Linking Assessment to Graduate Capabilities in an Undergraduate Medicine Program through an e-Portfolio

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Description of the Assessment

As junior professionals, medical graduates are required to contribute effectively to a range of professional teams and to sustain lifelong learning. In addition, a more patient-centred approach has resulted in a greater emphasis on communication skills, and ethical practice. Reflection is also seen as an important learning tool for both medical students and practitioners, but there is also recognition that reflection needs to be taught, and that students need to be given the opportunity to practice and refine this capability

Medical schools in general are adept at producing broad competencies and mission statements for their Medicine programs. However, creating an integrated assessment program that effectively guides the activities of students and teachers is more challenging. We developed a longitudinal program-based e-portfolio assessment which closely aligns with students' learning and reflection on the development of eight graduate capabilities, each of equal importance and weight, which underpin the six-year undergraduate Medicine program at the University of New South Wales. Approximately 270 students commence the Medicine program each year.

The graduate capabilities or primary educational outcomes of the Medicine program are grouped under three domains:

1. Personal Attributes
- Self-Directed Learning and Critical Evaluation
- Ethics and Legal Responsibilities
- Development as a Reflective Practitioner

2. Interactional Abilities
- Effective Communication
- Team Work

3. Applied Knowledge and Skills
- Using Basic and Clinical Sciences in the Practice of Medicine
- Understanding the Social and Cultural Aspects of Health and Disease
- Patient Assessment and Management

Box 1 - Key Aspects of the UNSW Medicine e-Portfolio.

1. Strong alignment with desired educational outcomes (graduate capabilities).
2. Data-driven – students longitudinally accumulate evidence of learning.
3. Student-centred – students participate in, monitor and reflect on accumulated evidence of learning.
4. Summative assessment of broad learning, but also drives learning to the desired outcomes.

The expected level of development of each of the graduate capabilities and the portfolio assessments requirements at each stage are made explicit to students from the outset of the program. Thus, an important aspect of the UNSW e-Portfolio is strong alignment with desired educational outcomes (Box 1). It is made clear that students are responsible for accumulating evidence of learning in all of the capabilities in preparation for the portfolio review at the end of each phase (Years 2, 4 and 6). The Portfolio is thus highly student-centred as they are engaged in the development of their portfolio from the outset. Students are supported in the development of their portfolios via mentoring by a portfolio advisor. Furthermore, part of the introductory course in the program is devoted to exploring and explaining the graduate capabilities and the portfolio system. Examples of good reflective essays and portfolios are made available on the intranet.

The UNSW Medicine e-Portfolio is largely data-driven, using already graded summative assessments as a large part of evidence of learning (Box 1). In each 8-week course throughout the first two years, students complete individual assignments and group projects, each focussing on two of the eight graduate capabilities. The topics of those assignments and projects can be chosen from a menu, or else negotiated with the Faculty. For negotiated assignments, students design their own assessment criteria, on which feedback is provided by staff. Further, three capabilities are assessed generically in each assignment and project: Effective Communication; Self-Directed Learning and Critical Evaluation; and Development as a Reflective Practitioner.

For each assignment and project, students' submissions, as well as examiners' grades and feedback comments, are stored in an electronic repository (eMed). Further, after each group project, students enter feedback on their peers' Team Work contributions to eMed, and are encouraged to enter comments on their own Team Work. Students use these comments, both given and received, as evidence for their development of the Team Work capability.

At the end of Year 2, the first formal portfolio review occurs. Summary tables comprised of students' grades and feedback for assignments and projects are automatically generated by eMed. Students submit a reflective essay, which includes discussion of their progress in each graduate capability, together with any additional supporting evidence. Students choose which assignments, projects and other experiences that they will present as evidence. Progress in each capability is coarsely graded against specific criteria, and feedback is provided to students.

In later years of the Medicine program, assignments and projects continue to be offered, including a compulsory Independent Learning Project where students must complete a supervised research project (the topic is often negotiated with each supervisor), and to write up the outcomes in a format suitable for publication in a peer-reviewed journal. Further, in their final two years, students are expected to negotiate learning plans with their clinical supervisors, which can include written assignments. Further portfolio reviews occur at the

end of Years 4 and 6 of the program. The final portfolio review incorporates an interview with two Faculty members, in which students are expected to demonstrate integrated development of the graduate capabilities based on their experiences in the program. The interview also provides an opportunity for Faculty members to congratulate students on their progress. Examiners for the Year 4 and Year 6 portfolio reviews have access to each student's previous portfolio reviews, including grades and comments.

Weighting of the Portfolio Assessment

The portfolio reviews are barriers to progression in each of the three Phases of the Medicine program. Students who fail the initial portfolio review meet with their portfolio advisors, and are permitted to re-submit 8 weeks after the original review, taking into account the feedback provided. Students who fail the re-submission are given an 8-week individualised study program, and they are required to revise and re-submit their portfolio at the end of that period. Students who fail following grading of this third submission exit the Medicine program.

Promotion of Long-Term Learning

The portfolio is student-centred. Students are responsible for building their portfolio prospectively, with reference to the graduate capabilities, and can negotiate assignments in areas of interest. However, sufficient structure is provided to prevent evasion of areas of weakness. The inclusion of self-direction and reflection in all assignments and projects, as well as the portfolio reviews, encourages students to regularly monitor their progress. We have evidence that students are constantly referring to the graduate capabilities and the indicators of performance, allowing the portfolio to drive their learning. The equal weighting given to all graduate capabilities emphasises to students that equal competency is required.

The portfolio assessment appears to be meeting the needs of the Medicine program, encouraging attention to those interactional skills and personal attributes which were hitherto undervalued and under-assessed, without detracting from the basic and clinical sciences. As a consequence, we expect that our students will be better prepared for clinical practice and for postgraduate training, in which a wide variety of personal and interactional capabilities are assessed in an ongoing manner. Funding has also been obtained to extend the use of the eMed Portfolio tool to other faculties at UNSW.

Representative Student Comments

"Integration of all aspects of learning helps develop a critical and evaluative mindset."
"Focus on the eight graduate capabilities to encourage development of a skilled doctor who can adapt to new experiences."
"It makes us to always reflect on our learning and I personally find that a valuable exercise that has benefited my progress in learning."
"The new course does a good job of balancing our need for medical science knowledge with other skills expected of 21st century doctors like effective communication and teamwork."

Aspects of the Portfolio Assessment

Active engagement

Giving and receiving feedback

Working with peers

Authentic and investigative activities

Developing learning and judgement

Integrative activities

Students design assessments

Variations on Portfolio Assessments

There is a wide range of possible variations on portfolio assessments, one of which is the format used, e.g. electronic vs. paper-based. We chose to use an electronic portfolio format, because utilising an electronic database with secure sites for submission, assessment and feedback comments permits all submissions to be time-stamped and tracked electronically, and allows a large amount of information to be presented in a manageable way. The e-portfolio enables a large repository of evidence to be presented in many formats, and examiners can delve deeper if they wish to obtain more detailed information. For example, a portfolio examiner can review an assignment submitted in an earlier course, or they may review a journal manuscript submitted as extra evidence of achievement. Electronic portfolios are used by other medical schools, and one report found that an electronic portfolio was at least as good as a paper-based format, but better in areas such as student motivation and teacher acceptance.

Other possible variations on portfolio assessments include:

1. Purely formative portfolio reviews. Although summative assessment of portfolios is not universally accepted, good reproducibility has been reported.
2. Formative portfolio reviews together with summative reviews, which we adopted for the first cohort of students in the program. However, this created a large additional workload for examiners, and has been replaced by formative feedback on students' abbreviated draft portfolios addressing only two capabilities early in the program.
3. A formal mentoring process for students, as opposed to voluntary consultations with portfolio advisors.

Critical Factors in Portfolio Assessments

Portfolios can function as a method of assessment as well as a tool to drive learning. However, to be effective and valid, portfolio assessment requires clear objectives and criteria for assessment, as well as a format that can be managed by students but which allows them some choice in the evidence they provide for assessment. Mentoring or close academic supervision with formative feedback is also recommended. Portfolios should require the student to reflect on their achievements or the evidence presented, as well as their progress and plans for the future. With these qualifications, portfolios have the potential to cover all areas of competence, and have been advocated as a powerful assessment tool.

Other critical issues that should not be overlooked include student acceptance, as well as staff acceptance and commitment to assessing portfolios. Grading a written portfolio, or interviewing a student about their portfolio, can consume a significant amount of examiner time. It can also be difficult to ensure reproducibility of grades between markers. Training and rewards for examiners are thus important factors to be considered.

Further Information

Those wishing to learn more about the e-Portfolio assessment in the Medicine program at UNSW should contact A/Prof Anthony O'Sullivan (a.osullivan@unsw.edu.au), A/Prof Peter Harris (p.harris@unsw.edu.au) or Dr Chris Hughes (c.hughes@unsw.edu.au).