4656	151.2303	.0000	.8656
PREP_STU	86.8852	148.1803	.1991	.8643
ADMIN	86.1352	137.3660	.5494	.8558
RESEARCH	85.3763	138.2694	.4486	.8588
RESEARC2	87.1977	151.3908	-.0327	.8671
PRIORIZI	85.2781	134.3263	.6594	.8523
TIMEMGMT	85.5107	137.0890	.5450	.8559
ETHICALK	85.0816	136.6644	.5643	.8553
DEALWETH	85.3016	134.5698	.6196	.8533
APPLIEDS	85.0638	143.0737	.3868	.8606
BASICSCI	84.4381	141.0443	.4357	.8592
SUCTIONI	85.7807	139.1897	.3468	.8628
CR_TX	84.8169	140.4717	.4744	.8583
NEURO_TX	85.4649	142.4830	.2792	.8642
MSK_TX	84.7156	145.9453	.2011	.8653
MT_STREN	85.3667	143.3811	.2451	.8653
ELECTRO	85.0191	144.8109	.1996	.8665
SAFETY	84.7959	138.6994	.5301	.8566
CHARTING	84.8316	139.8921	.4301	.8593
WRITING	85.5468	136.7482	.5253	.8563

Reliability Coefficients
N of Cases = 112.0 N of Items = 29
Factor 2: Interpersonal Skills Factor - Graduates with students
Alpha = .8645

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R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
ENTRY_CO	82.6251	110.8465	.0812	.8527
COMMUNIC	82.7304	103.9981	.5120	.8404
ENTRY_IN	82.2918	110.0237	.1105	.8527
INTERPER	82.8819	102.9949	.5713	.8386
TEAMWORK	82.8423	102.8830	.5313	.8394
REFERRIN	84.5549	112.5333	.0400	.8504
DIRECTAC	84.5549	110.8058	.3587	.8474
ENTRY_LE	82.9409	109.4835	.1822	.8496
PTASUPER	84.4067	101.4964	.4831	.8405
HADSTUDE	85.4847	112.8183	.0000	.8502
ADMIN	84.1632	101.4194	.5779	.8375
RESEARCH	83.2189	104.1622	.4075	.8433
RESEARC2	85.3619	112.0309	.0967	.8499
PRIORIZI	83.4093	101.9472	.6153	.8370
TIMEMGMT	83.4847	101.6026	.4586	.8415
ETHICALK	83.2391	101.7996	.5043	.8398
DEALWETH	83.4146	100.4954	.5437	.8382
APPLIEDS	83.0286	105.6359	.4584	.8424
BASICSCI	82.2918	105.1854	.4060	.8434
SUCTIONI	83.7230	105.0316	.2694	.8497
CR_TX	82.8418	109.4581	.2092	.8487
NEURO_TX	83.2718	108.8033	.2210	.8486
MSK_TX	82.8181	103.7341	.4437	.8421
MT_STREN	83.4672	100.3228	.4319	.8432
ELECTRO	82.8882	106.1847	.2811	.8479
SAFETY	82.6474	102.8213	.5154	.8398
CHARTING	83.0184	103.0897	.4500	.8418
WRITING	83.4865	102.1165	.4906	.8403

Reliability Coefficients
N of Cases = 57.0 N of Items = 28
Factor 2: Interpersonal Skills Factor - Graduates without students
Alpha = .8491

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R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
COMMUNIC	87.2268	110.1091	.5895	.8974
INTERPER	87.1616	107.8183	.7240	.8942
TEAMWORK	87.3518	109.6618	.6126	.8968
REFERRIN	89.3813	122.2405	.0000	.9046
DIRECTAC	89.5934	122.0438	.0130	.9053
PTASUPER	87.8224	116.7096	.3305	.9026
HADSTUDE	89.3813	122.2405	.0000	.9046
PREP_STU	89.4603	122.1598	.0010	.9052
ADMIN	88.2366	109.6497	.6315	.8964
MATURITY	86.9603	114.6920	.3879	.9018
RESEARCH	87.7139	115.4222	.3416	.9028
PRIORIZI	87.6092	108.9104	.6604	.8957
TIMEMGMT	87.8024	104.6567	.6576	.8959
ETHICALK	87.5695	110.4278	.6648	.8960
DEALWETH	87.5758	112.5547	.5094	.8992
APPLIEDS	87.4676	112.9224	.5816	.8980
BASICSCI	87.3874	109.1405	.6526	.8959
SUCTIONI	88.1445	121.5300	.0553	.9054
CR_TX	87.6761	121.1137	.0766	.9056
NEURO_TX	87.7897	114.1493	.3846	.9021
MSK_TX	87.4050	109.7849	.6841	.8955
MT_STREN	87.9355	108.7429	.5735	.8979
ELECTRO	87.7668	112.9799	.4608	.9003
SAFETY	87.1624	110.9455	.6541	.8963
CHARTING	87.3789	109.3628	.6406	.8962
WRITING	87.5724	109.8864	.6801	.8956

Reliability Coefficients
N of Cases = 38.0 N of Items = 26
Factor 2: Interpersonal Skills Factor - Supervisors with students
Alpha = .9032

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Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
COMMUNIC	86.8951	75.9178	.5052	.8841
INTERPER	86.8198	74.1991	.6872	.8797
TEAMWORK	87.1042	73.6614	.5851	.8818
REFERRIN	89.3398	82.7786	-.0308	.8914
DIRECTAC	89.4264	79.7178	.5120	.8863
PTASUPER	87.7380	73.5555	.6138	.8810
HADSTUDE	90.2953	82.7052	.0000	.8908
ADMIN	88.1431	74.1766	.4836	.8852
MATURITY	86.8064	79.6593	.2375	.8901
RESEARCH	87.4784	75.6729	.5294	.8835
PRIORIZI	87.5162	75.6273	.4479	.8858
TIMEMGMT	87.3722	72.1676	.6240	.8806
ETHICALK	87.2320	78.7109	.2443	.8911
DEALWETH	87.3707	76.8849	.3352	.8893
APPLIEDS	87.2091	71.9588	.7327	.8775
BASICSCI	86.7893	74.9316	.6355	.8811
SUCTIONI	88.1264	81.6875	.1643	.8901
CR_TX	87.6340	79.1524	.4739	.8860
NEURO_TX	87.7673	76.4617	.4904	.8845
MSK_TX	87.1820	75.8198	.5128	.8839
MT_STREN	87.7751	77.5040	.3886	.8869
ELECTRO	87.5762	76.3895	.4329	.8860
SAFETY	86.8962	75.4000	.5522	.8829
CHARTING	87.1298	75.0383	.5592	.8827
WRITING	87.4647	74.5461	.5578	.8826

Factor 2: Interpersonal Skills Factor - Supervisors without students
Reliability Coefficients
N of Cases = 45.0 N of Items = 25
Alpha = .889

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Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
CRITAPPR	26.6575	29.3330	.5856	.8280
CRITTHIN	26.5345	29.3251	.7295	.8139
DEALWETH	26.9569	29.9694	.6021	.8261
ETHICALK	26.7429	30.7619	.5539	.8312
EVIDBASP	26.9353	28.0860	.7026	.8141
OUTCOME	26.5635	33.0671	.2117	.8743
PROBSOLV	26.4101	29.1879	.7118	.8150
MSK_CR_N	26.9500	31.7110	.5460	.8327
IDENTIFY	27.0422	31.5252	.5572	.8316

Reliability Coefficients
N of Cases = 209.0 N of Items = 9
Factor 3: Evidence Based Practice Factor - Graduates & Faculty
Alpha = .8463

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Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
CRITAPPR	27.0304	17.5490	.6524	.8457
CRITTHIN	26.9229	16.1616	.7804	.8296
DEALWETH	27.1034	18.3975	.4477	.8681
ETHICALK	27.0253	18.2679	.5098	.8606
EVIDBASP	27.2447	17.6705	.5924	.8520
IDENTIFY	27.2935	17.1685	.6719	.8431
PROBSOLV	26.8354	16.6457	.7510	.8340
MSK_CR_N	27.3589	17.7388	.5405	.8581

Reliability Coefficients
N of Cases = 83.0 N of Items = 8
Factor 3: Evidence Based Practice Factor - Supervisors
Alpha = .8657

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Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
NO.COURS	72.5915	71.9210	.1779	.8632
NO.JRNLS	71.8165	75.9838	.1732	.8463
WORKINDE	72.3783	73.6952	.4916	.8322
SELFEVAL	72.2700	74.7192	.4109	.8350
INFOGATH	71.8165	70.1576	.6163	.8258
ENTRY_LE	72.3665	74.7364	.2795	.8405
PTASUPER	73.7623	75.3882	.3446	.8371
PREP_STU	74.6165	80.5136	-.0707	.8480
ADMIN	73.0125	73.6665	.5591	.8308
MATURITY	71.7633	75.9404	.3329	.8376
MSK_CR_N	72.4665	74.2125	.5020	.8325
IDENTIFY	72.5940	71.9921	.5975	.8280
PROBSOLV	71.9165	70.6865	.5994	.8267
TIMEMGMT	72.6915	72.7489	.4642	.8325
PRIORIZI	72.7775	72.6393	.4921	.8315
RESEARCH	72.3275	74.3444	.3663	.8364
RESEARC2	74.5070	79.5265	.0078	.8480
WRITING	72.6810	71.6413	.5610	.8287
NEURO_ID	72.0627	71.4383	.6949	.8253
NEURO_PL	72.1777	71.2553	.5798	.8278
NEURO_RE	72.4983	73.9401	.5258	.8317
NEURO_TX	72.4210	73.3564	.5334	.8309
NEUROAX	72.0980	73.6105	.5636	.8306

Reliability Coefficients
N of Cases = 40.0 N of Items = 23
Factor 4: Life Long Learning Factor - Faculty
Alpha = .8413

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Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
NO.COURS	66.6474	132.9707	.1026	.8627
NO.JRNLS	68.5224	141.8980	.0477	.8419
WORKINDE	68.5938	133.2841	.5882	.8072
IN_SERVI	70.5604	147.0786	.0541	.8238
SELFEVAL	68.9396	133.6564	.5494	.8085
INFOGATH	68.3986	136.8749	.4743	.8122
ENTRY_LE	68.9778	138.9958	.3318	.8171
PTASUPER	70.1304	136.4472	.4509	.8126
HADSTUDE	70.3171	147.8251	.0000	.8236
PREP_STU	70.7367	145.3602	.1579	.8222
ADMIN	69.9867	136.2366	.4541	.8124
MSK_CR_N	69.2449	133.9552	.6288	.8070
IDENTIFY	69.3260	134.0085	.6125	.8073
PROBSOLV	68.6563	133.4566	.5666	.8079
TIMEMGMT	69.3622	135.6620	.4650	.8119
PRIORIZI	69.1296	132.6464	.5913	.8067
RESEARCH	69.2278	134.7311	.4596	.8117
RESEARC2	71.0492	147.2513	.0348	.8242
WRITING	69.3983	135.1592	.4562	.8119
NEURO_ID	69.1001	133.9201	.5360	.8090
NEURO_PL	69.2533	133.7550	.5493	.8085
NEURO_RE	69.3708	131.9175	.6217	.8054
NEURO_TX	69.3164	132.7619	.5333	.8084
NEUROAX	69.0463	133.6637	.4928	.8101

Reliability Coefficients

N of Cases = 112.0 N of Items = 24

Factor 4: Life Long Learning Factor - Graduates with students

Alpha = .8221

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Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
NO.COURS	64.2146	94.9935	-.0118	.8169
NO.JRNLS	65.9689	88.1215	.1462	.7922
WORKINDE	65.9395	90.7466	.5194	.7385
IN_SERVI	67.7981	99.1266	.2056	.7570
SELFEVAL	66.4554	90.5040	.4476	.7412
INFOGATH	65.7233	90.9521	.4866	.7399
ENTRY_LE	65.9689	97.4451	.2207	.7556
PTASUPER	67.4347	93.0999	.3444	.7483
HADSTUDE	68.5128	101.1802	.0000	.7608
ADMIN	67.1912	92.8860	.4265	.7445
MSK_CR_N	66.4061	90.2588	.6236	.7346
IDENTIFY	66.4953	93.1368	.4707	.7434
PROBSOLV	65.9689	89.3679	.6102	.7334
TIMEMGMT	66.5128	93.0395	.3324	.7490
PRIORIZI	66.4374	92.1391	.5311	.7403
RESEARCH	66.2470	92.5793	.4292	.7440
RESEARC2	68.3900	99.9355	.1714	.7584
WRITING	66.5146	91.6857	.4536	.7421
NEURO_ID	66.0637	94.2402	.4929	.7448
NEURO_PL	66.2096	95.1957	.3830	.7486
NEURO_RE	66.4428	91.6486	.5816	.7382
NEURO_TX	66.2998	94.4178	.4260	.7465
NEUROAX	66.0861	95.7863	.3154	.7512

Reliability Coefficients
N of Cases = 57.0 N of Items = 23
Factor 4: Life Long Learning Factor - Graduates without students
Alpha = .7592

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Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
NO.COURS	73.6597	114.7736	-.1121	.9205
IN_SERVI	72.9755	112.7330	.1502	.9199
WORKINDE	70.5018	100.0874	.6795	.9113
SELFEVAL	70.8739	100.2357	.7457	.9098
INFOGATH	70.5545	98.4173	.6811	.9115
PTASUPER	71.1271	108.1040	.3964	.9171
HADSTUDE	72.6861	114.4102	.0000	.9198
PREP_STU	72.7650	114.3423	-.0012	.9205
ADMIN	71.5413	100.6061	.7271	.9103
MATURITY	70.2650	105.4490	.4878	.9156
MSK_CR_N	70.9492	102.0655	.7294	.9106
IDENTIFY	70.9755	102.7330	.7123	.9111
PROBSOLV	70.6034	99.4758	.7754	.9091
TIMEMGMT	71.1071	97.3851	.6582	.9126
PRIORIZI	70.9139	101.8326	.6419	.9123
RESEARCH	71.0187	107.5659	.3554	.9184
WRITING	70.8771	103.1990	.6331	.9125
NEURO_ID	70.9487	105.2904	.5681	.9140
NEURO_PL	70.9274	103.6731	.5949	.9133
NEURO_RE	71.0492	101.0323	.7349	.9102
NEURO_TX	71.0945	102.6791	.6076	.9130
NEUROAX	70.9924	106.2956	.5254	.9148

Reliability Coefficients
N of Cases = 38.0 N of Items = 22
Factor 4: Life Long Learning Factor - Supervisors with students
Alpha = .9178

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Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
NO.COURS	70.9329	74.9774	-.1090	.9010
IN_SERVI	70.4662	72.9874	.1454	.8990
WORKINDE	67.8351	63.9119	.6621	.8870
SELFEVAL	68.1484	69.6822	.3904	.8947
INFOGATH	67.6769	69.7376	.3075	.8977
PTASUPER	68.4867	64.8773	.6883	.8863
HADSTUDE	71.0440	74.4782	.0000	.8986
ADMIN	68.8918	65.3979	.5521	.8909
MATURITY	67.5551	71.5337	.2410	.8980
MSK_CR_N	68.5327	62.9736	.7501	.8839
IDENTIFY	68.3898	62.8887	.7969	.8825
PROBSOLV	67.8591	66.6667	.5953	.8893
TIMEMGMT	68.1209	66.9530	.4466	.8944
PRIORIZI	68.2649	66.2615	.5636	.8902
RESEARCH	68.2271	67.4916	.5567	.8905
WRITING	68.2133	66.6247	.5661	.8901
NEURO_ID	68.4351	67.6175	.6972	.8880
NEURO_PL	68.4109	68.5368	.6030	.8901
NEURO_RE	68.4751	67.0465	.5987	.8893
NEURO_TX	68.5160	67.7505	.5646	.8904
NEUROAX	68.3980	67.5912	.6228	.8891

Reliability Coefficients
N of Cases = 45.0 N of Items = 21
Factor 4: Life Long Learning Factor - Supervisors without students
Alpha = .8963

Appendix 18 — Analysis of variance of factor scales and selected scales

ANOVA of the Four Factors by Group (Graduates, Supervisors, Faculty)

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- ONEWAY -----

Variable FAC1_FAC Treatment Factor By Variable G_S_F Group
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	36.7154	18.3577	19.8204	.0000
Within Groups	289	267.6724	.9262		
Total	291	304.3878			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	169	6.8907	.9949	.0765	6.7396 TO 7.0418
Grp 2	83	7.6293	.8921	.0979	7.4345 TO 7.8240
Grp 3	40	7.5629	.9623	.1522	7.2552 TO 7.8707
Total	292	7.1927	1.0227	.0599	7.0749 TO 7.3105

GROUP	MINIMUM	MAXIMUM
Grp 1	3.7931	9.7241
Grp 2	4.5959	9.7241
Grp 3	5.1034	9.7241
TOTAL	3.7931	9.7241

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- ONEWAY -----

Variable FAC2_FAC Interpersonal Skills Factor By Variable G_S_F Group
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	88.4365	44.2182	41.3150	.0000
Within Groups	289	309.3080	1.0703		
Total	291	397.7445			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	169	6.3780	1.0994	.0846	6.2110 TO 6.5449
Grp 2	83	7.6324	1.0153	.1114	7.4107 TO 7.8541
Grp 3	40	6.9478	.7464	.1180	6.7091 TO 7.1865
Total	292	6.8126	1.1691	.0684	6.6779 TO 6.9473

GROUP	MINIMUM	MAXIMUM
Grp 1	3.3898	9.3220
Grp 2	5.0000	9.5833
Grp 3	5.0000	8.7500
TOTAL	3.3898	9.5833

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- ONEWAY -----

Variable FAC3_FAC Evidence Based Practice Factor By Variable G_S_F Group
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	67.7932	33.8966	18.9887	.0000
Within Groups	289	515.8920	1.7851		
Total	291	583.6852			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	169	7.5094	1.4156	.1089	7.2945 TO 7.7244
Grp 2	83	8.5802	1.2026	.1320	8.3176 TO 8.8428
Grp 3	40	8.2013	1.2467	.1971	7.8026 TO 8.6000
Total	292	7.9086	1.4163	.0829	7.7455 TO 8.0717

GROUP	MINIMUM	MAXIMUM
Grp 1	2.6471	10.0000
Grp 2	4.0000	10.0000
Grp 3	5.4286	10.0000
TOTAL	2.6471	10.0000

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- ONEWAY -----

Variable FAC4_FAC Life Long Learning Factor By Variable G_S_F Group
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	80.7759	40.3879	41.6822	.0000
Within Groups	289	280.0267	.9690		
Total	291	360.8026			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	169	6.3534	1.0212	.0786	6.1983 TO 6.5085
Grp 2	83	7.5579	.9872	.1084	7.3423 TO 7.7735
Grp 3	40	6.7760	.7992	.1264	6.5204 TO 7.0316
Total	292	6.7537	1.1135	.0652	6.6254 TO 6.8819

GROUP	MINIMUM	MAXIMUM
Grp 1	3.8938	9.0265
Grp 2	4.7694	9.5833
Grp 3	4.8214	9.0179
TOTAL	3.8938	9.5833

ANOVA of the Four Factors by University, Graduate Respondents

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- O N E W A Y -----
Variable FAC1_FAC Treatment Factor By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	2.9213	.9738	.9834	.4021
Within Groups	165	163.3811	.9902		
Total	168	166.3023			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	26	7.0904	.8288	.1625	6.7556 TO 7.4252
Grp 2	48	6.9854	1.0589	.1528	6.6779 TO 7.2929
Grp 3	56	6.7304	.9876	.1320	6.4659 TO 6.9949
Grp 4	39	6.8711	1.0242	.1640	6.5391 TO 7.2031
Total	169	6.8907	.9949	.0765	6.7396 TO 7.0418

GROUP	MINIMUM	MAXIMUM
Grp 1	5.4297	8.5517
Grp 2	4.6897	9.7241
Grp 3	4.0000	9.1724
Grp 4	3.7931	8.5517
TOTAL	3.7931	9.7241

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- O N E W A Y -----
Variable FAC2_FAC Interpersonal Skills Factor By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	21.0597	7.0199	6.3644	.0004
Within Groups	165	181.9936	1.1030		
Total	168	203.0534			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	26	7.2034	.9472	.1858	6.8208 TO 7.5859
Grp 2	48	6.2000	1.0067	.1453	5.9077 TO 6.4923
Grp 3	56	6.2194	1.0479	.1400	5.9388 TO 6.5000
Grp 4	39	6.2745	1.1646	.1865	5.8969 TO 6.6520
Total	169	6.3780	1.0994	.0846	6.2110 TO 6.5449

GROUP	MINIMUM	MAXIMUM
Grp 1	5.4098	8.8525
Grp 2	4.5902	8.5246
Grp 3	3.3898	8.5246
Grp 4	4.4068	9.3220
TOTAL	3.3898	9.3220

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- O N E W A Y -----

Variable FAC3_FAC Evidence Based Practice Factor By Variable UNIVCODE University Code

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	63.3577	21.1192	12.7495	.0000
Within Groups	165	273.3183	1.6565		
Total	168	336.6760			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	26	8.9253	.7269	.1425	8.6318 TO 9.2189
Grp 2	48	7.2655	1.3285	.1917	6.8797 TO 7.6512
Grp 3	56	7.3582	1.4564	.1946	6.9682 TO 7.7482
Grp 4	39	7.0829	1.2618	.2020	6.6739 TO 7.4919
Total	169	7.5094	1.4156	.1089	7.2945 TO 7.7244

GROUP	MINIMUM	MAXIMUM
Grp 1	7.6471	10.0000
Grp 2	4.4118	10.0000
Grp 3	2.6471	10.0000
Grp 4	4.4118	9.7059
TOTAL	2.6471	10.0000

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- O N E W A Y -----

Variable FAC4_FAC Life Long Learning Factor By Variable UNIVCODE University Code

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	18.1648	6.0549	6.3619	.0004
Within Groups	165	157.0382	.9517		
Total	168	175.2029			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	26	7.1127	.8158	.1600	6.7832 TO 7.4422
Grp 2	48	6.1609	1.0283	.1484	5.8623 TO 6.4595
Grp 3	56	6.2012	.9286	.1241	5.9525 TO 6.4499
Grp 4	39	6.3028	1.0671	.1709	5.9569 TO 6.6488
Total	169	6.3534	1.0212	.0786	6.1983 TO 6.5085

GROUP	MINIMUM	MAXIMUM
Grp 1	5.5752	8.5586
Grp 2	4.0708	9.0265
Grp 3	4.4144	8.7611
Grp 4	3.8938	8.5144
TOTAL	3.8938	9.0265

ANOVA of the Four Factors by University, Supervisor Respondents

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- O N E W A Y -----
Variable FAC1_FAC Treatment Factor By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	3.7961	1.2654	1.6536	.1839
Within Groups	78	59.6869	.7652		
Total	81	63.4830			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	18	7.5223	.7724	.1821	7.1382 TO 7.9064
Grp 2	18	7.5241	.8668	.2043	7.0931 TO 7.9552
Grp 3	28	7.9401	.8491	.1605	7.6109 TO 8.2694
Grp 4	18	7.4311	1.0089	.2378	6.9294 TO 7.9329
Total	82	7.6454	.8853	.0978	7.4509 TO 7.8399

GROUP	MINIMUM	MAXIMUM
Grp 1	5.7552	8.7690
Grp 2	6.1841	9.3414
Grp 3	5.3903	9.7241
Grp 4	4.5959	9.1172
TOTAL	4.5959	9.7241

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- O N E W A Y -----
Variable FAC2_FAC Interpersonal Skills Factor By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	6.0095	2.0032	2.0730	.1106
Within Groups	78	75.3715	.9663		
Total	81	81.3810			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	18	7.7804	.8395	.1979	7.3629 TO 8.1979
Grp 2	18	7.4454	.9938	.2342	6.9512 TO 7.9396
Grp 3	28	7.9474	1.0493	.1983	7.5406 TO 8.3543
Grp 4	18	7.2793	.9963	.2348	6.7838 TO 7.7747
Total	82	7.6539	1.0023	.1107	7.4337 TO 7.8741

GROUP	MINIMUM	MAXIMUM
Grp 1	5.6250	8.9583
Grp 2	5.2174	9.1304
Grp 3	5.2083	9.5833
Grp 4	5.0000	8.9583
TOTAL	5.0000	9.5833

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- ONEWAY -----

Variable FAC3_FAC Evidence Based Practice Factor By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	6.1275	2.0425	1.4317	.2399
Within Groups	78	111.2751	1.4266		
Total	81	117.4026			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	18	8.8178	.9851	.2322	8.3279 TO 9.3076
Grp 2	18	8.2006	1.4076	.3318	7.5007 TO 8.9006
Grp 3	28	8.7985	.9619	.1818	8.4255 TO 9.1715
Grp 4	18	8.3222	1.4575	.3435	7.5974 TO 9.0470
Total	82	8.5670	1.2039	.1330	8.3024 TO 8.8315

GROUP	MINIMUM	MAXIMUM
Grp 1	5.6667	10.0000
Grp 2	5.3133	10.0000
Grp 3	6.0000	10.0000
Grp 4	4.0000	9.6467
TOTAL	4.0000	10.0000

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- ONEWAY -----

Variable FAC4_FAC Life Long Learning Factor By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	3.1436	1.0479	1.1095	.3504
Within Groups	78	73.6655	.9444		
Total	81	76.8091			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	18	7.6306	.8594	.2026	7.2032 TO 8.0580
Grp 2	18	7.5010	1.0209	.2406	6.9933 TO 8.0087
Grp 3	28	7.7939	1.0435	.1972	7.3892 TO 8.1985
Grp 4	18	7.2723	.9071	.2138	6.8212 TO 7.7234
Total	82	7.5793	.9738	.1075	7.3653 TO 7.7932

GROUP	MINIMUM	MAXIMUM
Grp 1	5.0000	8.9796
Grp 2	5.8260	9.5833
Grp 3	4.7694	9.3429
Grp 4	5.1042	8.8776
TOTAL	4.7694	9.5833

ANOVA of the Four Factors by University, Faculty Respondents

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- ONEWAY -----
Variable FAC1_FAC Treatment Factor By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	2.9334	.9778	1.0608	.3778
Within Groups	36	33.1837	.9218		
Total	39	36.1171			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	10	7.4134	1.0371	.3279	6.6715 TO 8.1552
Grp 2	10	7.1962	1.1001	.3479	6.4092 TO 7.9832
Grp 3	14	7.8473	.8257	.2207	7.3706 TO 8.3241
Grp 4	6	7.7598	.8659	.3535	6.8511 TO 8.6684
Total	40	7.5629	.9623	.1522	7.2552 TO 7.8707

GROUP	MINIMUM	MAXIMUM
Grp 1	5.7931	9.2414
Grp 2	5.1034	8.7586
Grp 3	6.8455	9.7241
Grp 4	6.7476	9.2862
TOTAL	5.1034	9.7241

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- ONEWAY -----
Variable FAC2_FAC Interpersonal Skills Factor By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	1.0109	.3370	.5855	.6284
Within Groups	36	20.7173	.5755		
Total	39	21.7281			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	10	6.9787	.7692	.2432	6.4284 TO 7.5289
Grp 2	10	6.7428	.8001	.2530	6.1704 TO 7.3152
Grp 3	14	6.9389	.7175	.1917	6.5246 TO 7.3531
Grp 4	6	7.2587	.7667	.3130	6.4541 TO 8.0633
Total	40	6.9478	.7464	.1180	6.7091 TO 7.1865

GROUP	MINIMUM	MAXIMUM
Grp 1	6.1765	8.7500
Grp 2	5.0000	7.9412
Grp 3	5.6529	8.4559
Grp 4	6.2897	8.6375
TOTAL	5.0000	8.7500

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- O N E W A Y -----

Variable FAC3_FAC Evidence Based Practice Factor By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	16.0202	5.3401	4.3105	.0107
Within Groups	36	44.5985	1.2388		
Total	39	60.6187			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	10	9.1714	.6270	.1983	8.7229 TO 9.6200
Grp 2	10	7.4171	1.4486	.4581	6.3809 TO 8.4534
Grp 3	14	8.1867	1.2683	.3390	7.4544 TO 8.9191
Grp 4	6	7.9254	.5024	.2051	7.3982 TO 8.4526
Total	40	8.2013	1.2467	.1971	7.8026 TO 8.6000

GROUP	MINIMUM	MAXIMUM
Grp 1	8.0000	10.0000
Grp 2	5.4286	9.7143
Grp 3	5.4286	10.0000
Grp 4	7.4286	8.6667
TOTAL	5.4286	10.0000

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- O N E W A Y -----

Variable FAC4_FAC Life Long Learning Factor By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	3.1690	1.0563	1.7492	.1744
Within Groups	36	21.7400	.6039		
Total	39	24.9090			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	10	7.2088	.7292	.2306	6.6872 TO 7.7305
Grp 2	10	6.4491	.7479	.2365	5.9141 TO 6.9841
Grp 3	14	6.6626	.7969	.2130	6.2024 TO 7.1227
Grp 4	6	6.8643	.8561	.3495	5.9659 TO 7.7627
Total	40	6.7760	.7992	.1264	6.5204 TO 7.0316

GROUP	MINIMUM	MAXIMUM
Grp 1	6.2500	9.0179
Grp 2	4.8214	7.5893
Grp 3	5.5089	8.1250
Grp 4	5.9732	8.2723
TOTAL	4.8214	9.0179

ANOVA of the Four Factors by Year, Graduate Respondents

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- O N E W A Y -----

Variable FAC1_FAC Treatment Factor By Variable YEAR Year of Graduation
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.5272	.5272	.5311	.4672
Within Groups	167	165.7751	.9927		
Total	168	166.3023			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	71	6.8251	1.0326	.1226	6.5806 TO 7.0695
Grp1994	98	6.9382	.9693	.0979	6.7439 TO 7.1326
Total	169	6.8907	.9949	.0765	6.7396 TO 7.0418

GROUP	MINIMUM	MAXIMUM
Grp1992	3.7931	9.1724
Grp1994	4.2069	9.7241
TOTAL	3.7931	9.7241

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- O N E W A Y -----

Variable FAC2_FAC Interpersonal Skills Factor By Variable YEAR Year of Graduation
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	1.0574	1.0574	.8742	.3511
Within Groups	167	201.9960	1.2096		
Total	168	203.0534			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	71	6.4709	1.2047	.1430	6.1858 TO 6.7561
Grp1994	98	6.3106	1.0174	.1028	6.1067 TO 6.5146
Total	169	6.3780	1.0994	.0846	6.2110 TO 6.5449

GROUP	MINIMUM	MAXIMUM
Grp1992	3.3898	9.3220
Grp1994	4.4262	8.5246
TOTAL	3.3898	9.3220

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- ONEWAY -----

Variable FAC3_FAC Evidence Based Practice Factor By Variable YEAR Year of Graduation
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	6.6434	6.6434	3.3617	.0685
Within Groups	167	330.0325	1.9762		
Total	168	336.6760			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	71	7.2765	1.6016	.1901	6.8974 TO 7.6556
Grp1994	98	7.6782	1.2455	.1258	7.4285 TO 7.9279
Total	169	7.5094	1.4156	.1089	7.2945 TO 7.7244

GROUP	MINIMUM	MAXIMUM
Grp1992	2.6471	10.0000
Grp1994	5.0000	10.0000
TOTAL	2.6471	10.0000

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- ONEWAY -----

Variable FAC4_FAC Life Long Learning Factor By Variable YEAR Year of Graduation
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.1316	.1316	.1255	.7236
Within Groups	167	175.0713	1.0483		
Total	168	175.2029			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	71	6.3206	1.1048	.1311	6.0591 TO 6.5821
Grp1994	98	6.3772	.9612	.0971	6.1845 TO 6.5699
Total	169	6.3534	1.0212	.0786	6.1983 TO 6.5085

GROUP	MINIMUM	MAXIMUM
Grp1992	3.8938	8.7611
Grp1994	4.3363	9.0265
TOTAL	3.8938	9.0265

ANOVA of the Four Factors by Year, Supervisor Respondents

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- ONEWAY -----

Variable FAC1_FAC Treatment Factor By Variable YEAR Year of Graduation
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.1148	.1148	.1450	.7044
Within Groups	80	63.3682	.7921		
Total	81	63.4830			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	36	7.6031	.9633	.1606	7.2771 TO 7.9290
Grp1994	46	7.6785	.8285	.1222	7.4325 TO 7.9245
Total	82	7.6454	.8853	.0978	7.4509 TO 7.8399

GROUP	MINIMUM	MAXIMUM
Grp1992	4.5959	9.7241
Grp1994	5.5172	9.3414
TOTAL	4.5959	9.7241

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- ONEWAY -----

Variable FAC2_FAC Interpersonal Skills Factor By Variable YEAR Year of Graduation
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.2732	.2732	.2695	.6051
Within Groups	80	81.1077	1.0138		
Total	81	81.3810			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	36	7.7192	1.0095	.1683	7.3776 TO 8.0607
Grp1994	46	7.6028	1.0048	.1482	7.3044 TO 7.9012
Total	82	7.6539	1.0023	.1107	7.4337 TO 7.8741

GROUP	MINIMUM	MAXIMUM
Grp1992	5.0000	9.5833
Grp1994	5.0000	9.3750
TOTAL	5.0000	9.5833

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- ONEWAY -----

Variable FAC3_FAC Evidence Based Practice Factor By Variable YEAR Year of Graduation
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.0485	.0485	.0331	.8562
Within Groups	80	117.3541	1.4669		
Total	81	117.4026			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	36	8.5395	1.2002	.2000	8.1334 TO 8.9455
Grp1994	46	8.5885	1.2197	.1798	8.2263 TO 8.9507
Total	82	8.5670	1.2039	.1330	8.3024 TO 8.8315

GROUP	MINIMUM	MAXIMUM
Grp1992	4.0000	10.0000
Grp1994	5.3133	10.0000
TOTAL	4.0000	10.0000

26 Jan 98 SPSS for MS WINDOWS Release 6.1 ----- ONEWAY -----

Variable FAC4_FAC Life Long Learning Factor By Variable YEAR Year of Graduation
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.0619	.0619	.0645	.8002
Within Groups	80	76.7472	.9593		
Total	81	76.8091			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	36	7.6103	1.0236	.1706	7.2639 TO 7.9567
Grp1994	46	7.5550	.9437	.1391	7.2747 TO 7.8352
Total	82	7.5793	.9738	.1075	7.3653 TO 7.7932

GROUP	MINIMUM	MAXIMUM
Grp1992	4.7694	9.3429
Grp1994	5.0000	9.5833
TOTAL	4.7694	9.5833

ANOVA of the Selected Scales by Group (Graduates, Supervisors, Faculty)

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Variable KNOW_SC Knowledge Scale By Variable G_S_F Group

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	35.7760	17.8880	8.6834	.0002
Within Groups	289	595.3497	2.0600		
Total	291	631.1257			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	169	7.5034	1.4396	.1107	7.2848 TO 7.7221
Grp 2	83	8.2788	1.4448	.1586	7.9633 TO 8.5943
Grp 3	40	7.5000	1.3960	.2207	7.0535 TO 7.9465
Total	292	7.7234	1.4727	.0862	7.5537 TO 7.8930

GROUP	MINIMUM	MAXIMUM
Grp 1	2.0000	10.0000
Grp 2	3.0000	10.0000
Grp 3	4.0000	10.0000
TOTAL	2.0000	10.0000

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Variable NEURO_SC Neurology Scale By Variable G_S_F Group

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	63.7252	31.8626	13.2747	.0000
Within Groups	289	693.6725	2.4003		
Total	291	757.3977			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	169	6.3293	1.7310	.1332	6.0665 TO 6.5922
Grp 2	83	7.2733	1.2799	.1405	6.9938 TO 7.5528
Grp 3	40	7.2799	1.1982	.1894	6.8967 TO 7.6631
Total	292	6.7279	1.6133	.0944	6.5420 TO 6.9137

GROUP	MINIMUM	MAXIMUM
Grp 1	2.0000	10.0000
Grp 2	4.0000	10.0000
Grp 3	4.4000	10.0000
TOTAL	2.0000	10.0000

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Variable MSK_SC MSK Scale By Variable G_S_F Group

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	26.1463	13.0731	6.7235	.0014
Within Groups	289	561.9288	1.9444		
Total	291	588.0751			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	169	7.2826	1.4343	.1103	7.0648 TO 7.5004
Grp 2	83	7.7953	1.3586	.1491	7.4987 TO 8.0920
Grp 3	40	8.0289	1.2908	.2041	7.6161 TO 8.4417
Total	292	7.5306	1.4216	.0832	7.3668 TO 7.6943

GROUP	MINIMUM	MAXIMUM
Grp 1	3.1429	10.0000
Grp 2	2.0000	10.0000
Grp 3	4.5714	10.0000
TOTAL	2.0000	10.0000

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Variable CR_SC Cardio-Respiratory Scale By Variable G_S_F Group

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	28.7409	14.3705	9.2574	.0001
Within Groups	289	448.6220	1.5523		
Total	291	477.3630			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	169	6.9925	1.4436	.1110	6.7733 TO 7.2117
Grp 2	83	7.2704	.7216	.0792	7.1128 TO 7.4280
Grp 3	40	7.9255	1.1966	.1892	7.5428 TO 8.3082
Total	292	7.1993	1.2808	.0750	7.0518 TO 7.3468

GROUP	MINIMUM	MAXIMUM
Grp 1	2.8571	10.0000
Grp 2	5.1429	10.0000
Grp 3	4.5714	10.0000
TOTAL	2.8571	10.0000

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Variable PS2_SC problem solving By Variable G_S_F Group
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	65.3093	32.6547	13.6956	.0000
Within Groups	289	689.0658	2.3843		
Total	291	754.3752			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	169	6.7051	1.6309	.1255	6.4574 TO 6.9528
Grp 2	83	7.7527	1.4677	.1611	7.4322 TO 8.0731
Grp 3	40	7.4000	1.2969	.2051	6.9852 TO 7.8148
Total	292	7.0980	1.6101	.0942	6.9126 TO 7.2835

GROUP	MINIMUM	MAXIMUM
Grp 1	2.0000	10.0000
Grp 2	3.0000	10.0000
Grp 3	5.0000	9.0000
TOTAL	2.0000	10.0000

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Variable TREAT_SC Treatment Scale By Variable G_S_F Group
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	37.7938	18.8969	17.8287	.0000
Within Groups	289	306.3150	1.0599		
Total	291	344.1088			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	169	6.7559	1.0692	.0822	6.5936 TO 6.9183
Grp 2	83	7.5135	.8534	.0937	7.3272 TO 7.6998
Grp 3	40	7.4171	1.1825	.1870	7.0389 TO 7.7953
Total	292	7.0618	1.0874	.0636	6.9366 TO 7.1871

GROUP	MINIMUM	MAXIMUM
Grp 1	4.0000	9.2500
Grp 2	4.3600	9.5000
Grp 3	3.7500	9.7500
TOTAL	3.7500	9.7500

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Variable INTEG_SC Integration Scale By Variable G_S_F Group
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	83.5895	41.7947	16.3741	.0000
Within Groups	289	737.6712	2.5525		
Total	291	821.2606			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	169	6.0838	1.6562	.1274	5.8323 TO 6.3353
Grp 2	83	7.2946	1.6089	.1766	6.9433 TO 7.6459
Grp 3	40	6.7225	1.2869	.2035	6.3109 TO 7.1341
Total	292	6.5154	1.6799	.0983	6.3220 TO 6.7089

GROUP	MINIMUM	MAXIMUM
Grp 1	2.0000	10.0000
Grp 2	3.0000	10.0000
Grp 3	4.0000	10.0000
TOTAL	2.0000	10.0000

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Variable ETHIC_SC Ethics Scale By Variable G_S_F Group
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	42.6001	21.3001	4.4865	.0121
Within Groups	289	1372.0677	4.7476		
Total	291	1414.6678			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	169	6.4142	2.0339	.1565	6.1053 TO 6.7231
Grp 2	83	7.2530	2.5655	.2816	6.6928 TO 7.8132
Grp 3	40	6.3750	1.8768	.2968	5.7748 TO 6.9752
Total	292	6.6473	2.2049	.1290	6.3933 TO 6.9012

GROUP	MINIMUM	MAXIMUM
Grp 1	2.0000	10.0000
Grp 2	.0000	10.0000
Grp 3	.0000	10.0000
TOTAL	.0000	10.0000

ANOVA of the Selected Scales by University, Graduate Respondents

03 Nov 97 SPSS for MS WINDOWS Release 6.1 - - - - - O N E W A Y - - - - -

Variable KNOW_SC Knowledge Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	5.0370	1.6790	.8074	.4915
Within Groups	165	343.1374	2.0796		
Total	168	348.1744			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean		
Grp 1	26	7.1923	1.5237	.2988	6.5769	TO	7.8077
Grp 2	48	7.6458	1.3287	.1918	7.2600	TO	8.0317
Grp 3	56	7.4107	1.4743	.1970	7.0159	TO	7.8055
Grp 4	39	7.6687	1.4740	.2360	7.1909	TO	8.1465
Total	169	7.5034	1.4396	.1107	7.2848	TO	7.7221

GROUP	MINIMUM	MAXIMUM
Grp 1	4.0000	10.0000
Grp 2	4.0000	10.0000
Grp 3	2.0000	10.0000
Grp 4	4.0000	10.0000
TOTAL	2.0000	10.0000

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Variable NEURO_SC Neurology Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	14.2395	4.7465	1.6012	.1911
Within Groups	165	489.1219	2.9644		
Total	168	503.3615			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean		
Grp 1	26	6.6154	1.7315	.3396	5.9160	TO	7.3148
Grp 2	48	5.8818	1.9329	.2790	5.3206	TO	6.4431
Grp 3	56	6.4214	1.6753	.2239	5.9727	TO	6.8700
Grp 4	39	6.5572	1.4886	.2384	6.0747	TO	7.0398
Total	169	6.3293	1.7310	.1332	6.0665	TO	6.5922

GROUP	MINIMUM	MAXIMUM
Grp 1	3.2000	10.0000
Grp 2	2.0000	10.0000
Grp 3	2.0000	10.0000
Grp 4	2.0000	10.0000
TOTAL	2.0000	10.0000

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Variable MSK_SC MSK Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	52.6365	17.5455	9.8817	.0000
Within Groups	165	292.9668	1.7756		
Total	168	345.6032			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	26	7.0330	1.1741	.2303	6.5587 TO 7.5072
Grp 2	48	8.1310	1.3734	.1982	7.7322 TO 8.5297
Grp 3	56	6.7482	1.3105	.1751	6.3972 TO 7.0991
Grp 4	39	7.1722	1.4086	.2256	6.7156 TO 7.6288
Total	169	7.2826	1.4343	.1103	7.0648 TO 7.5004

GROUP	MINIMUM	MAXIMUM
Grp 1	4.2857	9.4286
Grp 2	4.2857	10.0000
Grp 3	3.1429	9.4286
Grp 4	4.2857	9.7143
TOTAL	3.1429	10.0000

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Variable CR_SC Cardio-Respiratory Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	13.0519	4.3506	2.1299	.0984
Within Groups	165	337.0337	2.0426		
Total	168	350.0856			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	26	7.0262	1.4452	.2834	6.4424 TO 7.6099
Grp 2	48	6.5627	1.4827	.2140	6.1322 TO 6.9933
Grp 3	56	7.2194	1.3648	.1824	6.8539 TO 7.5849
Grp 4	39	7.1733	1.4422	.2309	6.7057 TO 7.6408
Total	169	6.9925	1.4436	.1110	6.7733 TO 7.2117

GROUP	MINIMUM	MAXIMUM
Grp 1	4.0000	10.0000
Grp 2	2.8571	9.4286
Grp 3	3.4286	10.0000
Grp 4	4.0000	10.0000
TOTAL	2.8571	10.0000

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Variable PS2_SC problem solving scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	54.7788	18.2596	7.6847	.0001
Within Groups	165	392.0557	2.3761		
Total	168	446.8344			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	26	7.9615	1.1826	.2319	7.4839 TO 8.4392
Grp 2	48	6.7708	1.6143	.2330	6.3021 TO 7.2396
Grp 3	56	6.3393	1.5757	.2106	5.9173 TO 6.7613
Grp 4	39	6.3118	1.6064	.2572	5.7911 TO 6.8325
Total	169	6.7051	1.6309	.1255	6.4574 TO 6.9528

GROUP	MINIMUM	MAXIMUM
Grp 1	5.0000	10.0000
Grp 2	3.0000	10.0000
Grp 3	3.0000	10.0000
Grp 4	2.0000	9.0000
TOTAL	2.0000	10.0000

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Variable TREAT_SC Treatment Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	8.0227	2.6742	2.3976	.0700
Within Groups	165	184.0384	1.1154		
Total	168	192.0611			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	26	6.6869	.8967	.1759	6.3247 TO 7.0491
Grp 2	48	7.0699	1.1309	.1632	6.7416 TO 7.3983
Grp 3	56	6.5182	1.0784	.1441	6.2294 TO 6.8070
Grp 4	39	6.7569	1.0242	.1640	6.4249 TO 7.0889
Total	169	6.7559	1.0692	.0822	6.5936 TO 6.9183

GROUP	MINIMUM	MAXIMUM
Grp 1	4.6825	8.5000
Grp 2	4.5000	9.2500
Grp 3	4.0000	9.2500
Grp 4	4.0000	8.7500
TOTAL	4.0000	9.2500

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Variable INTEG_SC Integration By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	5.7734	1.9245	.6978	.5546
Within Groups	165	455.0529	2.7579		
Total	168	460.8264			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	26	6.4231	1.6043	.3146	5.7751 TO 7.0711
Grp 2	48	6.1875	1.8526	.2674	5.6496 TO 6.7254
Grp 3	56	5.9821	1.5666	.2093	5.5626 TO 6.4017
Grp 4	39	5.8759	1.5762	.2524	5.3649 TO 6.3869
Total	169	6.0838	1.6562	.1274	5.8323 TO 6.3353

GROUP	MINIMUM	MAXIMUM
Grp 1	4.0000	10.0000
Grp 2	3.0000	10.0000
Grp 3	2.0000	10.0000
Grp 4	2.0000	8.0000
TOTAL	2.0000	10.0000

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Variable ETHIC_SC Ethics Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	102.3578	34.1193	9.4992	.0000
Within Groups	165	592.6481	3.5918		
Total	168	695.0059			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	26	8.1538	1.6172	.3172	7.5006 TO 8.8071
Grp 2	48	6.4375	1.9776	.2854	5.8633 TO 7.0117
Grp 3	56	5.8393	1.8268	.2441	5.3501 TO 6.3285
Grp 4	39	6.0513	2.0513	.3285	5.3863 TO 6.7162
Total	169	6.4142	2.0339	.1565	6.1053 TO 6.7231

GROUP	MINIMUM	MAXIMUM
Grp 1	5.0000	10.0000
Grp 2	2.0000	10.0000
Grp 3	2.0000	10.0000
Grp 4	2.0000	10.0000
TOTAL	2.0000	10.0000

ANOVA of the Selected Scales by University, Supervisor Respondents

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Variable KNOW_SC Knowledge Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	23.6534	7.8845	4.3228	.0071
Within Groups	78	142.2656	1.8239		
Total	81	165.9190			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	18	8.4844	1.1954	.2818	7.8900 TO 9.0789
Grp 2	18	7.6228	1.3330	.3142	6.9599 TO 8.2857
Grp 3	28	8.9286	1.1198	.2116	8.4944 TO 9.3628
Grp 4	18	7.8450	1.7807	.4197	6.9595 TO 8.7305
Total	82	8.3066	1.4312	.1581	7.9921 TO 8.6211

GROUP	MINIMUM	MAXIMUM
Grp 1	5.0000	10.0000
Grp 2	6.0000	10.0000
Grp 3	7.0000	10.0000
Grp 4	3.0000	10.0000
TOTAL	3.0000	10.0000

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Variable NEURO_SC Neurology Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	3.8459	1.2820	.8188	.4873
Within Groups	78	122.1183	1.5656		
Total	81	125.9643			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	18	7.0073	.9992	.2355	6.5105 TO 7.5042
Grp 2	18	7.6571	1.5721	.3706	6.8753 TO 8.4389
Grp 3	28	7.3011	1.3523	.2556	6.7768 TO 7.8255
Grp 4	18	7.2718	.8995	.2120	6.8244 TO 7.7191
Total	82	7.3083	1.2470	.1377	7.0343 TO 7.5823

GROUP	MINIMUM	MAXIMUM
Grp 1	4.0000	8.0000
Grp 2	4.0000	10.0000
Grp 3	4.4000	10.0000
Grp 4	6.0000	10.0000
TOTAL	4.0000	10.0000

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Variable MSK_SC MSK Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	7.2146	2.4049	1.3548	.2629
Within Groups	78	138.4609	1.7751		
Total	81	145.6756			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	18	7.4917	1.2787	.3014	6.8558 TO 8.1276
Grp 2	18	7.9567	1.1629	.2741	7.3784 TO 8.5349
Grp 3	28	8.1567	1.1910	.2251	7.6949 TO 8.6186
Grp 4	18	7.5068	1.7042	.4017	6.6593 TO 8.3543
Total	82	7.8242	1.3411	.1481	7.5295 TO 8.1188

GROUP	MINIMUM	MAXIMUM
Grp 1	4.8571	9.4286
Grp 2	5.7143	10.0000
Grp 3	5.7600	10.0000
Grp 4	2.0000	9.7143
TOTAL	2.0000	10.0000

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Variable CR_SC Cardio-Respiratory Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	3.4841	1.1614	2.3102	.0828
Within Groups	78	39.2121	.5027		
Total	81	42.6963			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	18	7.2687	.6502	.1533	6.9454 TO 7.5921
Grp 2	18	6.9371	.6740	.1589	6.6020 TO 7.2723
Grp 3	28	7.5000	.8411	.1590	7.1738 TO 7.8262
Grp 4	18	7.2481	.5530	.1303	6.9731 TO 7.5231
Total	82	7.2704	.7260	.0802	7.1109 TO 7.4299

GROUP	MINIMUM	MAXIMUM
Grp 1	6.0000	8.8571
Grp 2	5.1429	7.9657
Grp 3	5.7143	10.0000
Grp 4	5.7143	8.0571
TOTAL	5.1429	10.0000

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Variable PS2_SC problem solving scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	6.5965	2.1988	1.0090	.3934
Within Groups	78	169.9729	2.1791		
Total	81	176.5695			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	18	7.7300	1.2230	.2883	7.1218 TO 8.3382
Grp 2	18	7.4761	1.7557	.4138	6.6030 TO 8.3492
Grp 3	28	8.1189	1.3930	.2633	7.5788 TO 8.6591
Grp 4	18	7.4683	1.5291	.3604	6.7079 TO 8.2287
Total	82	7.7496	1.4764	.1630	7.4252 TO 8.0740

GROUP	MINIMUM	MAXIMUM
Grp 1	5.0000	10.0000
Grp 2	3.0000	10.0000
Grp 3	4.0000	10.0000
Grp 4	3.0000	10.0000
TOTAL	3.0000	10.0000

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Variable TREAT_SC Treatment Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	6.7504	2.2501	3.5305	.0186
Within Groups	78	49.7116	.6373		
Total	81	56.4619			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	18	7.2178	.7989	.1883	6.8205 TO 7.6150
Grp 2	18	7.6074	.7263	.1712	7.2462 TO 7.9685
Grp 3	28	7.8799	.6732	.1272	7.6189 TO 8.1410
Grp 4	18	7.2450	1.0191	.2402	6.7382 TO 7.7518
Total	82	7.5354	.8349	.0922	7.3519 TO 7.7188

GROUP	MINIMUM	MAXIMUM
Grp 1	5.2200	8.3000
Grp 2	6.5000	9.2200
Grp 3	6.6900	9.5000
Grp 4	4.3600	8.5500
TOTAL	4.3600	9.5000

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Variable INTEG_SC Integration Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	6.8947	2.2982	.8802	.4552
Within Groups	78	203.6640	2.6111		
Total	81	210.5587			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	18	7.2222	1.6290	.3840	6.4121 TO 8.0323
Grp 2	18	7.0239	1.9429	.4580	6.0577 TO 7.9901
Grp 3	28	7.7018	1.4583	.2756	7.1363 TO 8.2673
Grp 4	18	7.0761	1.4745	.3475	6.3429 TO 7.8093
Total	82	7.3104	1.6123	.1780	6.9561 TO 7.6646

GROUP	MINIMUM	MAXIMUM
Grp 1	4.0000	10.0000
Grp 2	3.0000	10.0000
Grp 3	5.0000	10.0000
Grp 4	4.0000	10.0000
TOTAL	3.0000	10.0000

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Variable ETHIC_SC Ethics Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	21.6678	7.2226	1.1038	.3527
Within Groups	78	510.3810	6.5433		
Total	81	532.0488			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	18	7.2778	2.2959	.5412	6.1360 TO 8.4195
Grp 2	18	6.3889	3.1834	.7503	4.8058 TO 7.9720
Grp 3	28	7.7857	2.1492	.4062	6.9523 TO 8.6191
Grp 4	18	7.1111	2.6983	.6360	5.7693 TO 8.4530
Total	82	7.2195	2.5629	.2830	6.6564 TO 7.7826

GROUP	MINIMUM	MAXIMUM
Grp 1	.0000	10.0000
Grp 2	.0000	10.0000
Grp 3	.0000	10.0000
Grp 4	.0000	10.0000
TOTAL	.0000	10.0000

ANOVA of the Selected Scales by University, Faculty Respondents

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Variable KNOW_SC Knowledge Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	16.8095	5.6032	3.4079	.0277
Within Groups	36	59.1905	1.6442		
Total	39	76.0000			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	10	6.4000	1.3499	.4269	5.4343 TO 7.3657
Grp 2	10	7.8000	1.2293	.3887	6.9206 TO 8.6794
Grp 3	14	7.7857	1.2514	.3344	7.0632 TO 8.5082
Grp 4	6	8.1667	1.3292	.5426	6.7718 TO 9.5615
Total	40	7.5000	1.3960	.2207	7.0535 TO 7.9465

GROUP	MINIMUM	MAXIMUM
Grp 1	4.0000	8.0000
Grp 2	6.0000	10.0000
Grp 3	6.0000	10.0000
Grp 4	6.0000	10.0000
TOTAL	4.0000	10.0000

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Variable NEURO_SC Neurology Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	8.4829	2.8276	2.1427	.1119
Within Groups	36	47.5073	1.3196		
Total	39	55.9903			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	10	7.4952	1.2481	.3947	6.6024 TO 8.3880
Grp 2	10	6.6476	1.1848	.3747	5.8000 TO 7.4952
Grp 3	14	7.7483	1.1779	.3148	7.0682 TO 8.4284
Grp 4	6	6.8820	.7504	.3064	6.0945 TO 7.6695
Total	40	7.2799	1.1982	.1894	6.8967 TO 7.6631

GROUP	MINIMUM	MAXIMUM
Grp 1	6.0000	10.0000
Grp 2	4.4000	8.0000
Grp 3	6.0000	10.0000
Grp 4	6.0000	7.7560
TOTAL	4.4000	10.0000

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Variable MSK_SC MSK Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	4.1414	1.3805	.8169	.4931
Within Groups	36	60.8388	1.6900		
Total	39	64.9802			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	10	7.4946	1.8095	.5722	6.2001 TO 8.7890
Grp 2	10	8.1129	1.4395	.4552	7.0831 TO 9.1426
Grp 3	14	8.3198	.8103	.2166	7.8519 TO 8.7877
Grp 4	6	8.1010	.9149	.3735	7.1409 TO 9.0610
Total	40	8.0289	1.2908	.2041	7.6161 TO 8.4417

GROUP	MINIMUM	MAXIMUM
Grp 1	4.5714	9.7143
Grp 2	6.2857	10.0000
Grp 3	7.1429	9.7143
Grp 4	6.8571	9.7143
TOTAL	4.5714	10.0000

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Variable CR_SC Cardio-Respiratory Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	9.8319	3.2773	2.5644	.0698
Within Groups	36	46.0083	1.2780		
Total	39	55.8402			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	10	7.5214	1.2612	.3988	6.6192 TO 8.4237
Grp 2	10	7.3474	1.4727	.4657	6.2939 TO 8.4009
Grp 3	14	8.3894	.8360	.2234	7.9067 TO 8.8721
Grp 4	6	8.4800	.7860	.3209	7.6552 TO 9.3048
Total	40	7.9255	1.1966	.1892	7.5428 TO 8.3082

GROUP	MINIMUM	MAXIMUM
Grp 1	5.4286	9.7143
Grp 2	4.5714	9.4286
Grp 3	7.1429	10.0000
Grp 4	7.8286	10.0000
TOTAL	4.5714	10.0000

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Variable PS2_SC problem solving scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	24.2857	8.0952	7.0539	.0008
Within Groups	36	41.3143	1.1476		
Total	39	65.6000			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	10	8.5000	.7071	.2236	7.9942 TO 9.0058
Grp 2	10	6.3000	1.1595	.3667	5.4705 TO 7.1295
Grp 3	14	7.3571	1.1507	.3075	6.6927 TO 8.0216
Grp 4	6	7.5000	1.2247	.5000	6.2147 TO 8.7853
Total	40	7.4000	1.2969	.2051	6.9852 TO 7.8148

GROUP	MINIMUM	MAXIMUM
Grp 1	7.0000	9.0000
Grp 2	5.0000	8.0000
Grp 3	6.0000	9.0000
Grp 4	6.0000	9.0000
TOTAL	5.0000	9.0000

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Variable TREAT_SC Treatment Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	7.7366	2.5789	1.9838	.1338
Within Groups	36	46.7994	1.3000		
Total	39	54.5361			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	10	6.7105	1.6031	.5069	5.5637 TO 7.8573
Grp 2	10	7.4085	1.0932	.3457	6.6265 TO 8.1905
Grp 3	14	7.8377	.7925	.2118	7.3801 TO 8.2952
Grp 4	6	7.6279	.9748	.3980	6.6049 TO 8.6509
Total	40	7.4171	1.1825	.1870	7.0389 TO 7.7953

GROUP	MINIMUM	MAXIMUM
Grp 1	3.7500	9.0000
Grp 2	5.2500	8.7500
Grp 3	6.7500	9.7500
Grp 4	6.1350	9.1175
TOTAL	3.7500	9.7500

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Variable INTEG_SC Integration Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	13.5368	4.5123	3.1818	.0354
Within Groups	36	51.0529	1.4181		
Total	39	64.5897			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	10	7.2000	1.1353	.3590	6.3879 TO 8.0121
Grp 2	10	5.7300	1.2893	.4077	4.8077 TO 6.6523
Grp 3	14	7.0214	.9399	.2512	6.4788 TO 7.5641
Grp 4	6	6.8833	1.6130	.6585	5.1907 TO 8.5760
Total	40	6.7225	1.2869	.2035	6.3109 TO 7.1341

GROUP	MINIMUM	MAXIMUM
Grp 1	5.0000	9.0000
Grp 2	4.0000	8.0000
Grp 3	6.0000	8.0000
Grp 4	6.0000	10.0000
TOTAL	4.0000	10.0000

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Variable ETHIC_SC Ethics Scale By Variable UNIVCODE University Code
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	6.1131	2.0377	.5589	.6456
Within Groups	36	131.2619	3.6462		
Total	39	137.3750			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp 1	10	6.9000	1.5951	.5044	5.7589 TO 8.0411
Grp 2	10	6.2000	.9189	.2906	5.5426 TO 6.8574
Grp 3	14	6.4286	2.0649	.5519	5.2363 TO 7.6208
Grp 4	6	5.6667	3.0111	1.2293	2.5068 TO 8.8266
Total	40	6.3750	1.8768	.2968	5.7748 TO 6.9752

GROUP	MINIMUM	MAXIMUM
Grp 1	4.0000	10.0000
Grp 2	5.0000	8.0000
Grp 3	3.0000	10.0000
Grp 4	.0000	8.0000
TOTAL	.0000	10.0000

ANOVA of the Selected Scales by Year, Graduate Respondents

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Variable KNOW_SC Knowledge Scale By Variable YEAR Year of Graduation

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.1828	.1828	.0877	.7674
Within Groups	167	347.9916	2.0838		
Total	168	348.1744			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	71	7.4648	1.3715	.1628	7.1402 TO 7.7894
Grp1994	98	7.5314	1.4934	.1509	7.2320 TO 7.8308
Total	169	7.5034	1.4396	.1107	7.2848 TO 7.7221

GROUP	MINIMUM	MAXIMUM
Grp1992	4.0000	10.0000
Grp1994	2.0000	10.0000
TOTAL	2.0000	10.0000

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Variable NEURO_SC Neurology Scale By Variable YEAR Year of Graduation

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	5.0240	5.0240	1.6836	.1962
Within Groups	167	498.3375	2.9841		
Total	168	503.3615			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	71	6.1268	1.8374	.2181	5.6918 TO 6.5617
Grp1994	98	6.4761	1.6435	.1660	6.1466 TO 6.8056
Total	169	6.3293	1.7310	.1332	6.0665 TO 6.5922

GROUP	MINIMUM	MAXIMUM
Grp1992	2.0000	10.0000
Grp1994	2.0000	10.0000
TOTAL	2.0000	10.0000

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Variable MSK_SC MSK Scale By Variable YEAR Year of Graduation
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	1.5710	1.5710	.7626	.3838
Within Groups	167	344.0322	2.0601		
Total	168	345.6032			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	71	7.1693	1.3155	.1561	6.8579 TO 7.4807
Grp1994	98	7.3646	1.5159	.1531	7.0607 TO 7.6685
Total	169	7.2826	1.4343	.1103	7.0648 TO 7.5004

GROUP	MINIMUM	MAXIMUM
Grp1992	4.2857	9.7143
Grp1994	3.1429	10.0000
TOTAL	3.1429	10.0000

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Variable CR_SC Cardio-Respiratory Scale By Variable Year of Graduation
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	4.8056	4.8056	2.3243	.1293
Within Groups	167	345.2800	2.0675		
Total	168	350.0856			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	71	7.1906	1.4786	.1755	6.8407 TO 7.5406
Grp1994	98	6.8490	1.4078	.1422	6.5667 TO 7.1312
Total	169	6.9925	1.4436	.1110	6.7733 TO 7.2117

GROUP	MINIMUM	MAXIMUM
Grp1992	3.4286	10.0000
Grp1994	2.8571	10.0000
TOTAL	2.8571	10.0000

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Variable PS2_SC problem solving scale By Variable YEAR Year of Graduation

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	5.5097	5.5097	2.0849	.1506
Within Groups	167	441.3247	2.6427		
Total	168	446.8344			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	71	6.4930	1.7958	.2131	6.0679 TO 6.9180
Grp1994	98	6.8588	1.4908	.1506	6.5599 TO 7.1577
Total	169	6.7051	1.6309	.1255	6.4574 TO 6.9528

GROUP	MINIMUM	MAXIMUM
Grp1992	2.0000	10.0000
Grp1994	3.0000	10.0000
TOTAL	2.0000	10.0000

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Variable TREAT_SC Treatment Scale By Variable YEAR Year of Graduation

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.0881	.0881	.0767	.7822
Within Groups	167	191.9730	1.1495		
Total	168	192.0611			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	71	6.7291	1.1277	.1338	6.4622 TO 6.9960
Grp1994	98	6.7754	1.0303	.1041	6.5688 TO 6.9819
Total	169	6.7559	1.0692	.0822	6.5936 TO 6.9183

GROUP	MINIMUM	MAXIMUM
Grp1992	4.0000	9.2500
Grp1994	4.2500	9.2500
TOTAL	4.0000	9.2500

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Variable INTEG_SC Integration scale By Variable YEAR Year of Graduation

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	8.7211	8.7211	3.2214	.0745
Within Groups	167	452.1053	2.7072		
Total	168	460.8264			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	71	5.8169	1.7428	.2068	5.4044 TO 6.2294
Grp1994	98	6.2771	1.5713	.1587	5.9621 TO 6.5922
Total	169	6.0838	1.6562	.1274	5.8323 TO 6.3353

GROUP	MINIMUM	MAXIMUM
Grp1992	2.0000	10.0000
Grp1994	3.0000	10.0000
TOTAL	2.0000	10.0000

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Variable ETHIC_SC Ethics Scale By Variable YEAR Year of Graduation

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	1.3330	1.3330	.3209	.5718
Within Groups	167	693.6729	4.1537		
Total	168	695.0059			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	71	6.3099	1.8562	.2203	5.8705 TO 6.7492
Grp1994	98	6.4898	2.1598	.2182	6.0568 TO 6.9228
Total	169	6.4142	2.0339	.1565	6.1053 TO 6.7231

GROUP	MINIMUM	MAXIMUM
Grp1992	2.0000	10.0000
Grp1994	2.0000	10.0000
TOTAL	2.0000	10.0000

ANOVA of the Selected Scales by Year, Supervisor Respondents

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Variable KNOW_SC Knowledge Scale By Variable YEAR Year of Graduation

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	1.0786	1.0786	.5234	.4715
Within Groups	80	164.8405	2.0605		
Total	81	165.9190			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	36	8.1769	1.5807	.2634	7.6421 TO 8.7118
Grp1994	46	8.4080	1.3114	.1934	8.0186 TO 8.7975
Total	82	8.3066	1.4312	.1581	7.9921 TO 8.6211

GROUP	MINIMUM	MAXIMUM
Grp1992	3.0000	10.0000
Grp1994	5.0000	10.0000
TOTAL	3.0000	10.0000

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Variable NEURO_SC Neurology Scale By Variable YEAR Year of Graduation

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.1590	.1590	.1011	.7514
Within Groups	80	125.8053	1.5726		
Total	81	125.9643			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	36	7.3581	1.3822	.2304	6.8904 TO 7.8258
Grp1994	46	7.2694	1.1444	.1687	6.9295 TO 7.6092
Total	82	7.3083	1.2470	.1377	7.0343 TO 7.5823

GROUP	MINIMUM	MAXIMUM
Grp1992	4.0000	10.0000
Grp1994	4.0000	10.0000
TOTAL	4.0000	10.0000

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Variable MSK_SC MSK Scale By Variable YEAR Year of Graduation

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.1802	.1802	.0991	.7538
Within Groups	80	145.4954	1.8187		
Total	81	145.6756			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	36	7.7712	1.5053	.2509	7.2619 TO 8.2805
Grp1994	46	7.8657	1.2128	.1788	7.5055 TO 8.2258
Total	82	7.8242	1.3411	.1481	7.5295 TO 8.1188

GROUP	MINIMUM	MAXIMUM
Grp1992	2.0000	10.0000
Grp1994	4.8571	10.0000
TOTAL	2.0000	10.0000

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Variable CR_SC Cardio-Respiratory Scale By Variable YEAR Year of Graduation

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.1006	.1006	.1889	.6650
Within Groups	80	42.5957	.5324		
Total	81	42.6963			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	36	7.2308	.7654	.1276	6.9718 TO 7.4898
Grp1994	46	7.3014	.7007	.1033	7.0933 TO 7.5094
Total	82	7.2704	.7260	.0802	7.1109 TO 7.4299

GROUP	MINIMUM	MAXIMUM
Grp1992	5.7143	9.4286
Grp1994	5.1429	10.0000
TOTAL	5.1429	10.0000

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Variable PS2_SC problem solving scale By Variable YEAR Year of Graduation

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.0757	.0757	.0343	.8535
Within Groups	80	176.4937	2.2062		
Total	81	176.5695			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	36	7.7153	1.5811	.2635	7.1803 TO 8.2502
Grp1994	46	7.7765	1.4064	.2074	7.3589 TO 8.1942
Total	82	7.7496	1.4764	.1630	7.4252 TO 8.0740

GROUP	MINIMUM	MAXIMUM
Grp1992	3.0000	10.0000
Grp1994	3.0000	10.0000
TOTAL	3.0000	10.0000

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Variable TREAT_SC Treatment Scale By Variable YEAR Year of Graduation

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.0006	.0006	.0009	.9762
Within Groups	80	56.4613	.7058		
Total	81	56.4619			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	36	7.5322	.8669	.1445	7.2389 TO 7.8255
Grp1994	46	7.5378	.8186	.1207	7.2947 TO 7.7809
Total	82	7.5354	.8349	.0922	7.3519 TO 7.7188

GROUP	MINIMUM	MAXIMUM
Grp1992	4.3600	9.5000
Grp1994	5.2200	9.2200
TOTAL	4.3600	9.5000

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Variable INTEG_SC Integration Scale By Variable YEAR Year of Graduation
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	.0012	.0012	.0005	.9829
Within Groups	80	210.5575	2.6320		
Total	81	210.5587			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	36	7.3147	1.5068	.2511	6.8049 TO 7.8246
Grp1994	46	7.3070	1.7068	.2516	6.8001 TO 7.8138
Total	82	7.3104	1.6123	.1780	6.9561 TO 7.6646

GROUP	MINIMUM	MAXIMUM
Grp1992	4.0000	10.0000
Grp1994	3.0000	10.0000
TOTAL	3.0000	10.0000

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Variable ETHIC_SC Ethics Scale By Variable YEAR Year of Graduation
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	1	63.8266	63.8266	10.9053	.0014
Within Groups	80	468.2222	5.8528		
Total	81	532.0488			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
Grp1992	36	6.2222	3.2786	.5464	5.1129 TO 7.3315
Grp1994	46	8.0000	1.4298	.2108	7.5754 TO 8.4246
Total	82	7.2195	2.5629	.2830	6.6564 TO 7.7826

GROUP	MINIMUM	MAXIMUM
Grp1992	.0000	10.0000
Grp1994	5.0000	10.0000
TOTAL	.0000	10.0000

Appendix 19 — Lists

Strengths listed by under 10% of the faculty members

Mentioned once
ethics
charting skills
youth
generalist skills
intelligence
time management
research
rapport
Positive attitude

Mentioned twice
assessment skills
clinical skills
critical thinking
interpersonal skills
professionalism
self directed
teamwork

Strengths listed by under 5% of the Graduates

Mentioned only once
amputees
business / marketing
cardioresp
common sense
electrotherapy
ergonomics
ethics
functional assessment
generalist education
geriatrics
language
management
maturity
open minded
patience
practicality
professionalism
report writing
spinal assessment & treatment
sports injuries treatments

Listed twice
confidence
innovative
integration
responsibility

Listed 3 times
critical appraisal
decision making
exercise progression
neuro

Listed 4 times
EBP
work ethic

Listed 5 times
Client Centred
Knowledge Base
Positive Outlook

Listed 6 times
Charting Skills
Dedication
Leadership
Manual Therapy
MSK
Patient Education

Listed 7 times
Critical Thinking
Personality
Self Evaluation

Listed 8 times (4.8% of respondents)
Research
Self Directed

Strengths listed by fewer than 5% of Supervisors

Mentioned once
ambition
charting
client centred
common sense
creativity
dedication
ethics
full caseload
generalist skills
integration
report writing
self eval
stress management
teaching
undergrad work strong

Mentioned twice
business skills
cardioresp
competence
critical appraisal
critical thinking
intelligent
responsibility
total quality improvement

Mentioned three times
evidence based practice
research

Mentioned four times
initiative
treatment skills

What to keep items listed by fewer than 5% of the Graduates

Mentioned once
academy
advanced gait course
approach (general approach to physiotherapy)
cardiac rehab
complex patients
critical thinking
CSL
electives
evidence based care
exam prep
exercise
functional anatomy
geriatrics
guest speakers
inquiry seminars
integration
medical science courses
mentoring
PBT
pharmacology
PNF
post grad courses (intro to what there is) program length
sexuality workshop
soft tissue mobilization course
stethoscopes (mandatory purchase)
stipends
student eval
teaching format
teamwork
video teaching

Mentioned twice
everything
management course
clinicians (using them in teaching)
professionalism
education course
Northern Studies

Mentioned 3 times
small class size
pathokinesiology
class size
admission policies
balance of the program
small group learning

Mentioned 4 times
statistics
critical appraisal
self directed learning
problem solving skills

Mentioned 5 times
electrotherapy
presentations
multidisciplinary course
generalist training

Mentioned 7 times
ergonomics
faculty

What to keep items listed by under 10% of the Supervisors

Mentioned once
2 to one placement
4 year program
biomechanics
charting procedures
community involvement in curriculum
committee
ethical issues
everything
functional anatomy
inquiry seminars
length of program
management course
paediatrics
patient care modules
personal development
physiology
professionalism
second degree entry level
self directed learning
specialized electives
teaching approach
teamwork

Mentioned twice
assessment skills
block teaching
critical thinking
EBP
electrotherapy
generalist skills
geriatrics
manual therapy
problem based approach
research
self evaluation

Mentioned 3 times
Cardioresp
knowledge base

Mentioned 4 times
neuro I

Weaknesses mentioned by under 5% of graduates

Mentioned once
anatomy
assertiveness
basic sciences
biomechanics
consultant role
disability assessment
education - inservices
ethical issues
gynaecology
imaging
manual muscle test
massage
neonatal
oncology
paperwork demands
pathology
quality assurance
resources
surgery
writing skills
normal / abnormal signs
cultural issues
community resources
seating
labour and delivery
hands

Mentioned twice
braces
burns
amputee
research
role boundaries
TMJ assessments
medical science
traction
pharmacology
palliative care
acupuncture
student supervision
sports physio
teamwork

Mentioned three times
geriatrics
priorizing
integration
complex patients
caseload management

Mentioned four times
discharge planning
electrotherapy
wound care
pain management
clinical problem solving
MVA

Mentioned five times
supervision of PTAs
communication

Mentioned six times
assessment skills
charting
political issues
evidence based practice & outcome measures

Mentioned seven times
time management
ergonomics

Weaknesses mentioned by graduates of each year

1992
anatomy
assertiveness
cultural issues
evidence based practice & outcome measures
hands
manual muscle test
normal / abnormal
quality assurance
seating
surgery
writing skills

1994
basic sciences
biomechanics
community resources
consultant role
disability assessment
education - inservices
ethics
gynaecology
imaging
labour and delivery
massage
medical science
neonatal
oncology
paperwork demands
pathology
resources
role boundaries
student supervision
teamwork
traction

Both years
acupuncture
amputee
assessment skills
braces
burns
Business / Administration Skills
Cardioresp & Suctioning & ICU
caseload management
charting
clinical problem solving
communication
discharge planning
electrotherapy
ergonomics
geriatrics
Insurance & Legal Issues
Integration & Complex Patients & MVA Patients
Manual Therapy Skills
MSK
Neuro
Paediatrics
pain management
palliative care
pharmacology
political issues
priorizing
Psychology / psychosocial issues / difficult patients
research
sports physio
supervision of PTAs
time management
TMJ assessments
Treatment & Progression of Treatment
wound care

Preponderance of 1994 grads
(x/y = # 1994 grads / # mentioning the topic)
23/30 Treatment & progression of treatment
22/30 Manual Therapy Skills
18/18 Insurance & Legal Issues
8/10 Integration & complex patients & MVA patients
5/7 Ergonomics
5/6 Assessment Skills
4/6 Charting
4/5 PTA supervision
4/5 Communication skills
3/4 Pain management

Weaknesses mentioned by under 5% of supervisors.

Mentioned once:
acute care
administrator role
case conferences
client centred treatment
ethics
goals
integration
spinal Ax & Tx
outcome measures
pain management
palpation of muscles
private practice issues
psychosocial issues
report writing
suctioning
supervision
workers compensation issues

Mentioned twice:
business skills
Communication skills
confidence
d/c planning
industrial rehab
electrotherapy
problem solving
treatment options

Mentioned 3 times
complex patients
neuro

Prerequisites suggested by under 5% of the graduates

Mentioned once
nervous system
sociology
leadership
communication
computers
medical terminology
first aide

Mentioned twice
exercise fundamentals
pathology
statistics
study skills

Mentioned three times
English
thinking

Mentioned four times
pharmacology

Mentioned five times
general interest topics (history, political science, general science, Spanish, Music)

Prerequisites suggested by under 5% of the supervisors

Mentioned once
CPR
first aide
high school science & physical education
organizational behaviour
politics
program development
research
science degree
work experience

Mentioned two times
biology
education
ethics
physics
stats
volunteer work

Mentioned four times
biomechanics
computers

Graduate list of what to introduce to the programs, items listed by under 5% of the graduates

Mentioned once
amputee
assertiveness training
caseload management
client centred
clinical scenarios (more of them)
CPR
curriculum format (more pre-clinical hours)
curriculum course
d/c planning
equipment (aides for the home)
financial assistance
fitness testing
handouts (more class notes)
histology course
honesty
hydrotherapy
interpersonal skills course
journal club
leadership skills
licensing exam should continue
mentor program
nutrition
orthotics
outcome measures
PNF
post grad courses (info on)
prof qualifications (more experience)
projects
PT in USA
quality assurance
radiology
rehab science
residency of 6 months
seating knowledge
study skills
writing skills

Mentioned twice
McKenzie
time management
professionalism
communication skills
obs - gyn
block learning
massage
legal issues
manual techniques
library usage
literature

Mentioned 3 times
critical appraisal
burns & wounds
assessment
cardioresp
computer skills
insurance issues
ethics
surgery
self directed learning
physiology
acupuncture

Mentioned 4 times
geriatrics
biomechanics
pathology
direct access issues

Mentioned 5 times
electives - length of program
electrotherapy
patients
community resources
problem based learning
integration (4 of 5 from univ C)
admission process
pain
psychology
statistics
functional anatomy (5 of 5 from univ C)
supervision (PTAs & students)

Mentioned 6 times
charting
evidence based practice (5 of 6 from Univ C)
ergonomics
anatomy
paediatrics (4 of 6 from Univ B)

Mentioned 7 times
research
MSK
exams
exercise prescription

Supervisor list of what to introduce, items mentioned by under 5% of the respondents

Mentioned once
assessments
case based teaching
caseload management
clinical skills
clinicians involved in classroom teaching
community care
complex patients
cultural diversity
difficult clients
EBP
education
English
geriatrics
initiative
job preparation
longer program
masters entry level
mental health
patient education
personal skills
priorizing
professor qualifications of PhD
psychology
radiology
research
Safety/Contraindications
self directed learning
splinting
treatment planning & progression

Mentioned 2 times
computer skills
integration
interpersonal skills
legal issues
job market skills
outcome measures
paediatrics
supervision

Mentioned 3 times
basic sciences
electro therapy
manual techniques
McKenzie techniques

Mentioned 4 times
political issues
problem solving
time management

Mentioned 5 times
ethics
MSK Ax & Tx
insurance issues
professionalism
teamwork

Outcome Measures

Classified as being Outcome Measures

10 m walk test
12 min walk test
2 min walk test
6 min walk test
AIMS 'Alberta Infant Motor Scale
AIMS - Arthritis Impact
Auscultation
Bailey
Balance - sit & reach
Balance scale
Barthel Index
Berg balance scale
Body composition
Borg Perceived Exertion Scores
Blood pressure
Bruninks
Brunstrom Staging
BTE Baltimore
Cardiac Rehab Ax tool
CCDM
IRMs
CHAQ
Chart Audit Scale
Chedoke - McMaster Stroke Ax
COJS
COMPS
CORS
COVES
COVS (Clinical Outcomes Variable Score)
Curl up test
CxR
Cybex
Disability Questionnaire
Dynatrac computer analysis
Dyspnea scale
FAM
FCAs
FCE
FEV1.0
FIM (Functional Independence Measure)
Functional Disability Questionnaire
GARS
Get up and go
Girth Measurement
GMFM
Goal achievement
Grip - JAMAR
Dynamomenter
Gross motor performance measure
Heart rate
Incentive spirometry
Inclinometer (ROM)
Isokinetic dynamometer
Kincom - force
LEAP (lower extremity activity profile)
Length of Treatment
McGill pain questionnaire
McMaster Health Index Questionnaire
Mini-mental State Test
Modified Schober
Modified sphyg
Motor assessment of infants
Neland-Morris
O2 Sat
OARS Index
Objective measures
Oswestry Scale
Pain Scales (VAS, questionnaires, Ranaford pain diagram)
Patellofemoral Function Scale
Patient Satisfaction Scale
Peabody
Quality of Life Index
QWESTRY Profile
Respiratory Rate
Return to work
Roland & Morris Disability Questionnaire Spine
ROM Goniometry
Ronchos Levels
RUGS
SaO2
Self paced walk
SF36
Sickness Impact
SLR
SMAF
Sorenson Test
Standing Reach
Stop & go test
Stratford Questionnaire
Strength - muscle test
Time up and go
Tinetti balance
Tinetti gait scale
UCLA shoulder
ULFT
Visual Analogue
Vital capacity
VO2 max testing
Weight
WOMAC lower extremity

Classified as not being an Outcome Measure

Activity tolerance
Age
Balance; increased
Balance; standing
Body diagram re pain, paraesthesia etc
Cadence
Cardiac rehab
Client perception
Complete sit to stand
Complete total hip protocol exercises
Cost of treatment
Endurance - # reps
Endurance level
Evaluation of program
Flexibility
Function - ADL
Gait - aides, distance
Gross grip
Hams Hip Ratio
Height
Independence; ADL, bed mobility, sitting at bedside, transfers, transfers, w/c
Length of treatment
Medication required
Neural tension
Pain
Palpation - to tenderness
Patient's perception
Physical evidence
Plumb line position
Posture; improvement
Pre / post treatment
Pressure ? unit (lumbar stabilization)
Quality of movement
Quality of posture /movement
Rate of perceived exertion
Re-evaluations
Reflexes
Slump test
Special tests
Speed
Spinal Sat
Statistics in general
Stretch (# reps)
Subjective report
Swelling
Unilateral stance

Appendix 20 — Suggestions for revisions to the questionnaires

1. Supervisor Questionnaire

   a. In Question 18, underline & bold **prior**, as some answered as to what should be *included* in PT education, not what the graduates should have had *prior* to entry.

   b. Add an open ended question re weaknesses (parallel to q.15) as things which came up at the focus groups as weaknesses are not all being mentioned under question 14, which addresses weaknesses indirectly by asking for areas the graduate was unprepared for. An example is that time management was mentioned at the focus groups as being a big weakness, but this was not apparent to the same extent in responses to question 14.

2. Graduate questionnaire

   a. Question 27 - almost everyone said yes, they would consider graduate degree - but this doesn't tell if they really will do it. The question needs to be changed to allow for identification of those graduates who are seriously considering a graduate degree. Perhaps: ARE you making plans for entering a graduate program?

   b. Questions 20 & 25 brought out the same things, by and large. Question 25 is really the one which did not work well and could be deleted.

   c. Question 32 on how the graduate would test a new technique did not get the responses expected. This question was directed at finding out if the graduates actually used EBP, but most said they would practice the technique on a colleague.

d. Question 32 on outcome measures was a double barrelled question "...list 4 to 5...". This should be simplified to a single number. A higher number should be used as a number of graduates were able to list up to eight.

e. Some coding was backwards from what would be ideal for ease of data entry and analysis. Areas should be reviewed so that the response with the higher coding is a positive response. Eg. being a CPA member, yes = 2, no = 1, so that any calculations which include CPA membership give extra weight to those who said yes, they were members. Questions where coding needs to be addressed are 11, 12, 14 iv, 13, 22, 23, 26, 28, 29, 31, 35.

3. Faculty Questionnaire

a. Questions 23a and 23h are the same question. Retain h and delete a.