A Portfolio to Assess Clinical Competencies, Assist Learning and Develop Professionalism in Eye Care Education

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Abstract

Background: Formative assessment can assist students in acquiring clinical and professional competencies. Many tools exist in medical education literature, assessing various components of learning. However, using multiple processes is administratively complex. Methods: Using best practice in medical education, we integrated multiple processes into a portfolio for the Postgraduate Diploma in Eye Care. Results: The portfolio contains objective structured clinical examination guidelines, mini-clinical evaluations, learning journals, performance appraisals and patient feedback to assess development of competencies, assist learning and provide feedback to staff and students. Evaluation by supervisors and students showed good portfolio face validity and acceptability. Conclusion: Similar clinical portfolios could be applied to competency-based optometry programs.

Key Words: education, assessment, competencies, optometry, portfolio

Background and Objectives

For students to become accomplished and socially accountable providers, eye care education programs should aim for students to acquire clinical and professional competencies.

The Postgraduate Diploma in Eye Care (PGDEC) is a one-year, competency-based program for mid-level eye care providers delivered at Divine Word University in Papua New Guinea, in partnership with The Fred Hollows Foundation New Zealand and the National Department of Health. It was developed to address the shortage of eye care providers and help reduce the burden of avoidable blindness from conditions such as cataracts and uncorrected refractive errors. The PGDEC provides qualified nurses and other health workers with specialist eye care education. This enables them to provide eye care autonomously at an advanced nursing or allied health personnel level. As such, the PGDEC includes, among others, clinical courses on refraction, essential eye care and operating theatre assistance.

While developing the assessment structure of the PGDEC, we sought methods that would monitor and measure the development of clinical and professional competencies, as well as assist student learning. To encourage effective learning, it was also deemed important to include feedback sources for students. A plethora of learning tools, assessment methods and feedback mechanisms have been described in health professions education literature. A single method is unlikely to assess all components of competency development and performance. Instead, because various methods assess different aspects of performance, it is deemed preferable to use a series of snapshots of performance, using different techniques. However, adopting multiple processes of assessment can become administratively complex and time-consuming for students and supervisors. Therefore, we developed an assessment tool in order to integrate multiple methods into one assessment tool.

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We identified various tools to assess and measure competency. These were adapted and combined into a clinical portfolio for use in the PGDEC. This paper reports the development and implementation of the PGDEC portfolio and its subsequent evaluation by faculty and students after a one-year pilot program. It also makes recommendations for implementation of portfolios in optometry degree programs.

**Methods**

**Portfolio development**

A portfolio can be generally described as a collection of material that provides evidence that learning has occurred. The materials report on tasks fulfilled, feedback received and progression of competency. As a learning tool, portfolios have been heralded to be useful for feedback but also as a stimulus for reflection and self-assessment. They are effective for both formative and summative assessments.

Portfolios as described in the literature range from the almost completely free form to the highly formatted with strictly prescribed content. All of these, to differing extents, have been found to be beneficial to the development of competencies.

When developing the PGDEC portfolio, we sought to identify elements we considered most pertinent to the program’s competencies, based on best practice in health professions education. We conducted a review of medical, nursing and allied health education literature to identify valid, objective and reliable assessment methods suitable for the PGDEC’s clinical and professional competencies. The tools were adapted and integrated into a single clinical portfolio format, in the form of a binder divided into different sections. Grouping all processes into one document aimed to simplify and harmonize the administrative processes related to multiple assessment methods. Guidelines for the assessment and development of competencies ensured students and supervisors were cognizant of clinical learning objectives, expected levels of performance and grading policies.

**Portfolio components**

All components selected for the PGDEC portfolio assess different aspects of clinical and professional competencies. Selection criteria included documented validity, reliability and objectivity, in addition to simplicity, efficiency and user-friendliness. Methods were chosen for use as both formative and summative assessment in pre-clinical and clinical settings, using approaches of continuous feedback and reflective learning.

The first assessment method we selected was the Objective Structured Clinical Examination (OSCE). It consists of a series of short clinical examinations, which a student performs on a patient in a controlled setting, under the observation of an examiner supervisor. This method has been adapted for clinical examinations by optometry accreditation bodies. The examiner grades the performance of the student according to a standardized list of clinical procedural and behavioral steps, typically in the form of a yes/no checklist. Objective, validity and inter-rater reliability of the OSCE have been confirmed in numerous reports.

We adapted this method by developing OSCE checklists and assessments grids for all core clinical competencies of the PGDEC, in line with academic objectives. (Table 1) These served as a step-by-step description of procedures for students and supervisors to be cognizant of standards and essential steps. Examples of competencies in the PGDEC’s clinical courses include slit lamp examination, retinoscopy, sterilization of instruments, etc. Competencies such as formulation of differential diagnosis and management plan were common to both the refraction and essential eye care courses. Supervisors used OSCEs for summative practical assessments during the pre-clinical stage. However, their use was also formative; students were encouraged to use them to learn their skills and assess each other, and they kept them as reference clinical protocols during clinical rotations.

The second method selected was the mini-clinical evaluation (mCEX). This method allows supervisors to assess clinical skills during patient encounters in the student’s clinical training, and has good inter-rater reliability, construct and predictive validity.

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**Table 1**

Excerpt of Objective Structured Clinical Examination Guidelines for Developing Clinical Competency

<table>
<thead>
<tr>
<th>Skill Element</th>
<th>Visual Acuity</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Did the candidate...</td>
<td></td>
</tr>
<tr>
<td>Chart correct distance</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Adequate lighting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient instructions clear and concise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start with right eye then left</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Record data adequately</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perform skill in efficient way (time, logical sequence of actions)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Unsatisfactory</th>
<th>Satisfactory</th>
<th>Very good</th>
<th>Comments / retest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrance level of competency</td>
<td>Below</td>
<td>Achieved</td>
<td>Above</td>
<td></td>
</tr>
</tbody>
</table>

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ters are marked according to the quality of the essential elements of patient encounters, including history-taking, examination skills, efficiency and organization, clinical decision making, etc. (Table 2) We evaluated students with mCEX during most patient encounters in the clinical rotation, taking into consideration the type and complexity of the encounters. This enabled us to discuss cases and provide feedback at the end of the clinic each day. Completed mCEX forms, along with supervisor feedback, were returned to students and consigned to the portfolio.

Feedback and self-reflection can be useful in developing professionalism.22,23 We thus incorporated three elements that support these into the portfolio. First, to establish a habit of self-reflection, a learning journal section was built into each of the mCEX forms. (Table 3) A learning journal integrates reflection into clinical care, an essential skill for lifelong learning,7 and serves to develop the learner’s critical thinking. This component calls on the student to recall the main aspects of each case and identify key learning points, elements performed well, improvements needed and a learning plan. Second, we incorporated performance appraisals, where supervisors and students jointly assessed professionalism and other aspects of patient-centered care at the midpoint.

### Table 2
**Mini-Clinical Evaluation (mCEX) Assessment Template with Grading Guidelines**

<table>
<thead>
<tr>
<th></th>
<th>Unsatisfactory</th>
<th>Borderline</th>
<th>Satisfactory</th>
<th>Very good</th>
<th>N/A</th>
<th>Supervisor’s comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Below expectations / unacceptable</td>
<td>Needs some improvement</td>
<td>Meets expectations</td>
<td>Above expectations</td>
<td>Unable to comment</td>
<td></td>
</tr>
<tr>
<td>Information gathering (case hx)</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>Strong points:</td>
</tr>
<tr>
<td>Examination skills execution</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>Suggestions for development:</td>
</tr>
<tr>
<td>Efficiency &amp; organization</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td></td>
</tr>
<tr>
<td>Diagnosis/ DDx</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td></td>
</tr>
<tr>
<td>Treatment/Management plan</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td></td>
</tr>
<tr>
<td>Record keeping</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td></td>
</tr>
<tr>
<td>OVERALL CLINICAL CARE</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐</td>
<td></td>
</tr>
</tbody>
</table>

Complexity of patient encounter simple ☐ ☐ ☐ complex

Hygiene considerations:
Communication/attitude:

Additional comments

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**Unsatisfactory:** Unacceptable level of patient care. The student’s performance showed many areas of weakness or of inappropriate clinical care. Below expectations for this level of training.

**Borderline:** The student’s performance showed some areas of weakness and/or elements requiring improvements.

**Satisfactory:** The student performed well, to the expected level of competency for this point of the training. Appropriate for level of training. Most patient encounters performed adequately are expected to be marked in this section.

**Very good:** The student demonstrated impressive skills, knowledge and/or attitudes, above expectations for the level of training. Reserved for instances where distinction is awarded.

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**Table 3**
**Learning Journal Section of Mini-CEX Assessment Template**

<table>
<thead>
<tr>
<th>Main points of this encounter</th>
<th>Important points I have learned</th>
<th>Elements(s) of the encounter where I performed well</th>
<th>Elements(s) of the encounter that could improve next time</th>
<th>My learning plan to improve myself</th>
<th>How will I apply these skills &amp; knowledge in my work</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
and the end of the clinical rotation.\textsuperscript{24-26} (Table 4) Third, anonymous patient feedback forms\textsuperscript{27-29} (Table 5) were distributed to a sample of each student's patients and subsequently added to this section of the portfolio.

The final section summarized competency development and attainment assessed by the previous sections. It contained logs to help students and supervisors track patient encounters, procedure count and competency attainment.\textsuperscript{7,24-26,30,31} (Table 6) The clinical competency log contained competency development milestones, which included Entrance (prerequisite before commencing clinical rotation), Level 1 (minimum standard for expected competency) and Level 2 (advanced level of competency). These milestones had been developed for each competency through consultation with four supervisors. (Table 7) The log allowed students and supervisors an overview to track performance from the first days of preclinical training until graduation. The use of logs also identified necessary remedial interventions so these could be undertaken as soon as they appeared necessary. Procedure and patient encounter counts were checked regularly by supervisors during clinical rotations to ensure students were appropriately assigned to obtain adequate clinical exposure and case mix.

**Portfolio implementation**

The portfolio includes a user's guide to ensure its comprehension and effective use. This includes lists of competencies to be attained in each of the modules, explanations of the competency milestones, policies and grading guidelines for each portfolio component. In addition, the Head of Department held an orientation session for both students and supervisors explaining the use and benefits of the portfolio. Expectations for various stages of competency development were detailed, and students were instructed on how to use it as a learning tool. The importance of quality self-reflection and the value of the feedback components were stressed.

Questions were invited and answered. The Head of Department, also involved in clinical supervision and assessment, was available for queries and guidance on portfolio use throughout the preclinical sessions and clinical rotation.
The student portfolios were used from the beginning of pre-clinical training until the end of the PGDEC’s six-month clinical rotation, which concludes the program. Grades were assigned during meetings led by the Head of Department with two or three clinical supervisors, all of whom had assessed students. They examined each portfolio’s contents and translated them into a final numerical grade. This involved, in part, summarizing the continuous assessment from the mCEX encounters, examining and updating competency logs, and translating the level of attainment of competencies into a numerical grade, following the guidelines included in the portfolio. (Table 8) A portion of the final grade was assigned to the quality and completeness of the reflective learning entries.

The implementation process was evaluated. In its first year of use, the portfolio was piloted and revised, based on continuous ad hoc student and supervisor feedback. At the end of the year, a survey was distributed to students and supervisors to assess face validity and acceptability. (Table 9) The survey’s first objective was to ask users about the portfolio’s value as a formative and summative tool, i.e., to assess its face validity. Such questions included, for example, the user’s perception of the mCEX or...
the OSCE as fair assessment methods. The survey also aimed to gauge the acceptability of the portfolio to the user. For example, users were asked about the portfolio’s ease of use and its administrative burden. Questionnaire items were constructed using a Likert scale, and answers were converted into numerical scores for items relating to face validity and acceptability. Average scores were compiled. Sample size (n = 9 supervisors and 10 students) did not allow inference of statistical significance. In addition, open-ended questions allowed for comments and suggestions for improvement.

Results: Evaluation of Portfolio Implementation

Acceptability and face validity of the overall portfolio were rated as good (or better) by both supervisors and students. (Figures 1 and 2) Individual components (OSCE, mCEX, learning journals, performance appraisals, patient feedback) were perceived as acceptable and good. In general, comments were positive. Supervisors and students appreciated the clarity and objectivity of defined performance and assessment criteria for OSCE and mCEX components. However, learning journal sections in the mCEX forms were reported by some students as being too long to fill out and repetitive. Logistics for gathering patient feedback needed to be improved. Indeed, as patient selection was not always easily randomized in the midst of a busy clinical environment, this can lead to an uneven distribution of case mix. Grades assigned to the quality of reflective learning were in general relatively high because learning journal entries were mostly honest and constructive, indicating motivation in learning and increasing self-confidence with the attainment of competencies.

Discussion

Strengths of the PGDEC portfolio

Our clinical portfolio was intended to support students’ acquisition of competencies by providing precise guidelines on technical skills and explicit outcomes (OSCE), showing progress (clinical logs) and supporting the development of professionalism and socially accountable quality care (learning journals, patient feedback forms). Eval-

![Figure 1](image1.png)

**Figure 1**

Average Questionnaire Response Scores for Acceptability of PGDEC Portfolio

*(n = 9 supervisors, 10 students)*

-2 = very poor acceptability
-1 = poor acceptability
1 = good acceptability
2 = very good acceptability

<table>
<thead>
<tr>
<th>Component</th>
<th>Supervisors</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall portfolio</td>
<td>1.8</td>
<td>1.3</td>
</tr>
<tr>
<td>OSCE</td>
<td>1.1</td>
<td>1.3</td>
</tr>
<tr>
<td>mCEX</td>
<td>1.8</td>
<td>1.0</td>
</tr>
<tr>
<td>Learning journals</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Performance appraisals</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Patient satisfaction</td>
<td>1.3</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Score legend:  -2 = very poor acceptability
-1 = poor acceptability
1 = good acceptability
2 = very good acceptability

![Figure 2](image2.png)

**Figure 2**

Average Questionnaire Response Scores for Validity of PGDEC Portfolio

*(n = 9 supervisors, 10 students)*

-2 = very poor validity
-1 = poor validity
1 = good validity
2 = very good validity

<table>
<thead>
<tr>
<th>Component</th>
<th>Supervisors</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall portfolio</td>
<td>1.8</td>
<td>1.3</td>
</tr>
<tr>
<td>OSCE</td>
<td>1.1</td>
<td>1.3</td>
</tr>
<tr>
<td>mCEX</td>
<td>1.8</td>
<td>1.0</td>
</tr>
<tr>
<td>Learning journals</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Performance appraisals</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Patient satisfaction</td>
<td>1.3</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Score legend:  -2 = very poor validity
-1 = poor validity
1 = good validity
2 = very good validity

§ - only supervisors were surveyed on acceptability of patient satisfaction questionnaires
† - only supervisors were surveyed on validity of mCEX
‡ - only students were surveyed on validity of learning journals
tutive data on face validity show that users perceive the portfolio as effective in performing these functions, for all its components.

As an assessment tool, our portfolio aimed to support supervisors in assessing the acquisition of competencies by using more objective methods, defined performance criteria and an indication of students' clinical and professional performance. This was also reflected positively by the supervisor survey data.

The portfolio combines multiple assessment processes, but as reflected in the acceptability data of the survey, it did not impose an onerous administrative burden for users. As students had the portfolios with them at all times, these proved to be an accessible way of pinpointing a particular student's area of difficulty at any given time, allowing for quick identification of those requiring assistance. This was done a number of times throughout the clinical rotation. Supervisors were easily able to substantiate their impressions of weaknesses in performance, usually during daily case discussions and mCEx grading. Mid-rotation grading meetings again allowed for reflection on the progress of students, when portfolios were systematically examined by a group of supervisors. This led to timely remedial measures, such as adjusting patient load to reinforce given competencies or providing individual tutoring.

The potential for inter-rater variability of grading remains a challenge with any assessment tool. Although this was not evaluated in this portfolio, we attempted to minimize bias by a number of measures. These included the explicit description of guidelines for OSCE grading of clinical procedures and for mCEx assessment of patient encounters, instruction in the use of this tool, and using group consensus to arrive at final grades.

Considerations for implementing a portfolio system

The effective implementation of a portfolio requires:

- adequate introduction and mentoring about its use; in our case, this was done during the introductory briefing session and grading meetings
- integration with other assessment procedures in the program; ours served as the central element for both formative and summative assessments, with grading aligned with academic objectives
- provision of guidelines to students and teachers; we included the user's guide to optimize clarity, objectivity and transparency of performance and assessment
- user-friendliness that includes limited time demands on students and supervisors; positive survey results from students and supervisors on acceptability reflect the ease of use of the portfolio.

Implementing a portfolio, as with any assessment tool, requires a certain amount of ongoing administrative effort to remain effective. This includes:

- periodic monitoring and reviewing of student results to identify students requiring additional assistance; in our small PGDEC group of 10 students per year, this did not prove problematic, but could be time-consuming for larger student cohorts
- checking that the students' assessment, especially their self-reflective entries, remain meaningful and constructive; although our evaluative data include comments on learning journal entries being tedious at times, the grades allocated to the quality of journal entries reflected relevant and honest comments
- monitoring and evaluation for potential improvements in content and format by gathering and addressing feedback from both students and supervisors
- establishing a system to transfer assessment results into an acceptable format for the institution's academic policies.

Application to optometry programs

So far, our experience with using a portfolio in eye care education is limited to the PGDEC as described. Despite larger class size and longer duration, portfolios may be equally applicable to optometry programs. Similar to other

Conclusions

As optometry and other eye care education programs continue to move towards competency-based curricula, educators require appropriate tools to support the acquisition and assessment of competencies. A portfolio integrating multiple evidence-based tools has demonstrated successful comprehensive assessment of clinical and professional competency development in a program with small class size. Portfolios could be adapted for larger optometry programs by analyzing program needs before developing and piloting relevant portfolio elements. Using electronic platforms could facilitate implementation and use.

Acknowledgements

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References


