

Invited Article

Portfolio assessment

G G Ponnampereuma¹

¹Medical Education Development and Research Centre (MEDARC), Faculty of Medicine, University of Colombo, Sri Lanka

Keywords: portfolio assessment; portfolio entry; portfolio builder

Corresponding Author: G G Ponnampereuma, E-mail< gomindap@hotmail.com>
Received: March 2014, Accepted revised version: June 2014, Published August 2014
Competing Interests: Author has declared that competing interests do not exist

Introduction

Portfolio in contemporary history has been used in many contexts. It all began with architects carrying with them a portfolio that showcased their past work, so that a prospective client could make an informed decision whether they should hire the architect or not. Portfolios, however, have evolved since then to become an educational tool that demands somewhat specific 'cognitive input' from the person responsible for the portfolio; i.e. the portfolio builder.

Given the wide range of contexts in which they have been used, portfolios have been defined variously. A modern-day portfolio could be defined as 'a collection of papers and other forms of *evidence* that learning has taken place, annotated with the student's *reflections* on what has been learnt in terms of the *learning outcomes, over a period of time*'. As indicated in italics, the key concepts that define a contemporary portfolio, therefore, are the *evidence for learning* accompanied by learner *reflection* on the learning that would signify achievement of *learning outcomes over a considerable period of time*. If a portfolio is to be assessed in some summative form, the clarity of purpose that leads to a clear-cut format for developing a portfolio becomes imperative. This article intends to provide such a clear-cut format that could perhaps offer both the trainer and the trainee a clear road map to follow when implementing portfolio assessment, in postgraduate medical education.

Why is a portfolio needed?

Portfolios in the context of learning

It is customary in the business world to build portfolio profiles of investment. The rationale is to spread the investment risk over many financial tools or business ventures to maximise profit. A portfolio can also be viewed as an educational tool that spreads learning over many learning opportunities to maximise learning. A learning opportunity can be considered as any event, either within or out-with professional life, which triggers learning.

Such a method of learning can be considered as learner-centred, since the initiative for learning is entirely placed within the purview of the learners themselves, with little or no external stipulations, such as those imposed by a formal curriculum. Hence, portfolios are considered ideal for continuing professional development and they can be developed using the learning opportunities offered within the workplace.

Portfolios in the context of assessment

Portfolios fundamentally differ from traditional assessment in many ways as indicated below:

1. Portfolios constitute continuous and longitudinal assessment, as opposed to stand-alone, cross-sectional and ad-hoc assessment. The latter is often compared to a still picture, whereas the former is akin to a video that captures action serially and more realistically. Hence, portfolios are ideally built over years rather than over weeks.

2. In addition to assessing knowledge and skills, portfolios are used to assess aspects which traditional assessment cannot assess, such as attitudes, professionalism, teamwork and leadership. These aspects are usually assessed using a set of observational tools that allow an observer, who can be a formal examiner/supervisor, a work colleague or a patient, to rate the ability of the candidate. Commonly used observational tools include, workplace-based assessment instruments such as Mini Clinical Evaluation Exercise (Mini-CEX), Directly Observed Procedural Skills (DOPS), Case Based Discussions (CBD), Multi Source Feedback (MSF), etc. Ratings of such workplace-based assessments are collected over time and included in the portfolio, so that not only the candidate's ability in the technical domain, but also attitudes, ethics, professionalism, teamwork and leadership can be captured and documented.

3. Research has consistently and unequivocally shown the need to assess a professional not only under highly structured and controlled conditions, but also under normal working conditions. Such research has found that there is loss of ability when one transfers ability (i.e. knowledge, skills and attitudes) from a controlled situation to a more lax and unstructured workplace situation. Portfolios can be used to assess the practice of a trainee both in their normal work environment, and under controlled conditions.

4. Portfolios represent a more 'qualitative' form of assessment, as against the more 'quantitative' forms of assessment that other methods such as essays, structured essays, multiple choice questions, long cases, short cases and Objective Structured Clinical Examinations (OSCEs) represent. The dichotomy is perhaps analogous to quantitative and qualitative research. Hence, portfolios offer more formative information (i.e. information that can be used as feedback to improve the ability of the candidate) as opposed to more summative information (i.e. information used to pass or fail a candidate). It is noteworthy, however, that portfolios can be used for both formative and summative purposes.

5. Portfolios are not a mere 'method' of assessment, but a 'framework' for assessment. This implies that portfolios can be used as the framework to accommodate the results of many assessments. Hence, by using information collected from many forms of assessment, such as written and clinical assessments conducted under examination conditions, and workplace-based assessment, portfolios can build an authentic, more comprehensive picture of the candidate that cannot be achieved by any other form of assessment.

Miller¹ classified all assessments into four levels: 'knows', 'knows how', 'shows how' and 'does'. Figure 1 shows the four levels and the respective assessment methods that can be used to assess each of the four levels. Although in Figure 1 'portfolios' are identified as a method that assesses at the 'does' level, it can be also argued, that portfolios (as a framework for assessment) can utilise the information provided at all levels to build a realistic picture of the candidate.

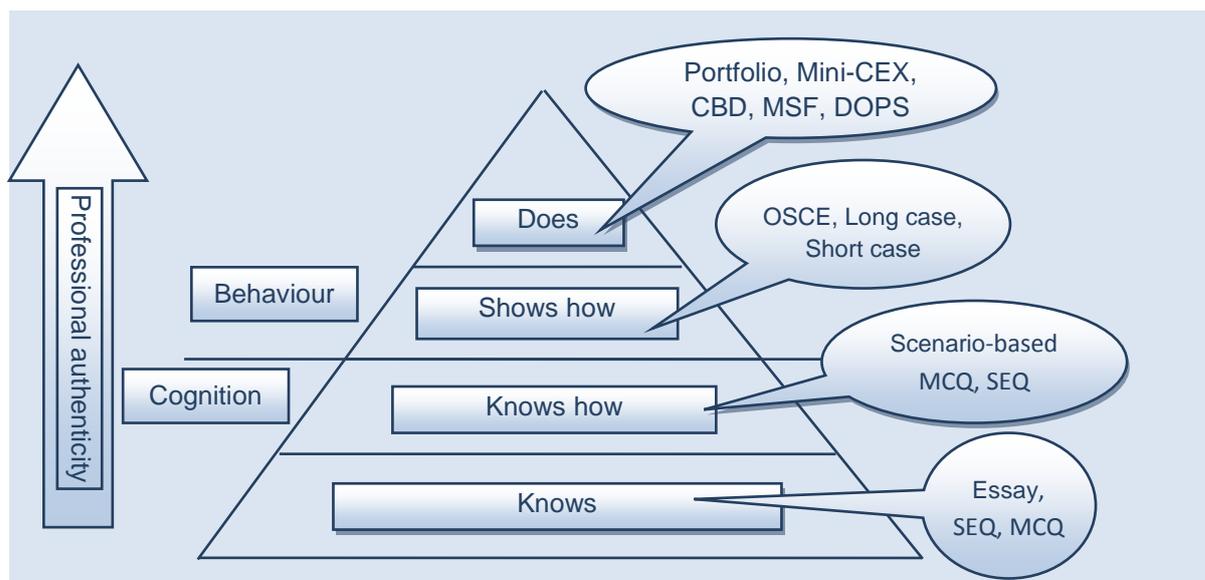


Figure 1: Classification of assessment based on Miller's levels of assessment

What constitutes a portfolio?

There are only two ingredients to a portfolio: portfolio content and learning outcomes. The portfolio builder should select portfolio content to illustrate achievement of learning outcomes. Usually, the learning outcomes are stipulated by the course committee (e.g. Board of Study) that requested the development of a portfolio.

Common learning outcomes that can be used to develop a portfolio are: clinical skills, investigations, procedural skills, patient management, health promotion and disease prevention, communication skills, information handling, basic social and clinical sciences knowledge, ethics, attitudes and legal responsibilities, problem solving, ethical/ clinical reasoning and higher order thinking, role of the doctor in a healthcare team (e.g. teamwork, leadership, educating others), and professionalism and lifelong learning. However, each discipline should identify the learning outcomes that best suit their discipline.

If portfolio content is not used for any assessment purpose, then, as a true learner-centred method of learning, the content can be selected entirely according to the discretion of the learner. However, if the portfolio is used for assessment, it should be structured, so that all candidates can be assessed using the same criteria, enabling the comparison of scores or grades that the candidate achieves. To balance these two diametrically opposing standpoints related to learning and assessment, it is customary for assessment portfolios to be semi-structured. This means the broad categories of content are usually imposed by the course committee, whereas within a category the candidate (or the trainee) is free to select individual portfolio items/entries that they wish to include. For example, if a course committee stipulates that an X number of case discussions on a certain topic/subject should be included within the portfolio, the trainee should be able to select the individual cases (or portfolio entries or items) to be included under such a topic entirely on their own, without any external influence.

When developing a portfolio it would be useful for the learner to develop a portfolio blueprint, as shown in Table 1, which meshes portfolio content with the learning outcomes. By ticking the respective columns along a given row in the blueprint, the candidate could show the learning outcomes that each portfolio entry contributed to. However, if these are the only aspects to be included in a portfolio, it is more like an advanced logbook, rather than a true portfolio. What makes a portfolio different from a logbook? It is 'reflection'².

Pee et al³. define reflection as a “deliberate, purposive exploration of experience, undertaken in order to promote learning, personal and professional development, and improvement of practice”. Therefore, reflection is the key activity that illustrates improvement of practice, as opposed to the mere documentation of learning, as typically done through a logbook.

Table 1: An illustration of a sample portfolio blueprint

Outcomes Content	Clinical skills	Procedural skills	Investigations	Role of doctor	Professionalism
Case discussions - e.g. Case Based Discussions (CBD)					
Entry 1 (e.g. dyspnoea) Entry n	✓		✓		✓
Patient presentations - e.g. Mini-CEX					
Entry 1 (e.g. chest pain) Entry n	✓		✓	✓	✓
Clinical procedures - e.g. DOPS					
Entry 1 (e.g. lumbar puncture) Entry n		✓			✓
Health prevention/education activities					
Entry 1 (e.g. diabetes) Entry n	✓		✓	✓	
Research					
Entry 1 Entry n			✓	✓	✓
Results of other exams					
MCQ OSCE	✓	✓	✓	✓	✓
Any other material					
Entry 1 Entry n		✓		✓	✓

Challis⁴ argues: “Portfolio’s purpose is to demonstrate learning, not to chronicle a series of experiences. Learning from experience will only happen once reflection and application of resulting modifications in practice have taken place. It is evidence of how the learning has been, or will be applied that will form the basis of the review or assessment”.

Therefore, it is the evidence for improvement of practice that should form the basis of evidence that a learner includes in a portfolio. Such improvement of practice can only be achieved through a process of reflection. As aids to carrying out meaningful reflection, there are several theoretical models proposed in the literature. The model proposed by Kolb⁵, popularly known as 'Kolb's cycle', is perhaps the most widely used. Kolb's cycle conceptualises reflection as a four-stage process:

1. Concrete experience
2. Reflective observation
3. Abstract conceptualisation
4. Active experimentation

These four stages can be simplified into five questions, as shown in Table 2.

Table 2: An explanation of the simplified version of the reflective cycle

Question	Explanation
1. What was the learning experience?	A 'learning experience' can be any event that either concluded well or not. Irrespective of the outcome of the event, there should be sufficient material within the event to plan further learning, with a view to responding to such an event in the future more successfully.
2. What did I learn?	Any event whether successfully carried out or not offers a lot of material that can be taken as potential 'lessons' to modulate future practice. These lessons should be banked and re-used in a future situation without any refinement or further learning.
3. What more do I have to learn?	These are (or this is) the 'learning need(s)' that can be extracted out of the above event. Such learning must be acted upon through further learning in order to face a similar event successfully in the future.
4. How can I learn it?	This is/these are the method/s adopted to achieve the learning need/s identified in question 3.
5. What is the evidence for learning?	Once the new learning stated in question 3 has been achieved, the best would be to practice it; i.e. apply it either to the same event that was described in question 1 or to another similar situation. Evidence for such application of learning could be observation by a third party, video evidence for the application of learning, or a product (e.g. development of new health education material) that resulted due to the application of learning. This would be the strongest possible evidence that one could produce. However, if it is not possible to produce such evidence, as in the case of rare learning experiences, then other evidence such as a short summary of learning along with the references of the journals, books, websites used for learning could be documented. A good portfolio entry should include both types of evidence; i.e. evidence for change of practice and evidence of the resources used to achieve the new learning.

How to develop a portfolio?

Once the candidates have received the broad content areas (e.g. the light-coloured rows in Table 1) for their portfolios from the course committee, they should start collecting evidence to develop portfolio entries within each content area, to illustrate achievement of the learning outcomes (e.g. columns in Table 1). If such evidence is to be 'evidence for learning', rather than mere 'evidence of learning' (i.e. if the portfolio entries are to show how candidates improved their practice and progressed towards achievement of learning outcomes, rather than being a mere record of the learning activities that the learner went through), candidates need to reflect on the material that triggered the development of portfolio entries. Boxed

overleaf, is an illustration of how a candidate could reflect on a patient presentation to show achievement of learning outcomes.

Reflection can be performed at different levels of sophistication. They are:

1. Descriptive level
2. Analytical level
3. Evaluative level

An example of reflective writing in a portfolio entry:

1. **What was the learning event?** A patient who was on Entanercept (an immunosuppressive drug) sought advice on travel vaccination for Yellow fever.
2. **What did I learn?** There are no resources to inform both patients and practitioners on issues related to vaccination in immune-compromised situations.
3. **What more should I learn?** Need to learn more about the indications and contraindications for vaccination in immuno-compromised patients.
4. **How can I learn it?** Contact British Society for Rheumatology (BSR).
5. **What can be included as evidence for learning?** The patient was advised not to have the vaccine unless the drug had been stopped for three months. Also developed a physician guide to be used in similar situations in the future that may involve travel related vaccination.

The Physician guide on travel advice:*

Only two live attenuated viruses i.e. yellow fever and polio are used regularly as foreign travel vaccination.

Yellow fever vaccine must not be given unless the drug has been stopped for three months. Immuno-compromised patients should be advised not to travel to countries requiring this vaccine e.g. mid-Africa. If the patient has to travel, an exemption statement could be issued, but the patient will be at risk.

Polio vaccine - the live oral vaccine must not be given. Killed inactivated vaccine can be given but may need to be imported. Therefore, adequate notice must be given.

Typhoid - the live form must not be given. Killed vaccine is available, but only 70% secure.

Inactivated virus immunisations can be given e.g. Rabies, Anthrax, and Cholera.

Learning outcomes addressed:

Clinical care and maintaining good medical practice.

N.B. Above advice may not be applicable to Sri Lanka as this example portfolio entry has been adapted from a portfolio entry in the UK.

The reflection in the example portfolio entry above illustrates reflection at a basic level, which is called the 'descriptive level'. It is called 'descriptive level' as each of the five stages/questions within the reflective cycle has been addressed in this example as mere descriptions. However, this example can be upgraded to an 'analytical' level, if the portfolio developer answered the question 'why' within each stage/question. For example, 'why did the patient seek advice?' The reasons may be either the patient has not been given this information at the time the drug was prescribed or the patient has forgotten the advice given earlier.

Once the portfolio builder has identified the reasons for each stage, the same reflective process can be upgraded to an 'evaluative' level by selecting the best possible reason/s. Such selection of the best reason/s should be accompanied by a justification as to why the chosen reason/s could be considered as the best. For example, out of the reasons identified above regarding why the patient sought travel advice, the best reason may be that the patient has not been given accurate information. The justification for such selection may be that the patient has been compliant otherwise, with an adequate educational level to retain such information.

By including many such portfolio entries with reflections, the candidate could show how they progressed towards the achievement of learning outcomes over a period of time. It is ideal to include reflection on each portfolio entry. If this is too demanding, the authorities responsible for developing the portfolio could request the candidates to reflect, as a whole, on a few similar events over a week or two; e.g. reflect on all patients with dyspnoea that the candidate encountered over a week or two and write a single portfolio entry.

Once the portfolio entries together with reflection are collected within the broad content areas, the final portfolio could be arranged into chapters where each broad content area could be considered as a chapter. Within a given chapter the portfolio builder could cross-refer to material in another chapter, if the said material is relevant. The first chapter could be the 'introduction' where the portfolio builder could introduce themselves with their curriculum vitae and other personal statements. The final chapter could be the 'conclusions' where the learning material included within all chapters could be crystallised. Throughout the process of developing a portfolio, the trainee should be guided and mentored by an assigned supervisor. The feedback received through regular meetings with the supervisor would be immensely beneficial for the trainee to correct any misconceptions, doubts or mistakes.

How to assess a portfolio?

Once the portfolio has been submitted, an examiner would evaluate material with the intent of finding out whether it conforms to the required standard. The standard should be decided by the course committee based on the following criteria:

1. Does the portfolio include all material as requested by the course committee (e.g. the number of entries within a broad content area)?
2. What is the extent to which learning outcomes have been addressed?
3. What is the quality of reflection (i.e. has the reflective cycle been completed and if so what is the level at which the candidate has reflected)?
4. What is the quality of evidence for learning, included within the portfolio (i.e. does the evidence indicate an attempt to improve/change practice)?
5. How appealing is the overall organisation of the portfolio?

Ideally, the above criteria should be objectively assessed using properly configured rating scales. One of the most contentious issues in assessing a portfolio is to ascertain whether there is any evidence of plagiarism. The use of appropriate plagiarism detection software is highly recommended towards this end.

Conclusion

It is often said that the portfolio should 'mirror' the person who developed it. In this sense, the portfolio could be viewed as an educational tool that will appropriately sample not only the work of the portfolio builder, but also how she or he has progressed towards achieving the learning outcomes. If this is to be achieved, the portfolio process should be meticulously planned, with special emphasis on what should be included, how it should be developed, how

the process should be supported and supervised, and how it should be assessed, as detailed in this article.

There are many ways to develop a portfolio. The way how a portfolio is developed should be determined to a large extent by its intent or purpose. Thus, the steps delineated in this article cannot be considered universal, but would broadly fit in to a postgraduate portfolio in medical education. Hence, the individual course committees need to customise these guidelines as they are best applicable to their specialty.

References

1. Miller G. The assessment of clinical skills /competence/performance. *Academic Medicine* 1999;65:S63-7.
doi:<http://dx.doi.org/10.1097/00001888-199909000-00045>
2. Davis MH, Ponnampertuma GG. Portfolios, dissertations and projects. In: J.A. Dent, R.M. Harden (Eds.) *A Practical Guide for Medical Teachers*, 3rd edn. Churchill Livingstone Elsevier, Edinburgh, 2009;349.
3. Pee B, Woodman T, Fry H, Davenport ES. Appraising and assessing reflection in students' writing on a structured worksheet. *Medical Education* 2002;36:575-85.
doi:<http://dx.doi.org/10.1046/j.1365-2923.2002.01227.x>
4. Challis M. AMEE Medical Education Guide No.11 (revised): Portfolio-based learning and assessment in medical education. *Medical Teacher* 1999;21:370-86.
doi:<http://dx.doi.org/10.1080/01421599979310>
5. Kolb DA. (1984). *Experiential learning*. London: Prentice Hall.