Rehabilitation needs and practice in Canada developed exponentially during and after World War II. Pressed by a lack of personnel, Canadian universities developed three year combined diploma programs in physiotherapy and occupational therapy. Gradually these were converted into degrees, but differences in the theory and knowledge bases of the two professions indicated the need for separate curricula. Today, master’s level entry programs are the norm for both. Nonetheless, the general thrust of practice remains similar: physiotherapy seems best suited to deal primarily with acute care cases while occupational therapy focuses on longer term service for individuals with chronic, developmental or progressive disorders. This variance in service foci has also led to different approaches in education and research: for occupational therapy, the use of models has become essential as a mechanism for guiding practice, and for developing and disseminating knowledge.

While the environment had long been recognized as a critical component of occupational performance (Law et al, 1992), this factor slipped from written prominence until later in the 20th century when once again environmental issues began to be considered. Interest grew and was reinforced by new national practice guidelines that emphasized the importance of the person and the environment (Canadian Association of Occupational Therapists, 1983, 1991). Still lacking, however, was a systematic, scholarly approach for including environmental concerns in treatment protocols.
The Research Group

In 1991, six occupational therapists, five of whom were based at McMaster University and one at the University of Toronto, formed a group to discuss this need. The professional backgrounds of the members of the group varied: three had clinical experience in pediatrics, two in gerontology and one in mental health. The author had combined training in occupational therapy and physiotherapy. Their educational levels differed as well: two were completing Ph.D. studies, Mary Law at the School of Urban and Regional Planning at the University of Waterloo and the author, at the School of Architecture and Urban Planning at the University of Wisconsin-Milwaukee. The others were enrolled in various masters programs, Epidemiology, Gerontology and Health Care Practice. Most were also involved in the development of the new School of Rehabilitation Science at McMaster University.

Initial leadership to address this professional gap was provided by Mary Law. The group met regularly, and for practical reasons, soon adopted a rotating leadership model for tasks. We were unsure where these explorations would lead us, and so approached the venture as a series of stepped objectives, each dependent on previous efforts and results. These are collapsed neatly here into five distinct steps; the reality was much more interrupted and certainly not as tidy.

Developing The Person-Environment-Occupation Model:

Phase 1: Literature Review

In the early 90’s, the existing occupational therapy literature on the therapeutic role of the environment was limited, consisting primarily of basic ideas on discrete issues such as barrier free design (Cooper, Cohen, & Hasselkus, 1991), and post occupancy evaluation (Cooper, Ahrentzen, & Hasselkus, 1991). Theoretical and conceptual models incorporating the environment as a key variable in clinical practice were not in common use (Krefting, 1985). However, interest was starting to develop, and we were aware of similar concerns being explored by colleagues in the United States at Washington University in St. Louis and at the University of Kansas. Earlier group discussions had revealed that Mary Law and the author were familiar with many of the same theoreticians from their respective PhD studies, so we decided to use this as our starting point.
**Research Objective**

Our first objective was to review the multi-professional theoretical literature on environment-behavior studies (EBS), and to identify and critique key authors whose ideas seemed a good match with current thinking in occupational therapy. We also reviewed the occupational therapy literature on the topic and identified existing measures of environmental attributes.

**Literature Review**


**Methods**

We studied the EBS literature on environment from the perspective of definitions, taxonomies, attributes and inquiry paradigms. Following this, we reviewed the eight authors, critiquing their work systematically in order to judge their congruence with occupational therapy thinking. These results were collapsed into a grid addressing: Players, Conceptualization of Environment, Environment/Behavior Interaction, Adaptation, and Measurement. Graphic models of the eight conceptual models were also noted. Documents issued by CAOT (1983, 1991) on the focus of client centered approaches and on the importance of the environment were included in our review.

**Results**

We organized this information into a monograph which was published under the auspices of Can Child Research Unit at the School of Rehabilitation Science at McMaster University (Law et al., 1992). The monograph had four sections: the first defined the structure of the environment; the second examined the literature on the process of person-environment relations; the third discussed the measurement of
environmental attributes and identified and reviewed 36 measures. The final section examined the application of all these issues to occupational therapy. Two appendices provided additional information on the theories reviewed and on the instruments of measure. In Appendix II we reviewed the assessments by purpose, clinical utility, scale construction, standardization, reliability and validity. The group presented these results at the 1992 conference of CAOT in St. Johns, Newfoundland and made copies of the monograph available for purchase ((Law et al., 1992). It sold out, thereby encouraging us to continue developing our ideas further.

Phase 2: Developing A Theory-Based Model

We were encouraged by the reaction of conference attendees to our presentation and reasoned that a theoretical clinical model that incorporated material from both occupational therapy and other professional sources would be well-received. In addition to the measurement section of the monograph, we had recently addressed the use of measures in person-environment relations more specifically in an article by Letts et al. (1994) wherein we identified 67 instruments purporting to measure person-environment relations. Of these we identified 41 that met basic criteria in the following areas: environmental attributes measured; environmental application; clinical utility; instrument development; and psychometric testing. Because of this work and because the ever-changing content focus of the Model requires the use of different measures each time, we did not address this issue again until later.

Research Objective

The main objective of Phase 2 was to develop a theory-based model that would incorporate the substance of the EBS literature reviewed and critiqued in the monograph with relevant occupational therapy literature and practice guidelines. If possible, the model should be appropriate for both clinical and research use.

Literature Review

We returned to our original review for the monograph and expanded this as necessary. First, we identified the key concepts and assumptions that would combine best with occupational therapy. In particular, the notion of press and person-environment fit as espoused by Lawton (1982) and Kahana (1982) seemed to summarize the essence of these conceptual interactions. Additional theoreticians in EBS were reviewed and
we identified Csikzentmihalyi and Csikzentmihalyi (1988) as authors of interest for their ideas on flow. We also re-examined the literature on models currently used in occupational therapy, such as O’Reilly (1954), Kielhofner and Burke (1980), Barris (1982), Howe and Briggs (1982), Kiernat, (1982), Christiansen and Baum (1991) and Shakade and Shultz (1992), noting in particular the concepts essential to occupational therapy and the current use of terminology. Finally, we revisited the CAOT documents (1983, 1991) addressing the role of the environment and the focus on the person in clinical practice.

The results of our literature review indicated that the environment was multifaceted and site concentric. It also showed that the relationship between the person (client), his/her occupation and role (what the person does) and the environment in which he/she lives is dynamic and interwoven and thus cannot be teased apart. Therefore, the model we developed would need to be transactive in nature and its unit of measure would be occupational performance or the dynamic experience of a person engaged in purposeful activities or tasks within an environment. The multiple layers of environment (e.g., home, community, city etc.) in which an individual(s) performed his/her roles called for a concentric conceptualization.

**Methods**

Our ideas for the Model reflected much of the earlier introductory work in the monograph (Law et al, 1992) but expanded upon these ideas. Of the occupational therapy models reviewed, Christiansen and Baum’s (1991) was closest to our own view, but all these authors agreed on the importance of the environment on behavior and activities.

We determined the key concepts and assumptions of the model as the person, the environment, activity, tasks, and occupation(s), and occupational performance, adding time as a factor of importance to describing change and space to describe location. Key concepts and assumptions were defined in keeping with existing terminology; these are enumerated below (Law et al, 1996).

The person is defined holistically as a unique being who assumes a variety of roles simultaneously. These roles are dynamic, varying across time and context in duration and significance. The Model assumes that the person is a dynamic, motivated and ever-changing being who interacts constantly with the environment to effect occupational
performance. *The environment* is broadly defined as the context in which occupational performance occurs. It includes cultural, socio-economic, institutional, physical, and social aspects, each being equally important and relevant to the unique perspective of the person in his/her various roles. The model assumes that *the environment* is dynamic and purposeful and cannot be teased apart since its components can enable or constrain behavior, which in turn influences the environment. Nonetheless, the environment is considered easier to change than behavior (Law, 1991; Lawton, 1986), hence optimally interventions should focus on modifying the environment rather than expecting the person with a disability to alter his behavior.

*Activity, Task and Occupation(s)* are considered as being nested, with activity forming the basic unit. *Activity* is defined as a single pursuit, such as the act of writing, *task* as a set of purposeful activities such as writing a report and *occupation* as groups of self-directed, functional tasks in which a person engages for purposes of self maintenance, expression and fulfillment.

The Model assumes that *occupations* are purposeful, complex and are necessary for living.

*Occupational performance* is defined as a complex, dynamic phenomenon, which has both spatial and temporal dimensions. *Interface information* describes the interaction occurring at the overlapping areas of the Venn circles, such as the degree of fit of the person and the occupation in question. *Time* is described as the patterns and rhythms that encompass occupational routines in a fixed period; *space* is defined concentrically from intimate to public and is subsumed by *environment*.

The model assumes that *occupational performance* is both described and shaped by the unique person, environment, occupation transaction and therefore constantly in flux. The evaluation of occupational performance thus requires the use of both observable and self report measures.

*Person-environment-occupation fit* describes the ongoing, varying congruence of the key concepts of person, environment and occupation as these constantly transact.

The model assumes that maximal *fit* occurs when these components overlap closely; minimal *fit* is the product of lack of congruence of one or more of the interfaces. Therefore, in the practice of occupational therapy, the PEO Model is used to expand the
person and therapist’s ability to identify and discuss strategies to improve congruence and therefore, occupational performance.

**Results**

The Person-Environment-Occupation Model for use in occupational therapy assessment and intervention was now almost complete. Early drafts of the Model and related material were presented as opportunities arose (e.g., Cooper et al., April, 1994; Letts et al., April, 1994; Cooper et al., June 1994; Law et al., 1994a). However, for the Can-Am Conference in Boston, a major professional venue held in July, 1994, we structured our presentation as an interactive workshop (Law et al., 1994b). The ensuing discussion provided relevant information on the professional views of the strengths of the Model and identified areas requiring further clarification or improvement. These useful comments were used to refine the Model before submitting it for publication (Figure 1). We felt it was important to disseminate these ideas first in Canada, therefore, as with the initial step, presented the PEO Model at the annual conference of the CAOT in Ottawa, (Cooper et al., 1996) and published our paper in the Canadian Journal of Occupational Therapy (Law et al., 1996).

![Figure 1: The Person-Environment-Occupation Model](image)

Phase 3: Measurement

As health care professionals, occupational therapists are required to demonstrate that their interventions have a positive effect on client concerns and function. This means that we must be able to assess issues and outcomes accurately and be familiar with the attributes and psychometric properties of the instruments of measure we are using. However, measures are constantly being developed, modified and researched for clinical purposes and when appropriate, therapists sometimes use measures from other professions. As a result, establishing the utility, reliability and validity of measures is an ongoing concern and never fully up-to-date. Additionally, each application of the PEO Model requires the use of specific measures, since these must change in accordance with the issues under consideration or with the age of the clients. For example, an assessment and intervention for a child usually requires different measures than a similar study for an elderly person; the use of the model to address community issues would require different measures than the same issues studied at the family level. We had addressed the use of person-environment measures in occupational therapy in the monograph (Law et al., 1992) and in Letts et al.’s (1994) article, however, we had not as yet identified preferred measures for specific groups, sites or functional and behavioral issues.

Research Objective

To review and evaluate the instruments available to measure person-environment relations from the perspective of specific populations and issues commonly encountered in occupational therapy practice.

Literature Review

Just as we started considering how best to deal with this, requests began to arrive asking us to write chapters for occupational therapy text books on the assessment of environments. These required us to describe the use of the PEO Model in different contexts with different populations, thereby providing us with a practical framework for addressing measures: Lacking another, we resolved to review the assessment literature according its specific relevance to the needs of each chapter requested and maintain the same approach to this day.
Methods

Consistency in evaluation is essential. The format established by Letts et al. (1994) provided an initial filter for identifying and assessing person-environment instruments (see Phase 2). Through Mary Law, we were given access to a form already developed and tested by Can Child (Outcome Measures Rating Forms and Guidelines, 1994). Instructions for its use are clear and straightforward, thereby allowing multiple assessors to conduct the reviews as required without skewing results. The form consists of eleven pages, too long to reproduce here, but it is available through Can Child at the School of Rehabilitation Science, McMaster University on the following websites:


Results

This body of work has resulted in numerous assessment chapters for occupational therapy texts (e.g., Cooper, Rigby & Letts, 1995; Cooper et al., 1999, 2001; Rigby et al., 2001, 2004, 2005 2007, 2008). These requests have continued for later editions of the same texts, indicating that the PEO Model has been well accepted into the standard occupational therapy literature (e.g., Law & Townsend, 1997/2002; Stewart et al., 2003). Over the years we have added new editors and co-authors as interest and expertise among ourselves and other faculty was demonstrated (e.g., Rigby, Lowe, Letts & Stewart, 2007; Rigby, Stark, Letts & Ringaert, 2008). Chapters in books targeted at other professions such as architecture have also widened our influence (e.g., Cooper et al., 1999).

Phase 4: Dissemination

Thanks to the Internet, international conferences, sabbaticals and other travel, the world has become a much smaller place. For a small profession like occupational therapy, dissemination of ideas has become even more vital. In order to foster the use of the Model, we focused on three areas: peer validation, educational integration and the utility of the model in professional, cross-professional and graduate research.
Objectives

The first objective was to disseminate issues related to the PEO Model through the traditional methods of peer reviewed publications and conferences; the second was to integrate the PEO Model into the education of students and clinicians; and the third was to disseminate information on the Model as widely as possible through speaking engagements, especially at other universities and to affiliated professional audiences.

Literature Review

In this phase, we conducted reviews when necessary and as relevant for the papers and presentation under consideration. Members kept each other appraised of new articles and views, monitoring in particular, evidence of clinical utility and research application of the PEO Model.

Methods

We addressed the first objective by discussing authorship of potential articles and podium presentations with members of the PEO Group and arranged to share the work. We determined the order of authors and degree of involvement at the beginning of each undertaking according to their fit with other schedules and commitments and directed our efforts at highly ranked journals and conferences.

All courses in the curriculum of the McMaster Occupational Therapy (professional) Program are reviewed yearly, incorporating changes suggested by student and other feedback as relevant. However, since the Faculty of Health Sciences at McMaster is well known for its problem based/self directed learning approach, no special introduction to the model was required, for our students always identified it themselves when preparing for tutorials. We were developing other graduate programs in rehabilitation at that time and found that these students often used the PEO Model for projects and theses. The self-directed educational structure and an institutional emphasis on feedback allowed us a less biased assessment of its value in education.

Information on the clinical application of the PEO Model for interested local therapists who had not studied at McMaster was gained mostly through their tutoring opportunities at the school. However, other traditional forms of continuing education, such as conference presentations, workshops and journal articles also kept them informed.
Again, feedback was sought from and provided by these groups.

**Results**

We gave papers on the PEO Model at major national and international occupational therapy conferences such as CAOT (e.g., Cooper et al., 2002), the British Society of Occupational Therapists (e.g., Green & Cooper, 1997), the World Federation of Occupational Therapists (Cooper et al., 1994, Letts et al., 1994, Cooper et al., 1998; Green & Cooper, 1998). At the same time, we also concentrated on submitting papers to occupational therapy and other affiliated journals (e.g., Strong et al., 1997 & 1999). While McMaster students quickly became familiar with the PEO Model, the greatest impact on occupational therapy students in general no doubt came from the many textbook chapters we were asked to author on the environment, person-environment assessments and the PEO Model itself. In addition to the assessment/evaluation chapters reported in the previous phase, these included chapters for the classic occupational therapy practice text, Willard and Spackman (e.g., Stewart, D. et al., 2002), gerontology (e.g., Cooper & Day, 2003), orthopedics, (e.g., Cooper et al., 2002), mental health (e.g., Strong & Rebeiro, 2003 & in press) and occupational therapy practice theory (e.g., Law et al., 1997). All members of the PEO Group participated in these activities and as this chapter itself indicates, this work is still ongoing.

Members of the group were also invited to edit texts, some of which contain many of the chapters previously referenced. Perhaps the best example of these efforts is *Using Environments to Enable Occupational Performance*, which was edited by three of the PEO Group members (Letts, Rigby & Stewart, 2003) and included chapters by all group members (Cooper & Day, 2003; Letts, 2003; Letts, Rigby & Stewart, 2003; Rigby & Huggins, 2003; Rigby & Letts, 2003; Stewart, 2003; Stewart & Law, 2003). This book is widely used in occupational therapy curricula by universities around the world. The content focuses on the barriers and enablers in the environment that influence how people participate in daily life. Most importantly, these ongoing requests to edit and write chapters for occupational therapy texts provide validation for the continuing relevance of the content and academic expertise of the PEO Group. In addition to these contributions, external dissemination of the model was greatly facilitated through natural contacts, such as sabbaticals and major conferences as well as by invitations from other universities to present workshops or lectures on the Model (e.g., Cooper, B., 1996a, 1997a and 1997b). We also accommodated opportunities to speak to members of affiliated professions, such as gerontology (e.g., Cooper, B., 1997b),
Building Science (e.g., Cooper, B., 1997a & b) and pediatrics (Rigby et al., 1997). However, perhaps the most significant request was an invitation to present the model to medical colleagues and scientists at a McMaster meeting of the Research Council of Canada (Cooper et al., 1997).

**Phase 5: Validation**

Validation for the PEO Model is now foremost in importance. New models require evidence of support for their major concepts, assumptions and theoretical base; definitions of these terms must be upheld. Most importantly, professional utility must be demonstrated. While it is common for the parent group to be involved in such activities at the beginning of this long venture, nonetheless, evidence of use by individuals not affiliated with the parent group is crucial. This is best demonstrated by external educational, clinical and research application as reported in peer reviewed fora.

An early example of such validation was provided by a peer-reviewed publication written by then Ph.D. candidate, Sharon Green, a member of faculty in the Department of Occupational Therapy at Liverpool University and this author (2000). It reported on the application of the Model in a qualitative study in which it was used as a means of structuring the research itself; as a mechanism for organizing the semi-structured interview; and as a framework for organizing and analyzing the results, particularly in a manner relevant to occupational therapy. While utility was amply demonstrated, the results also provided validation for the key concepts of occupational performance and time and stressed the importance of interface information.

Similar outcomes were demonstrated by Strong in her analysis of a literature review conducted as background for a chapter on the PEO Model for a book on mental health (Strong & Rebeiro Gruhl, in press). Her broad and exhaustive search on the use of the PEO Model included 1998-2008 databases of EMBASE, MEDLINE, PsychINFO and CINAHL using the PEO Model.mp, and the names of the PEO Group. In addition to Google, she also conducted separate searches using the reference lists in each article and citations. Through this, Strong identified 36 examples of multi-professional research using the PEO Model: the studies varied in focus, research design, participant characteristics as well as country of origin. However, regardless of these variables but with one exception (Pongsaksri, 2004), these studies overwhelmingly endorsed the PEO as a useful tool for organizing research structure and for analyzing and interpreting results.
In particular, they support the model’s key concepts and assumptions and its utility for conveying results clearly. However, two authors (O’Brien et al., 2002 and Rowles, 2003) identified a need for the authors of the model to expand further on their ideas on the role and meaning of place (space) in occupational performance. Place has long been a topic of interest to those in EBS and is also recognized pragmatically by therapists, who, for example, traditionally opt to conduct functional assessments in the location where clients normally perform these activities. However, this specific task remains to be done.

The Pongsaksri exception raises both a cultural and a conceptual issue. Because Thai culture emphasizes collectivity, models that focus on the person are not considered a good fit for their approach to occupational therapy. Although the other studies reviewed by Strong had shown the PEO Model to be culturally neutral and the proposed concentric structure of the PEO Model does adjust for expanded population use, this particular assumption has not as yet been specifically studied. Clearly both issues need to be explored further.

Interestingly, five of the authors reviewed by Strong (Smith, 2001; Schult, 2002; Pongsaksri, 2004; Takase, 2005; & Vrkljan, 2006) reported on the use of the PEO Model to guide their Ph.D. theses: one in nursing, one in public health and three in a wide variety of occupational therapy studies). Each thesis does so in a unique manner. Singly and as a group, these studies illustrate not only application of the Model for educational and research use, but its flexibility in these areas.

Discussion

The PEO Model’s strength appears to be organizational: it provides a clear and systematic way to collect, investigate and report on data relevant to the modular components, their interfaces and occupational performance. It also offers a systematic way of determining multiple points of entry for intervention or study, particularly at the interfaces of the components. These functions indicate good internal consistency.

The PEO Model was designed and is primarily used as an occupational therapy tool, but we contend that very little modification would be required to make it applicable to other professions. This assertion is supported by Takase’s (2005) use of the Model for her Ph.D. study in Nursing, by Rigby’s application of the model to rehabilitation
and assistive technology in her PhD thesis (2010), and by O’Brien et al.’s paper (2002) which married concepts from sociology and the geography of disability to occupational therapy. These examples and the diversity of occupational therapy practice itself point to flexibility of use both within the profession and otherwise.

The conceptualization of the PEO Model as a transactional model, however, is both a strength and a weakness: the former, because it more accurately describes the complex person-environment-occupation relationship, the latter, because our current measures are inadequate for this complexity of understanding and we must depend on time-series, cross-sectional measures to capture the effects of interventions and the passage of time. To compensate for the need for objectivity in research, we also use self-report measures.

While we are encouraged by these data, they also identify issues where further investigation is needed. Conceptual refinement is required in particular, as related to the role played by space and place in occupational performance. Additionally, we need to devise ways to test our contention that space and person are in fact concentric or else, modify these ideas appropriately within the structure of the Model. Additional questions also exist: Do the concepts vary with age, that is, with time? Should any of the major concepts be weighted? In other words, are some more important than others? If so, does this change for different populations and/or under different conditions? The inclusion of time in a lifespan model poses even more questions: How does the relationship change in a person over time? Is it predictable; does it pattern in any way. And, perhaps most importantly, is the PEO Model the action arm of an “as yet unexpressed” theory? It seems to fit the description of what Walker (1993) describes as the theory-practice-theory process in which theory from other fields is used to develop occupational therapy practice and theory. The data emerging from the use of the PEO Model certainly describe and explain occupational performance but aside from one report on predictability (Schult, 2002), there is little evidence as yet to support this last theoretical attribute. In health care, the ability to predict outcome is considered a quintessential factor (Cooper & Saarinen, 1986), and so would be valuable.

### Conclusion

Occupational therapy uses and continues to produce a plethora of clinical models. For important reasons, not the least of which are issues of shared professional beliefs,
good communication, practice foci and application of research results, it behooves the profession to try to limit this number. The multi-professional EBS literature interwoven with the specific conceptual foci of occupational therapy offers the option of a strong compatible foundation that can be specifically applied to clinical practice and research. The resulting model has demonstrated utility and flexibility. Our data also indicate that the PEO Model shows signs of being a good general crossover approach for health care and social science based professions.

The development of a new practice model clearly requires commitment and is a long process best approached systematically. In this instance, the five-step approach we used provided a good working model. We highly recommend the use of a small group (five or six members) of committed individuals with compatible knowledge who can provide diversity, experience and dedication to the task. However, good timing overrides all these factors. There is no foolproof recipe for identifying this, but ongoing peer and user feedback while formulating and refining the model is essential. This will soon tell you whether or not your ideas are viable. If you are on track, an added bonus is that peer reviewed academic contributions will be far richer than individual ones ever could be. And, because they are shared, they are never onerous.

As the use of the PEO Model continues to grow, the Group’s activities have diminished and become less organized. These are now mostly ad hoc and related to the use of the PEO Model in mainstream education, research application and chapters for textbooks. Nonetheless, we acknowledge that all groups have a finite life span and are comfortable in the knowledge that other academic endeavors await our attention. If we have done our job well, others will continue to build on this legacy and bring fresh ideas to the table.
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