

Theoretical Foundations

Learning Portfolios: Potential to Assist Health Professionals with Self-Directed Learning

JOHN PARBOOSINGH BSc, MBChB, FRCOG, FRCSC

Associate Director, The Office of Fellowship Affairs

The Royal College of Physicians and Surgeons of Canada and

RS McLaughlin Professor of Medical Education, Faculty of Medicine

University of Ottawa, Ottawa, Ontario

Abstract: *While learning portfolios have been used by students enrolled in formal education courses for over 20 years, their potential to assist health professionals with their learning activities remains relatively unexplored. The increasing need for health professionals to manage change efficiently and the central role of practice-based self-directed learning provide the impetus for educators to find ways of assisting professionals to enhance the quality of their learning activities. This article explores the potential of the portfolio to enhance the quality of an individual's learning activities while respecting their desire for control of the education process. Physicians using a new computer software program called PCDiary report that it helps them to review and appraise their learning activities. It is predicted, based on these early experiences, that the integration of computer and telecommunications technology and the traditional learning portfolio will produce a new generation of interactive learning tools. PCDiary, and future computer-based learning tools, will stand or fall on their ability to assist professionals to plan and appraise learning activities generated from their practice experiences. Computer "smart" portfolios will enhance learner interaction in ways that preserve the autonomy of independent learners. They will also be useful tools to research ways of helping professionals with their continuing learning.*

Key Words: Continuing medical education (CME), portfolio assessment, portfolio learning, practice-based learning, self-directed learning

Portfolios were first introduced to students in the visual arts in the 1970s with the intent of engendering feelings of self-control over their learning and to promote reflective thinking. Their use in the health professions has for the most part been limited to the assessment and recertification of nurses and midwives in select jurisdictions. Brown¹ defines a learning portfolio as "a collection of evidence which demonstrates the continuing acquisition of knowledge, skills, attitudes, understanding and achievements...reflecting the current stages of development and activity of the individual." A

personal portfolio may contain artifacts, including personal activities, presentations, and papers that document the scholarly accomplishments of the individual; documentation of attendance at education sessions; records of formal evaluations; and journal or diary entries that document the student's insight into their professional development. Outside of the visual arts, learning portfolios have been tried only in limited circumstances.² This article explores the potential for portfolios to assist physicians and other health professionals to enhance their practice-based learning activities.

Use of Portfolios by Health Professionals

Portfolios are used in nursing education for the certification of skill levels of practical nurses seeking entry into university baccalaureate programs,^{3,4}

Reprint requests: John Parboosingh, BSc, MBChB, FRCOG, FRCSC, Associate Director, Office of Fellowship Affairs (MOCOMP®), The Royal College of Physicians and Surgeons of Canada, 774 Echo Drive, Ottawa, Ontario, Canada, K1S 5N8.

as a way of recording continuing education (CE) achievements,⁵ and for recertification in the United Kingdom.⁶ Jasper⁷ perceives the potential of the portfolio in nursing to be wider than an instrument for certification, providing a record of knowledge embedded in practice and contributing to the description of nursing's expertise. In keeping with the original intent for portfolios, Jensen and Saylor³ describe their potential in formal nursing education to "reconnect the nursing student to the practice elements of a discipline through an active, reflective learning process." Research studies confirm that physicians, like other professionals, learn and change naturally by solving problems and by taking ownership of their learning in a purposeful manner.⁸ These studies, and those cited by Candy⁹ exploring the components of autodidactic competence, as well as the work of Schon¹⁰ on the role of practice reflection in learning in the workplace, provide the impetus for continuing educators to explore the use of portfolios to enhance the quality of self-directed learning undertaken by health professionals. Only one published report could be found on portfolio-based learning in postgraduate and continuing medical education (CME). Pietroni and colleagues¹¹ recommended portfolio-based learning to physicians and trainees of the Royal College of General Practitioners in the United Kingdom. These workers recognize that, while the profession places emphasis on hours of attendance at formal education courses, individual physicians are increasingly dependent on practice-based experiential learning to keep up to date. They contend that keeping a portfolio could assist the physician learner with "the critical intellectual task of moving from a description of an experience to the identification of the learning derived from that experience...."

The contents of portfolios described in the literature vary with their intended purpose. Portfolios designed as strategies for assessment are heavily structured and standardized. Brown¹ describes the documentation required for recertification for nurses as a "learning profile" rather than a portfolio, defining it as a "public document

constructed according to externally applied criteria and used for regulatory purposes." The contents of the personal profile required by the United Kingdom Central Council for Nursing include "pre- and postregistration education, employment and professional education history, record of statutory 5 days professional development, and information relating to the Council's requirements." Jensen and Saylor³ instruct their nursing students that the portfolio "represents an artifact that we can use to look more deliberately at your experiences in this course. The portfolio is your own creation and can include papers, journal entries, examples of classroom work or anything else that is meaningful to you and represents your growth and understanding in this area." The portfolios described by Pietroni et al.¹¹ and Jarvinen and Kohonen¹² are intended to enhance experiential learning and are based on Kolb's model of experiential learning. The portfolio designed for physician trainees by Pietroni et al.¹¹ follows a sequence of steps: "first, the identification of experiences which the learner defines as significant... Next, the identification of what learning arose from these experiences, and how that learning can be demonstrated in practice; then, the identification of further learning needs; and finally, ways in which these can be met." In keeping with the original intent for the tool, this portfolio is designed primarily to assist the learner to learn from experience.

Impact of Portfolios on the Learner and the Learning Process

The multiplicity of approaches to the study of self-directed learning reported in the literature provides a variety of options for exploring the impact that portfolios may have on a physician's learning activities. Portfolios may exert their effects on the individual (e.g., keeping a portfolio may enhance learner satisfaction, self-efficacy, and motivation), on the learning process (e.g., keeping a portfolio may assist the physician to decide what needs to be learned), and on the

integration of learning into practice (e.g., keeping a portfolio may assist the physician to evaluate the impact of new learning on his or her practice). The usefulness of portfolios to the learning process may vary with the type of learning project undertaken and the stage in the project that the learner has reached. For instance, portfolios may be of limited use in the early stages of learning about a new field when the learner does not know enough about the subject to raise relevant questions. On the other hand, a portfolio may add structure to the serendipitous, incidental, and random nature of the typical adult's learning activities. They may be designed to assist learners at the beginning of a project to "hold conversations with themselves," thereby defining the question and reflecting on its relevance to their world. Differentiating new information gleaned, for example, while solving a patient's problem, from that which has meaning to personal development, requires a clear image of one's zones of mastery¹⁰ as well as a capacity for reflective thinking. Keeping a learning portfolio may assist the learner to respect the differences between memorizing facts and the more desirable behavior of abstracting new meaning and interpretations. In other words, keeping a portfolio fosters the higher categories of learning, namely, learning as making sense or abstracting meaning and learning as interpreting and understanding reality in a different way. The integration of computer and telecommunications technology will produce new types of learning portfolios that will guide learners through these processes and enhance the quality of their self-education without compromising feelings of ownership and self-efficacy engendered by independent learning. The PCDiary software described here represents a new generation of computer "smart" portfolios.

PCDiary: Software to Assist Physicians to Create a Learning Portfolio

The MOCOMP® diary is designed to encourage specialist physicians and surgeons in the Maintenance of Competence (MOCOMP®) Program of

the Royal College of Physicians and Surgeons of Canada to create a portfolio of learning based on their practice experiences. A report on the use of the MOCOMP diary has been published elsewhere.¹³ The Appendix displays a sample of the items from the portfolio of an internist. A computerized version of the diary, termed PCDiary, has been used by 200 physician volunteers over a period of 18 months. The front screen of the Windows version of the author's diary is shown in Figure 1. The initial feedback from physicians using PCDiary suggests that the interactive features of the software enhance its potential to influence the learning process. PCDiary is designed to assist physicians to apply Schon's model of reflective practice¹⁰ to their self-directed learning. Having learned something new while solving a patient's problem or as a consequence of attending an educational program, the physician can use the software to reflect on the new information and to speculate on its potential impact on their expertise or zone of mastery.¹⁰ An item of learning is defined as new, or revision of old, knowledge, skills, or attitudes that the physician perceives has enhanced his or her expertise or ability to apply that expertise in practice. The item is entered in the software in the form of a question, a strategy that is said to encourage deep-level learning.⁹ The software requests the physician to reflect on what triggered the question and to think of the impact of the new learning on his or her expertise. These features encourage the user to be selective by reflecting on the interface between an item of new information, the physician's image of the zone of mastery on which the learning may impact, and the outcome intended for the learning. For instance, if the physician assigns "I will modify my practice" as the outcome code to an item of learning, the software then requests the physician to describe how they intend to modify their practice. PCDiary encourages physicians to focus on the purpose of the learning and to clarify the image of its potential to impact on their expertise, two features that Fox et al.⁸ report increases the likelihood that learning will result in a change in

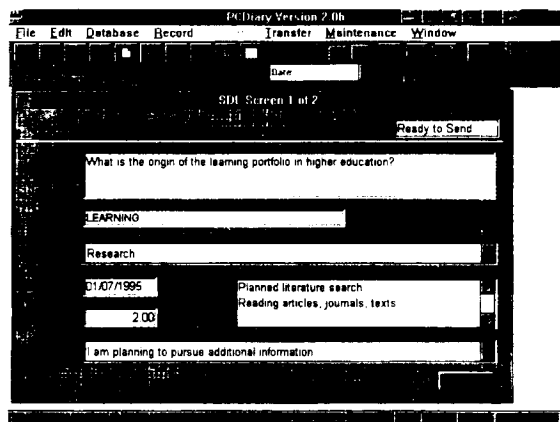


Figure 1 Sample entry taken from the author's PCDiary files. This entry is the first of a series of entries recorded under the topic area designated "learning in practice," which the author created in his diary to record items of learning related to the PCDiary project. As shown in the screen face, the research project was the stimulus to the item; several resources, recorded in a separate reference file, were used to accomplish the project. The project, which took 2 hours to outline, is ongoing. Several further diary entries have been made and a strategy has been implemented to continuously monitor the literature on the subject.

behavior. The software enables users to search and sort items of learning by topic, by stimulus, and by the assigned outcome. For instance, the physician may print a list of items to which he or she has assigned the outcome code "I will modify my practice" with the intent of ensuring that they make the necessary changes in practice. The search and sort capabilities of PCDiary provide feedback of learning and engender ownership as well as feelings of accomplishment, both of which motivate independent learners.¹⁴

The integration of computer and telecommunications technology into the design of personal learning portfolios will enable learners to network with peers and mentors during the learning process, strategies that are said to enhance deep learning and reflective thinking. At present, PCDiary users contribute diary entries (consisting

of the question, the stimulus, resources used to accomplish the learning, and the intended outcome) anonymously by modem transfer of data to a central database. In the future, they will be able to search the database from their home computers to find out what their peers are learning and their intent to make changes in their practices. Adult learners are motivated by knowledge of the learning activities of their peers and mentors. The concept of a central "depository" of items of learning, carefully selected by experts building personal portfolios of learning, is intriguing. As well as keeping experts aware of the learning activities of their peers, such a library of questions, equipped with free text search engines on a website, could become a valuable source of educational needs for CE providers and program planners and a useful source of information for planners of residency curricula and certification examinations.

Barriers to Introducing PCDiary

PCDiary software is presently being used by a relatively small number of physicians. While a lack of computer skills is a significant barrier to its use, it must also be remembered that physicians are not accustomed to expressing the outcome of their educational activities in terms of items of learning or recording its impact on their expertise. Although physicians most commonly use independent learning resources such as reading articles to keep up to date, self-directed learning has never been legitimized by the profession. Indeed, as Candy⁹ states, "spending years in teacher centered educational settings has likely reduced many professionals to passive learners and deprived them of the confidence to take charge of their own learning." This educational background engenders feelings of insecurity and threatens their self-efficacy, a major determinant, according to Mann,¹⁴ in "people's choice of what to do, how long to persevere, how much effort to expend and whether tasks are approached anxiously or assuredly." Mann, referring to Bandura's social cognitive theory, points out that success in learning generates confidence in the

learner to undertake more challenging tasks. Feedback from focus groups of PCDiary users suggests that the software has the potential to motivate physicians to undertake learning projects. As one physician user of PCDiary stated, "PCDiary allows you to put all the stuff in and then you print out your listing and you can say, hey I did all of that. That's great!" It will take time, and perhaps a shift in the culture of the profession and a shift in the locus of control within individual physicians, before we begin to give priority to the planning of our professional development. The term "personal mastery" is used by Senge¹⁵ to describe the discipline of personal growth and learning. He states: "When personal mastery becomes a discipline — an activity we integrate into our lives — it embodies two underlying movements. The first is continually clarifying what is important to us... The second is continually learning how to see current reality more clearly..." Keeping both a personal vision and a clear picture of current reality before us generates, according to Senge, a creative tension or intrinsic driving force that strives to bring them together. Senge states: "Learning in this context does not mean acquiring more information, but expanding the ability to produce the results we truly want in life." People with high levels of personal mastery are not driven by the prospect of a reward for "arriving;" they live in a continual learning mode in which the journey is the reward. Industry's interest in professionals with high levels of personal mastery is, according to O'Brien, president of Hanover Insurance (cited by Senge),¹⁵ based on observations that they tend to take more initiatives, have a broader and deeper sense of responsibility in their work, and learn faster than their colleagues. It may be predicted that physicians with high levels of personal mastery will find PCDiary and future interactive portfolios to be useful in the management of their continuing professional development. They likely exhibit the characteristics of autonomous learners, as summarized by Candy;⁹ score high on the Guglielmino self-directed readiness scales,¹⁶ indicating their openness to learning; and have an intrinsic interest

in meaningful learning. In contrast, physicians who are dependent on more traditional provider-centered or mandatory approaches to CME will not be motivated to use the PCDiary or other forms of portfolios. These professionals tend to perceive education as the transmission of knowledge and will likely be driven to their learning by extrinsic interests, such as passing examinations or gaining qualifications. These hypotheses are supported by the work of Bligh,¹⁷ who, applying the Guglielmino self-directed learning readiness scale to general practitioner trainees in the UK, identified three principal factors from the analysis: enjoyment and enthusiasm for learning, a positive self-concept as a learner, and a factor suggesting a reproducing or memorizing orientation to learning. The intriguing question worthy of researching is, can PCDiary and other forms of computer portfolios help physicians and trainees to enhance the quality of their self-directed learning and develop high levels of personal mastery? Do physicians who use PCDiary as a learning portfolio provide a more objective assessment of their practice needs than their colleagues?

Learning Portfolios Describe the Qualities of a Professional

The recent interest shown by the health professions in portfolios lies in their potential role as an assessment strategy for the purposes of accreditation and recertification. Jensen and Saylor³ state: "As educators face ever increasing demands to prepare thinking practitioners, the limits of standardized testing and normal curves are clearer and ... educators seek alternatives to past assessment methods." Compared with traditional methods, the portfolio presents a more attractive method of assessment for individual practitioners who have developed unique practices based on their special interests and expertise. However, while a portfolio may best describe an individual's professional qualities, validation of the data and the setting of standards remain problematic. Portfolios provide excellent opportunities to evaluate the qualities of

experts outside of their knowledge base, including their ability to learn from practice, to make judgments, take risks, develop leadership skills, and so on.¹⁸ The documentation created by PCDiary can be used to assess the learning abilities of its user, referred to by Candy as "autodidactic competence." The term is all embracing and includes the ability to self-monitor, to use educational resources appropriately, be selective in the adoption of new practices, and be knowledgeable of the changes his or her peers across the country are introducing into their practices. In this context, the portfolio of learning created by the diary can be used to identify physicians with leadership skills who manage change efficiently and are personally empowered to take charge of their professional development. Indeed, industry's primary interest in identifying professionals with personal mastery is to head hunt them for senior executive positions. These considerations create a dilemma since PCDiary, like other learning portfolios, should primarily be used as a tool to enhance personal learning and the satisfaction that goes with intrinsically motivated lifelong learning.

Conclusions

While learning portfolios have been used by students for over 20 years, their potential to enhance learning in health professionals remains relatively unexplored. The increasing need for health professionals to manage change efficiently and the central role of practice-based self-directed learning provide the impetus for educators to find ways of assisting professionals to enhance the quality of their learning activities. This article makes the case that the integration of computer and telecommunications technology into the traditional learning portfolio will produce a new generation of interactive learning tools that will enhance learner interaction in ways that preserve the autonomy of self-directed independent learners while at the same time providing useful tools for research into the learning activities of health professionals.

Acknowledgment

The author acknowledges the significant contribution made by Searle Canada Inc. to the development and evaluation of the PCDiary software.

References

1. Brown R. Portfolio development and profiling for nurses. Quay Publishing, Lancaster (cited by Jasper M, 1995).
2. Jones JE. Portfolio assessment as a strategy for self-direction in learning. *New Dir Adult Cont Educ* 1994; 64 (Winter):23-29.
3. Jensen GM, Saylor C. Portfolios and professional development in the health professions. *Eval Health Prof* 1994; 17:344-357.
4. Marsh HF, Kasky PA. The professional portfolio: documentation of prior learning. *Nurs Outlook* 1984; 32:264-267.
5. English National Board. Professional portfolio. London: EBN, 1991.
6. United Kingdom Central Council for Nursing. The future of professional practice. The Council's standard for education and practice following registration. London: UKCC, 1994.
7. Jasper MA. The potential of the professional portfolio for nursing. *J Clin Nurs* 1995; 4:249-255.
8. Fox RD, Mazmanian PE, Putnam RW, eds. *Changing and learning in the lives of physicians*. New York: Praeger, 1989.
9. Candy PC. *Self-direction for lifelong learning*. Jossey-Bass Higher and Adult Education Series 1991. San Francisco: Jossey-Bass, 1991.
10. Schon DA. *Educating the reflective practitioner: toward a new design for teaching and learning in the professions*. San Francisco: Jossey-Bass, 1987.
11. Pietroni R, Heath I, Burrows P, Savage R, Sowden D, Millard L. Portfolio-based learning in general practice. Report of working group on higher professional education, The Royal College of General Practitioners of the United Kingdom. London occasional paper 63. 1993.
12. Jarvinen A, Kohonen V. Promoting professional development in higher education through

portfolio assessment. Assess Eval Higher Educ 1995; 20(1):25-36.

13. Campbell C, Gondocz T, Parboosingh J. Documenting and managing self-directed learning among specialists. Ann R Coll Phys Surg Canada 1995; 28:80-84.
14. Mann KV. Educating medical students. Lessons from research in continuing education. Acad Med 1994; 69(1):41-47.
15. Senge PM. The fifth discipline. The art and practice of the learning organization. New York: Doubleday, 1991.
16. Guglielmino P, Guglielmino L. Practical experience with self-directed learning in business and industry human resource development. New Dir Adult Cont Educ 1994; 64 (Winter):39-46.
17. Bligh JG. Independent learning among general practice trainees: an initial survey. Med Educ 1992; 26:497-502.
18. Paulson FL, Paulson PR, Meyer CA. What makes a portfolio a portfolio. Eight thoughtful guidelines will help educators encourage self-directed learning. Educ Leadership 1991; February:60-63.

APPENDIX A

01.12.95

1994 LEARNING PORTFOLIO

Page 1
Group 136

page 2

Outcome: I will modify my practice

- 1) 12.02.94 Are there any differences in the interpretation of thyroid function tests in the elderly (specifically hypothyroidism)?
Stimulus: 3) Audit of a clinical or lab practice
Resource: 1) Reading articles, journals, texts
 - 2) 04.03.94 What is the role of Hydroxychloroquine in the management of R.A.?
Stimulus: 4) Reading (scanning) literature
Resource: 1) Reading articles, journals, texts
Resource: 6) Teaching, Research, Publication, Presentation
 - 3) 09.03.94 What diagnostic approach and treatment strategy is effective in the treatment of life-threatening ventricular arrhythmias?
Stimulus: 3) Audit of a clinical or lab practice
Resource: 1) Reading articles, journals, texts
Resource: 6) Teaching, Research, Publication, Presentation
 - 4) 06.05.94 Are the causes of fluctuating neurologic signs in MM?
Stimulus: 1) During the management of a current patient or problem
Resource: 1) Reading articles, journals, texts
Resource: 2) CME Project
Resource: 99) Other
 - 5) 23.06.94 What are the indications and complications of anti-thyroid medications in patients with Hyperthyroidism?
Stimulus: 1) During the management of a current patient or problem
Resource: 1) Reading articles, journals, texts
 - 6) 13.07.94 What is the long term prognosis of patients who present with Chronic Fatigue Syndrome?
Stimulus: 3) Audit of a clinical or lab practice
Resource: 1) Reading articles, journals, texts
 - 7) 25.09.94 How predictive are ipsilateral cervical bruits in the detection of high grade carotid Stenosis?
Stimulus: 3) Audit of a clinical or lab practice
Resource: 1) Reading articles, journals, texts
 - 8) 25.09.94 Which treatment has the greatest efficacy in preventing DVT following total hip replacement?
Stimulus: 1) During the management of a current patient or problem
Resource: 1) Reading articles, journals, texts
 - 9) 25.09.94 What is the value of upright Tilt Table Testing in the evaluation of syncope of uncertain etiology?
Stimulus: 1) During the management of a current patient or problem
Resource: 1) Reading articles, journals, texts
Resource: 2) CME Project
 - 10) 25.09.94 What is the role of hypokalemia in the development of the Osmotic Demyelination Syndrome?
Stimulus: 2) After reviewing the management of more than one patient
Resource: 1) Reading articles, journals, texts
Resource: 2) CME Project
Resource: 99) Other
 - 11) 28.09.94 What is the incidence of sleep apnea in patients with hypertension?
Stimulus: 4) Reading (scanning) literature
Resource: 1) Reading articles, journals, texts
Resource: 6) Teaching, Research, Publication, Presentation
 - 12) 15.10.94 What antiarrhythmic drug(s) are appropriate for the treatment of symptomatic VT in patients with known ischemic congestive heart failure?
Stimulus: 1) During the management of a current patient or problem
Resource: 1) Reading articles, journals, texts
Resource: 6) Teaching, Research, Publication, Presentation
 - 13) 08.11.94 Is low dose aspirin effective in the prevention or treatment of pre-eclampsia?
Stimulus: 3) Audit of a clinical or lab practice
Resource: 1) Reading articles, journals, texts
Resource: 6) Teaching, Research, Publication, Presentation
- Outcome: I will wait for more information before modifying my practice.
- 14) 04.03.94 Is there a benefit from the deliberate Preoperative increase in oxygen delivery on mortality of high risk surgical patients?
Stimulus: 4) Reading (scanning) literature
Resource: 1) Reading articles, journals, texts
Resource: 6) Teaching, Research, Publication, Presentation
 - 15) 04.03.94 Does giving postmenopausal women estrogen reduce their risk of future cardiovascular disease?
Stimulus: 4) Reading (scanning) literature
Resource: 1) Reading articles, journals, texts
Resource: 6) Teaching, Research, Publication, Presentation
 - 16) 23.06.94 What is the role of Auscultatory Percussion in the detection of pleural effusion?
Stimulus: 3) Audit of a clinical or lab practice
Resource: 1) Reading articles, journals, texts
 - 17) 25.09.94 How accurate is the examination of the Liver in detecting enlargement?
Stimulus: 2) After reviewing the management of more than one patient
Resource: 1) Reading articles, journals, texts
- Outcome: I see no need to modify my practice
- 18) 09.03.94 What is the impact of antihypertensive therapy on LVH regression?
Stimulus: 3) Audit of a clinical or lab practice
Resource: 1) Reading articles, journals, texts
 - 19) 09.03.94 What is the impact of ACEI therapy on diabetic nephropathy?
Stimulus: 2) After reviewing the management of more than one patient
Resource: 1) Reading articles, journals, texts
Resource: 2) CME Project
 - 20) 25.09.94 What is the value of using compression ultrasound in the detection of symptomless Postoperative DVT?
Stimulus: 2) After reviewing the management of more than one patient
Resource: 1) Reading articles, journals, texts