

Evaluation of an electronic portfolio:
A technologically mediated approach to
facilitating and enhancing procedural
competency and reflective practice.

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Executive Summary

Introduction

Latrobe Regional Hospital (LRH) has developed an electronic portfolio (ePortfolio) named Gippsland Hospital Performance Management System (GHPMS), which allows Gippsland Region Intern Training (GRIT) interns to establish evidence of procedural skill competency through the process of self-reflection and following feedback from experienced clinicians.

GHPMS has been introduced to GRIT interns since 2012 and several improvements have since been made to the ePortfolio. It is thus imperative to evaluate the value of this ePortfolio. The outcomes of this study will be readily applicable and transferrable to others in the broader prevocational community considering the introduction of an ePortfolio to an intern training program by providing strengthened evidence base for its effectiveness.

The LRH Department of Medical Services applied for, and received the Postgraduate Medical Council of Victoria Research Grant 2016 to fund this study in December 2015.

Objectives

This study was conducted to evaluate:

1. The acceptability of the GHPMS ePortfolio by both the interns and their assessors;
2. The usefulness of the GHPMS ePortfolio in recording progress and competency in procedural skills;
3. The usefulness of the electronic portfolio in facilitating reflective practice for interns;
4. To identify opportunities for improvement in both the effectiveness and acceptability of the ePortfolio.

Method

The study utilised a mixed methodology for data collection and analysis. Quantitative analysis of data generated from the GHPMS software was used to address objective 2. Semi-structured interviews of participants were conducted to address objectives 1, 3 and 4. Data from the transcripts of the interviews was analysed thematically.

Results

Seven (7) GRIT interns and one (1) assessor participated in the study.

The results from the study demonstrate:

- 5 out of 7 intern participants were receptive to the idea of using the GHPMS ePortfolio to record procedural skill competency;
- 5 out of 7 intern participants found the ePortfolio useful in recording progress and procedural skill competency as it provides structure and expectations of their internship training;
- 5 out of 8 participants did not find the ePortfolio useful in facilitating reflective practice;
- The need to communicate objectives, potential benefits, assessment process and instructions on how to use the ePortfolio to both GRIT interns, their assessors and term supervisors;
- All participants struggled with the layout and technicalities of navigating the ePortfolio online. All participants voiced the need for a more user friendly format of the ePortfolio with suggestions of improved functionality on smartphones and possibility of developing the ePortfolio into a smartphone App;
- 5 out of 7 intern participants agreed that the ePortfolio would add value to the intern training program if it is used to provide evidence of procedural competency during formative and summative rotational assessments;
- 2 intern participants cited that their learning is enhanced through the mentoring and feedback provided by their assessors.

Conclusion

The GHPMS ePortfolio is potentially a useful tool in education and development of medical interns, if implemented correctly, with improved ease of use, linkage with formal summative assessments and with the support of clinical mentorship.

The Report

Context

The focus of healthcare delivery has been in a state of constant evolution over the last three decades. The shift in focus has placed greater emphasis on patient safety and quality of health care provision, which led to major changes to the regulation of medical education and training. The integration of medical training and quality management, has meant that medical trainees and clinicians alike have been required to develop themselves professionally and maintain clinical competency throughout their training and careers, hence there is global drive amongst governing bodies to introduce regular assessments of workplace competencies for doctors during their prevocational and vocational training (Beard, Marriott, Purdie, & Crossley, 2011; Davis, Myers, & Myers, 2010).

Traditionally, the training of doctors was based upon an apprenticeship model and assessments of doctors in training consisted of less formal interactions with supervisors. There was little consolidated control over the type of assessment or the quantity of assessments that were required of trainees. (Tailor, Dubrey, & Das, 2014) In recent years, the assessment of doctors' performance has become increasingly objective, with a focus on demonstrating key competencies during workplace-based assessments (WPBAs) and recording them in the form of an electronic portfolio (ePortfolio). In the United Kingdom (UK) for example, WPBAs and ePortfolio have become integral components of postgraduate medical training following the introduction of "Modernising Medical Careers" (MMC) in 2005. The General Medical Council (GMC) later introduced the additional components including stimulating formative feedback, self-directed learning and reflective practice to

WPBAs. The ePortfolio supports this process by providing a secure record of workplace performance appraisals and a platform for reflective practice (Tailor et al., 2014).

The use and validity of WPBAs and ePortfolios continue to be a topic for debate, particularly due to the lack of definitive evidence linking the assessments and the use of an ePortfolio to improved clinical performance (Miller & Archer, 2010). While there is some evidence that the ePortfolio facilitates better understanding amongst trainees (Webb, Aprahamian, Weigelt, & Brasel, 2006), there are other studies that demonstrate that some trainees perceive the ePortfolio as a “tick-box” exercise, rather than a constructive educational tool (Tailor et al., 2014). As the knowledge of trainees’ experiences of the ePortfolio within the literature is limited, Tailor et al (2014) conducted a multi-centre survey across five National Health Service (NHS) trusts in the UK, aimed at assessing the opinions of core medical trainees and their supervisors on WPBAs and the ePortfolio. The study concluded that WPBAs and the ePortfolio are potentially powerful tools in the development of doctors in training provided that they are implemented correctly, with further improvements in mentoring and feedback required.

In regard to surgical training in the UK, the Postgraduate Medical Education and Training Board mandated all postgraduate medical specialities to provide comprehensive training curricula, in which competencies defined in the syllabus, are blueprinted to an assessment system. Surgical specialities in the UK have since introduced Workplace Based Assessment (WBA) to assess surgical skills of trainees. Examples include the Objective Structured Assessment of Technical Skills (OSATs) developed by the Royal College of Obstetricians and Gynaecologists, and the procedure-based assessment (PBA) developed by the Intercollegiate Surgical Curriculum Programme (ISCP) and the Orthopaedic Curriculum and Assessment

Project (OCAP) (Beard et al., 2011). (Pereira & Dean, 2009) conducted a study to assess British surgeons' experiences of the mandatory online WPBA and it concluded general dissatisfaction amongst surgeons with the tool, with many questioning evidence of its validity. Following the findings from Pereira et al, Beard et al (2011) published the findings from a two year prospective, observational study aimed to evaluate user satisfaction and acceptability, reliability and validity of the PBA and OSATS. The study concluded that the PBA tool possesses good overall utility as an assessment method given the good evidence for high reliability, validity and user satisfaction/acceptability. The results indicate that the PBA is highly suitable as an assessment *for* learning and as an assessment *of* learning of technical skills.

In Australia, similar WBA tools are implemented by various surgical specialities to aid assessment of trainees' technical competency during their vocational training. However, based on our literature review there is a paucity of such tools to facilitate and assess procedural learning and competency of junior doctors during their prevocational training. In 2006, the Confederation of Postgraduate Medical Education Councils (CPMEC) developed the Australian Curriculum Framework for Junior Doctors (ACF) ((CPMEC); Johnson et al., 2012). The ACF outlines the knowledge, skills and behaviour required of prevocational doctors and provides a bridge between undergraduate curricula and the curricula that underpin college training programmes. Three online national assessment tools were developed in 2009 to assist in the assessments of the ACF: self-assessment, mid-term appraisal and end-of-term assessment ((CPMEC)). The assessments are in the form of tick-boxes against components of each domain. While the ACF outlines the need for assessment against nineteen specific procedural skills in the skills and procedures domain, little

emphasis is placed on how competency in these skills are defined and assessed, and how junior doctors may further enhance their learning and acquisition of procedural competency.

Potential Implications

In view of the above, Latrobe Regional Hospital (LRH) developed an electronic portfolio named the Gippsland Hospital Performance Management System (GHPMS) in 2012 for Gippsland Regional Intern Training (GRIT) interns to establish evidence of procedural competency against the requirements outlined in the ACF. The exercise is non-compulsory and can be completed in a non-linear fashion. However, the GRIT interns and assessors are encouraged to participate actively in the program throughout the clinical year. LRH intends for the ePortfolio to serve as a platform for formative assessment of procedural skills during medical internship and encourages assessors to use the information accrued in the portfolio for summative assessments. GHPMS also contains fields for the interns to enter their reflection of their learning experience following each assessment, and fields for assessors to provide feedback.

GHPMS has been utilised by GRIT interns since 2012 and several improvements have since been made to the ePortfolio. It is thus imperative to evaluate the value of this system. The outcomes of this project will be readily applicable and transferrable to others in the broader prevocational community considering the introduction of an electronic portfolio to an intern training program by providing a strengthened evidence base for its effectiveness and for its acceptability amongst its intended audience.

Lessons and insights from the collection of rich qualitative data may also inform quality improvements in intern training programs in other health services. This evaluation will also contribute to existing knowledge by providing empirical evidence for the acceptability and

effectiveness of an electronic portfolio in facilitating self-reflection and the development of 'tacit knowledge', whilst documenting personal growth and the demonstration of 'explicit knowledge'.

Objectives

The aims of the study were to evaluate the opinions of the GRIT interns and their supervisors on the GHPMS electronic portfolio as a tool for facilitating formative workplace-based assessment and documentation of procedural competency. The investigators aimed to evaluate the electronic portfolio for 1) its acceptability amongst its users, 2) usefulness of the electronic portfolio in recording the progress and competency of interns in selected procedural skills, 3) its usefulness in facilitating reflective practice, and 4) to identify opportunities for improvement in both the effectiveness and acceptability of the program.

Approach

The study utilised a mixed methodology for data collection and analysis. Quantitative analysis of data generated from the GHPMS software was used to address objective 2. Semi-structured interviews of participants were conducted to address objectives 1, 3 and 4. The interviews were conducted either face-to-face or via the telephone and recorded using a digital recorder.

Recruitment

The GRIT interns were invited to participate by the Latrobe Regional Hospital Medical Education Officer, who is not involved in management of GHPMS or the research project. All potential participants were provided with an explanatory statement and consent form.

Fifteen (15) GRIT interns and thirty-nine (39) assessors were invited to participate in the study. Seven (7) GRIT interns and one (1) assessor consented to participate.

Ethical approval

The study received approval from LRH Human Research Ethics Committee (HREC) on 27th June 2016. The project number is 2016-02 LNR. All participants gave consent for both the presentation and publication of the results. No patients were involved in the study.

Qualitative data collection and analysis

The investigators conducted in-depth semi-structured interview with each participant and the interviews were audio recorded. Data from the transcripts of the interviews were analysed thematically.

Results & Discussion

The GHPMS ePortfolio allows GRIT interns to record their procedural skills assessments in four main domains depending on which rotations they are allocated to for internship training. All interns are required to undertake General Medicine, General Surgery or Orthopaedic Surgery and Emergency Medicine rotations. In any one rotation, nine (9) GRIT interns are training at LRH, and three (3) at West Gippsland Hospital Group (WGHG) and Central Gippsland Health Service (CGHS) respectively.

The GHPMS ePortfolio software allows the GHPMS administrator to track and produce a report on the usage pattern of each ePortfolio user. Figure 1 demonstrates an overview of the usage pattern of the GHPMS ePortfolio by all the GRIT interns in 2016.

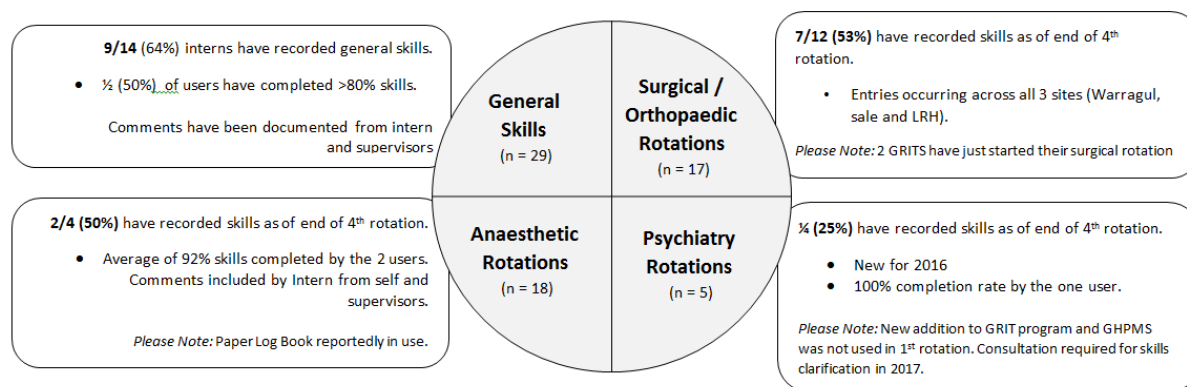


Figure 1. Overview of recording of skills on GHPMS ePortfolio by GRIT interns at the end of the fourth rotation in 2016.

Acceptability of the GHPMS ePortfolio amongst its users

A controversial issue in the literature around educational portfolios is whether it is acceptable to have one portfolio for both assessments and reflection (Snyder, Lippincott, & Bower, 1998; Tigelaar, Dolmans, Wolfhagen, & Vleuten, 2004; Wolf & Dietz, 1998). An argument against this dual function is that assessment may jeopardise the quality of reflection thereby detracting from the portfolio's effectiveness for mentoring purposes. Junior doctors may be reluctant to expose their less successful efforts at specific tasks and to reflect on strategies for addressing weaknesses if they believe they are at risk of having "failures" turned against them in an assessment situation. Unassessed portfolios, on the other hand, do not "reward" doctors for the time and energy they invest in them. Interestingly, the interviews demonstrated that there is a fairly positive response amongst the intern participants regarding the use of the GHPMS ePortfolio to record their competency in procedural skills and reflection. A number of intern participants expressed positive opinion of the ePortfolio acting as a platform that sets out the expectations of their training in procedural skills during internship and that it encouraged them to strive to achieve those skills. Typical remarks were:

“I started off on a surgical rotation in Warragul and I was all keen, ready to go...” – Intern 1

“Well, particularly in the last few years of my medical school training, I tried to keep a log of patients. And so, for me, I sort of took it on as a bit more of a positive, oh this is another tool that we can use, hospital specific, and in a sense, standardised for data input...” - Intern 2

“So I thought it was really good actually in the sense that you get to think about the different skills that you should practice and, and know by the end of this year... it was good to have that structure to know that this is what I need to practice and what I should be confident in by the end of this year.” - Intern 3

“I have to admit though because I felt that I’ve been keen to do all the skills so I didn’t think that there was any sort of need or requirement ...” – Intern 4

“I think it’s a good thing... when we were introduced to it was the fact that as a group internally you guys are actually taking a very interested approach into the skills that we’re getting. So it’s nice to know that you don’t just let us on the loose and just expect us to get the skills. You actually have a form and requirements you actually want for yourself. And so I think that’s really good in regards to your concern about our learning.” – Intern 5

“It was good because they did explain different rotations, what you need to do and things like that.” – Intern 6

“I thought my attitude was quite neutral; I wasn’t particularly excited but not cynical about it because this type of learning system it has to sort of – I’ve done similar thing back in medical school.” – Intern 7

On the other hand, the only assessor participant was neutral about the use of the ePortfolio in this setting.

“Well I agree they need to have their procedural skills assessed in some way and I suppose this is one way of doing it. I don’t see it being any better or any worse than any other methods.” – Assessor 1

Usefulness of the GHPMS ePortfolio in facilitating the assessment and recording of procedural skills competency

While majority of intern participants were of the opinion that analysing and recording one's competencies in an ePortfolio was both instructive and meaningful, some participants thought otherwise. Some comments were:

"I don't think it's encouraged me to get out and expand my knowledge or skills at all but I think, for me personally, I was doing all of those things anyway, wanting to get that knowledge anyway. I can see how if you were quite timid or wanting to be a bit more lazy, maybe, having that list of things to do would force you out of your comfort zone to go and do them, but for me, myself, I don't think I found it very helpful and probably because I haven't been engaging with it since the start of the rotation, it's probably not a good thing either and that's my fault for not doing that..." - Intern 1

"I understand for some people who are less keen to do those sorts of things or the ones that avoid the cannulas and the technical skills, I can understand why it would be important to have them tick those boxes but it's just I felt like it was something you had to do and then that was it." – Intern 4

Early and unambiguous portfolio instructions

Literature on portfolios suggests that the factors contributing to portfolio effectiveness include an early and unambiguous portfolio instructions, supportive mentor system, clear portfolio structure and appropriate assessment procedure (E. Driessen, Van Tartwijk, Vermunt, & Van Der Vleuten, 2003). The participants' responses suggest that these factors are indeed crucial.

In many cases, the purpose of portfolios seems unclear to their intended users. As a result, portfolios are often superficial (Tailor et al., 2014). As with the implementation of any new initiative, it is prudent to provide all intended users with clear explanation of the objective, benefits and intended outcomes, as well as clear instructions on the usage of the program.

The intern participants were fairly satisfied with the introduction of the GHPMS ePortfolio at orientation, but many were not unsure if the exercise was mandatory or not. Several intern participants also reported that they experiencing difficulties getting their clinical supervisors

or Registrars to sign off their procedural skill competencies, but they were not aware that other clinicians such as a nursing clinical educator or qualified nurse practitioner may also provide assessment of a procedural skill.

The only assessor participant remarked that the GHPMS ePortfolio program was mentioned briefly at orientation, yet the objective of the program, role and responsibilities of the assessor and clear instructions on the navigation of the ePortfolio, were not provided.

Portfolio structure

Web-based portfolios (WBPs) are often preferred over paper-based portfolios for a number of reasons (Campbell, Parboosingh, Gondocz, Babitskaya, & Pham, 1999; Duque, 2003).

However, the problem with the usage of WBPs as (Cook, 2005) pointed out was “...the evidence supporting the use of web-based learning tools is scant and often lags far behind technology, and there are some who fear that fascination with technology may outstrip actual learning gains.” In a study that compared the effects of the medium used (i.e. web or paper) on portfolio quality, user-friendliness and student motivation in undergraduate medical students, the authors concluded that the increased user-friendliness of WBPs was crucial for mentor engagement and that WBPs encourage greater sense of ownership of the portfolio with respect to both form and content (E. W. Driessen, Muijtjens, Van Tartwijk, & Van der Vleuten, 2007).

The common feedback from our study participants was their constant struggle with the layout and technicalities of the GHPMS ePortfolio, which contributed significantly to the ease of usage, user engagement and motivation to use the portfolio.

“So, I don’t really like it very much... I haven’t used it since my first rotation... I went through my list, I found the website itself difficult to navigate. You’re always opening and

closing and expanding and un-expanding things and then, the separate rotations weren't easy to pick out... I think the layout of the website has been the biggest turn off for me because I couldn't figure out what I was supposed to be doing for each rotation... if you could see all of that put out in front of you, I think that would be a lot easier and a lot more appealing to get back into it throughout the year." – Intern 1

"The thing that I think may streamline it further is if it was able to be used on a smart phone from home, because I'm able to access it, but some of the drop-down menus don't register, so, therefore I can't log my entry, I actually need to do it onsite, which is not necessarily a bad thing..." – Intern 2

"So one thing that it's quite time consuming to fill it out for the supervisor in the sense that there are a lot of ticks for each item..." – Intern 3

"...at Deakin we had an App and that was easy in the sense that you could just on the way home, on the train, but then you didn't require supervisor for that, so that was just us logging our own skills. And, and you could do it on the way, on the train, on the way home and then made, definitely made it easier because you can just do it on the go. But then you need to have also a good App rather than just a website that you use on the phone." – Intern 3

"It's really hard to use and in the first couple of rotations, like getting a computer can be quite hard..." – Intern 4

"I would make the website more functional and easy to use. And I guess once you do that you know exactly where you need to go and what you need to do. And I think other than that maybe reassessing some of the relevance of the questions and maybe taking away the feedback boxes purely – I think they're a good idea, but purely because the Registrars are more hesitant to put anything in them or they'll just put something very brief. Otherwise I think that the biggest thing is actually using it." – Intern 5

"Yeah the thing is, online is really good, but the problem is getting a computer at the same time, to get someone come over and log in, it's a bit difficult. Like you have to log in and do it and if there's no computer available at that time they're like "Oh we'll do it later" ... So if it's like an app or something like that you could have it on, like you could have it offline, you sign things off but then when you go online..." – Intern 6

"Personally I prefer paper based but of course the downside is that sometime if I lose the copy then it's gone forever but if you have it electronically it sort of stay in a record for permanent. I guess the good thing about paper based is that you can carry it with you and then when you've done a certain clinical procedure you can just give it to your Registrar or your Consultant to sign off but it can be quite tricky to, for an online one, for example if you can't find computers and then you use, and when you come back to your registrar later they might forget... but once you've got all the technical things setup it's quite easy to use, it's quite straightforward." – Intern 7

“It was a little bit frustrating because we basically sat down at the end of the term and went through on the scheme all the procedures and it involves logging in and entering the details of each one so it’s quite tedious to enter all the data.” – Assessor 1

These findings emphasize the importance of a user-friendly platform to both the GRIT interns and their assessors, especially in hospital setting where time constraint and computer availability are often problematic. In this age of technology and almost universal smartphone usage, mobile friendly platforms should be considered to enhance uptake.

Assessment procedure

At the heart of every portfolio is information collected in evidence of the user’s learning process and/or competence levels. The evidence is often organised by competencies and may be supplemented with reflections on educational achievement, and personal and professional development (McMullan, Endacott, Gray, & Jasper, 2003). Portfolios were primarily introduced to assess performance in authentic contexts and encourage learners to reflect on their performance (Snadden, 1999). The GHPMS ePortfolio is not dissimilar to other portfolios. The GRIT interns are assessed and their competency for each recorded skill is graded against six levels i.e. clearly above expected level, expected level, borderline/pass, clearly below expected level, no chance to assess or not applicable. The ePortfolio allows assessors to document feedback, and for the GRIT interns to log their reflections on their learning process as diary entries. The interns were encouraged to present evidence of their procedural skill competence using the GHPMS ePortfolio during formal mid-term and end of term assessments with their clinical supervisors to facilitate the grading of the surgical skills domain. The intern participants welcomed the proposed notion using the ePortfolio support their assessments.

“Probably the other way you could use it is, at the midterm meeting with your supervisor to bring it up and say, probably not on the computer, but a list of things – these are the things that I need to have done and I’ve done this many, but I need to finish off the rest of these, just so your supervisors are aware as well and they can encourage you to come and join in things when it’s happening. That might be the other good time for it – the midterm.” – Intern 1

“I think it’s good but I think that, I know in my situation my consultants did the PMCV assessment and my registrars did GHPMS assessment. So that’s where it’s difficult because obviously unless the consultants ask for feedback from the registrars, the registrars don’t do PMCV assessment so that’s where there’s a bit of a difficulty with crossover. So that would be the only difficulty I foresee with that. But otherwise I think that’s a great way of feed-in. And to be honest with you I think it would make it easier if it did have some link up with the PMCV because now it’s very segregated and I think that your registrars kind of see it as another assessment that’s kind of an irritation instead of seeing it as the official to the PMCV assessment.” – Intern 5

“I think the purpose of GHPMS is to serve as actual evidence to demonstrate the number of procedure that you have done and then the outcomes so it’s good for that providing an actual proof that you have done this precision how many – however many times. And that you’ve done it correctly and all that so I think from that perspective GHPMS it can be a useful extra supporting documents for procedural skills.” – Intern 7

However, given the completion of the GHPMS ePortfolio is not compulsory, usage of the ePortfolio amongst the interns is not currently uniform (Figure 1). In order to serve as a supporting document of recorded competency that is linked to formative assessments, the completion of the ePortfolio has to be implemented as a mandatory exercise. We explored the opinions of the participants of this proposed notion and it was met with mixed feelings. While the interns acknowledge that making the GHPMS ePortfolio a compulsory exercise enforces expectations on their competency in procedural skills, a number of intern participants cited time constraint, lack of supervision and inability to attain certain skills as the main barriers to the completion of the portfolio.

“I can see how it’d be good for it to be a mandatory exercise, but I think it would create a lot of stress for people if it was mandatory and I think if you’ve got a busy rotation and you haven’t achieved some of those goals, it’s not good for your training, but also, you need to be out there doing your job.” – Intern 1

“Because there are some people that I know from talking with my colleagues, who do not like logbooks, and as soon as logbooks are mentioned they’re sort of like, oh no, not more paper. The fact that it’s electronic, I think in a sense takes out some of that tedious writing... And if a compulsory logbook is required to complete internship, then in a sense, it’s academic whether you call it compulsory or not compulsory, it’s the requirement. So, if it’s compulsory for internship, it should be compulsory...” – Intern 2

“I took it as if it was compulsory anyway and I don’t think it’s hard to achieve and to do those skills... I didn’t find it hard... you have opportunities, so many opportunities in Gen Med, Surgical and ED to do your skills so. And I think those skills we should have practiced this year, it forces you to, if you haven’t been exposed to something, it forces you to get exposed to that, because next year if you something comes up if you’re working in the ED, you’re not an intern anymore, so it’s, I wouldn’t feel, it wouldn’t feel nice having to say, “Oh I have never done suturing,” when I should have practiced this.” – Intern 3

“I have to admit I did initially think it was compulsory... It really would make sense to do that but also I don’t believe there’s enough supervision to actually have someone there able to watch you do these skills, especially on the wards.” – Intern 4

“I have to get these assessments done, having come from being a med student where you get all these assessments done. But at the same time I think it would make you more conscious while you’re on the ward to get these vital skills... I guess it makes sure that you’re doing it the proper way. I think it could become a bit of a hindrance in the fact that actually getting someone – because there is so many, ... either reducing it and making it more compact, like those really essential skills.” – Intern 5

“Oh I think you'd probably get negative because, only problem is because as I said before time constraint, difficulty getting people ... and stuff like that, it's hard.” – Intern 6

“Like different consultants have different expectations, like some people are just happy with catheter and cannulas and things like that, some people want more, I think probably that needs to be standardised before you can actually tie it with summative assessments.” – Intern 6

“I think it’s a good – I think it’s not a bad way of becoming part of the compulsory program but at the same time making it become compulsory also there’s some certain concern because there are certain skill set you just won’t be able to do in a given the rotation that you’re in.” – Intern 7

It is the strength of portfolios that they offer rich and authentic evidence of learner’s development and achievements. This makes them highly suitable not only for monitoring,

but also for assessing learners' competence development. Unfortunately published studies on validity issues in relation to portfolios are rare. When portfolios are used for summative assessments, the psychometric qualities must meet stringent requirements, particularly in terms of reliability. Hence if the organisation is considering implementing the GHPMS ePortfolio as a mandatory exercise and link it to end of term assessments, it is imperative to consider further research to investigate the reliability and validity of the GHPMS ePortfolio assessment tool.

Mentorship system

The single most decisive factor for the successful use of portfolios may well be mentoring (E. Driessen, Overeem, & Vermunt, 2005). Mentors do not only play the role of assessors, they have supportive roles to play in the various steps of the reflective process and also providing feedback, probing and confronting questions crucial in arriving at relevant objectives (Wade & Yarbrough, 1996). The remarks made in the interview echoed the importance and benefits of mentorship and constructive feedback in the interns' learning process when using portfolios.

"I think that the reason I had such a thorough experience within the first rotation's because I worked closely with my team." – Intern 5

"So at the start of the rotation, for my first and second, I let my Registrars know what they needed to do and then at the end of the rotation they obviously went through the criteria that were required... We're a very close team and they knew what was required of them and I knew what was required of me so they were able to complete the GHPM survey really well. My third rotation was ED, which we didn't complete the GHPMS survey. And my fourth rotation was anaesthetics. Again, I didn't complete the GHPMS survey because I didn't have someone that was there with me that could actually verify what I was and wasn't doing because I didn't really work part of a team. My Consultant and Registrars were constantly changing." - Intern 5

"...the most important part about learning is the comments, the teaching coming from your supervisor..." – Intern 7

While it is evident that mentorship enhances the interns' learning journey, mentor or assessor engagement in assessment processes continues to pose a challenge especially in a setting where there is a high turnover of assessors or mentors, or when time is a limiting factor (E. Driessen et al., 2005). Conducting assessments and giving constructive analysis and feedback in such circumstances can be difficult, and may result in many treating the assessment process as a tick-box exercise. Thus, it is vital to engage assessors, clinical supervisors and mentors at the development and introduction of the ePortfolio with clear instructions on the purpose, value, benefits and requirements of the exercise.

“So, my first rotation, I was in Warragul and the surgeons there only do one day a week so they don't spend much time in Warragul anyway, and I don't think they were aware of the system. My registrar was just new, so, she didn't know about the system until I had told her about what she needed to do.” – Intern 1

“...if they had a set time to be assessed for procedural skills so planned assessment rather than ad hoc because often the interns would come up to me and say oh can you sign this this and this off? And I said well I wasn't really ready to assess you then and it sort of all happened on the fly...” – Assessor 1

The usefulness of the GHPMS electronic portfolio in facilitating reflective practice

Reflection is a cyclic process of self-regulation in which one looks back on one's actions, analyse them, think up alternatives, try these out in practice, look back on them, etc., (Korthagen & Kessels, 2001). The objective of this process is to learn from experience.

Reflection thus becomes a condition for professional development (Korthagen & Kessels, 2001).

Research has shown that a portfolio is no guarantee that reflection will occur. (Pearson & Heywood, 2004) investigated the reflective use of a portfolio by general practice registrars.

Their study demonstrated that the majority of the registrars and their trainers did not use the portfolio for reflection and that its purpose was unclear. Moreover, many trainers were not motivated to work with the portfolio and this did not encourage its use. This correlated with poor use of the portfolio for reflection.

Another study looked at the depth of engagement with the reflective aspect of ePortfolio by first year specialist trainees, found large variation in the extent to which trainees engaged in and documented evidence of reflection (Nagler, Andolsek, & Padmore, 2009). The authors cited time constraints, a lack of understanding of the purpose of the section and wariness to reflect on adverse events such as near misses in clinical practice, as possible reasons for this variation.

The insights provided through the interviews with our participants reflected the same issues when they were asked if the GHPMS ePortfolio was useful in facilitating reflective practice but at the same time there were some positive responses.

“I don’t think so, because I don’t think I filled that out, first of all. I think by the time we get to the stage of internship that should be a skill that you’ve learned a long time ago, that when you do learn something that you think about how you went about it and how you could do differently. I don’t think putting it down on paper is particularly helpful. I think that’s just a skill you should have by now, probably.” – Intern 1

“I think this question is also linked in with style, in that at the bare minimum, GHPMS allows you to log your skills, and if you want to actually push yourself – and this is my view anyway – if you want to push yourself and improve, and learn from it, so, learning opportunities, there are fields there for you to note your thoughts at the time, you know, what you found difficult. – Intern 2

“I think it does, I think because you always have some areas that you feel more confident and it encourages you and pushes you a bit more to practice those areas that maybe you don’t feel as confident in and then reflect on how you went because you then have a session with your supervisor to fill, fill out the list and then you do have feedback. So my registrars wouldn’t always write heaps of comments in the program because that would be, even more time consuming with them, but it would give that opportunity for me to

think about the skills I've done and for them to give me feedback as well, and for me to bring up to discuss with them how I went. So I thought that was really good." – Intern 3

"I think it depends on who you have as a Registrar... my Registrar kind of did it as a bit of an on the spot interview. So he kind of covered the screen and was like, "Okay, so tell me what you do in this particular setting." And so then I would say what I would do, even though he'd seen me do it. It was kind of like a clarification that I knew what I was doing. So I actually – I found that really advantageous." – Intern 5

"To be honest, probably not... when you fill up those ... my experience said we are in a hurry, we're trying because we are in the middle of our working hours; we only get five minutes to get your Registrar to sign this off which there's not really a lot of time for you to think about, to reflect on... and I think clinical skill is something that you just keep doing it until you become good at it. It's very hard to sort of – it's a skill that's very hard to try analyze it." – Intern 7

"I think for some trainees, it would be. But I think the most of trainees would look at this as a hurdle to be passed and so I doubt that any of them would go back and look at their comments in the reflection portion... in my electronic logbook for my own training I rarely put anything in the reflective comments." – Assessor 1

(E. Driessen et al., 2005) conducted a study to investigate the conditions for successful reflective use of portfolios in undergraduate medical education. Although the study was flawed in its methodology in that it only examined the teachers' perspective, it concluded that the four factors to success of portfolio learning were good coaching, appropriate portfolio structure and guidelines, sufficient number of relevant experiences on which to reflect and association with summative assessment.

The findings of our study so far, resonate with Driessen's findings. The purpose of the ePortfolio, and in particular reflective logs, need to be made clearer and emphasised to the interns at the beginning of the process to achieve the desired outcomes that the portfolio is created for.

Conclusion

In summary, the main implications of our research for the implementation of electronic portfolios for the assessment and record of procedural skills competency in medical internship are as follows:

- The electronic portfolio is potentially a useful tool in the education and assessment of competency in procedural skills in medical internship if implemented correctly.
- The ePortfolio is generally accepted by the interns and their assessors as a method to record the assessment of competency in procedural skills.
- The ePortfolio is generally thought to be a useful tool in the assessment of competency as it provides structure and lays expectations of training requirements.
- The ePortfolio was not deemed to be useful in facilitating reflective practice by the study participants. However, this practice may be improved by providing mentorship or coaching, structure and guidelines to lay down expectations of training, and pairing with summative assessment.
- The ePortfolio has to be introduced to all intended users with clear communication of goals and procedures.
- The ePortfolio should be supported by mentoring.
- There may be benefits to implementing the ePortfolio as a mandatory exercise which is articulated with the summative assessment program.
- Acceptability may be enhanced by an improved format and user-friendliness of the ePortfolio, in particular a mobile friendly version or App.

Further research

Further research should be conducted on testing the reliability and validity of the GHPMS ePortfolio as an assessment tool prior to embedding the ePortfolio into formal summative assessment programs.

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Reference

- (CPMEC), C. o. P. M. E. C. Australian curriculum framework resources. Retrieved from <http://www.cpmeec.org.au/Page/acf-resources>
- Beard, J. D., Marriott, J., Purdie, H., & Crossley, J. (2011). Assessing the surgical skills of trainees in the operating theatre: a prospective observational study of the methodology. *Health Technol Assess, 15*(1), i-xxi, 1-162. doi:10.3310/hta15010

- Campbell, C., Parboosingh, J., Gondocz, T., Babitskaya, G., & Pham, B. (1999). A study of the factors that influence physicians' commitments to change their practices using learning diaries. *Academic Medicine, 74*(10), S34-36.
- Cook, A. D. (2005). The Research We Still Are Not Doing: An Agenda for the Study of Computer-Based Learning. *Academic Medicine, 80*(6), 541-548.
- Davis, N. L., Myers, L., & Myers, Z. E. (2010). Physician ePortfolio: the missing piece for linking performance with improvement. *Am J Manag Care, 16*(12 Suppl HIT), SP57-61.
- Driessen, E., Overeem, K., & Vermunt, J. (2005). Conditions for successful reflective use of portfolios in undergraduate medical education. *Medical Education, 39*(12), 1230-1235.
- Driessen, E., Van Tartwijk, J., Vermunt, J., & Van Der Vleuten, C. (2003). Use of portfolios in early undergraduate medical training. *Medical Teacher, 2003, Vol.25*(1), p.18-23, 25(1), 18-23. doi:10.1080/0142159021000061378
- Driessen, E. W., Muijtjens, A. M. M., Van Tartwijk, J., & Van der Vleuten, C. P. M. (2007). Web- or paper-based portfolios: is there a difference?(Author abstract)(Report). *Medical Education, 41*(11), 1067.
- Duque, G. (2003). Web-based evaluation of medical clerkships: a new approach to immediacy and efficacy of feedback and assessment. *Med Teach, 25*(5), 510-514. doi:10.1080/01421590310001605697
- Johnson, S., Cai, A., Riley, P., Millar, L. M., McConkey, H., & Bannister, C. (2012). A survey of Core Medical Trainees' opinions on the ePortfolio record of educational activities: beneficial and cost-effective? *J R Coll Physicians Edinb, 42*(1), 15-20. doi:10.4997/JRCPE.2012.104
- Korthagen, F. A. J., & Kessels, J. (2001). *Linking Practice and Theory: The Pedagogy of Realistic Teacher Education*: Routledge.
- McMullan, M., Endacott, R., Gray, M., & Jasper, M. (2003). Portfolios and assessment of competence: A review of the literature. *Journal of Advanced Nursing, 41*(3), 283.
- Miller, A., & Archer, J. (2010). Impact of workplace based assessment on doctors' education and performance: a systematic review. *BMJ, 341*, c5064. doi:10.1136/bmj.c5064
- Nagler, S. A., Andolsek, S. K., & Padmore, S. J. (2009). The Unintended Consequences of Portfolios in Graduate Medical Education. *Academic Medicine, 84*(11), 1522-1526. doi:10.1097/ACM.0b013e3181bb2636
- Pearson, D., & Heywood, P. (2004). Portfolio use in general practice vocational training: a survey of GP registrars. *Medical Education, 38*(1), 87-95.
- Pereira, E. A., & Dean, B. J. (2009). British surgeons' experiences of mandatory online workplace-based assessment. *J R Soc Med, 102*(7), 287-293. doi:10.1258/jrsm.2009.080398
- Snadden, D. (1999). Portfolios--attempting to measure the unmeasurable? *Medical Education, 33*(7), 478.
- Snyder, J., Lippincott, A., & Bower, D. (1998). The Inherent Tensions in the Multiple Uses of Portfolios in Teacher Education. *Teacher Education Quarterly, 25*(1), 45-60.
- Taylor, A., Dubrey, S., & Das, S. (2014). Opinions of the ePortfolio and workplace-based assessments: a survey of core medical trainees and their supervisors. *Clin Med (Lond), 14*(5), 510-516. doi:10.7861/clinmedicine.14-5-510
- Tigelaar, D. E. H., Dolmans, D. H. J. M., Wolfhagen, I. H. A. O., & Vleuten, C. P. M. v. d. (2004). Using a conceptual framework and the opinions of portfolio experts to develop a teaching portfolio prototype. *Studies in Educational Evaluation, 30*, 17.
- Wade, R. C., & Yarbrough, D. B. (1996). Portfolios: A tool for reflective thinking in teacher education? *Teaching and Teacher Education, 12*(1), 63-79. doi:10.1016/0742-051X(95)00022-C
- Webb, T. P., Aprahamian, C., Weigelt, J. A., & Brasel, K. J. (2006). The Surgical Learning and Instructional Portfolio (SLIP) as a self-assessment educational tool demonstrating practice-based learning. *Curr Surg, 63*(6), 444-447. doi:10.1016/j.cursur.2006.04.001
- Wolf, K., & Dietz, M. (1998). Teaching Portfolios: Purposes and Possibilities. *Teacher Education Quarterly, 25*(1), 9-22.

Appendix

Interview Questions

- I am just going to give you a couple of minutes to think about your experience of using the GHPMS electronic portfolio. Please share your experience of using the portfolio with me.
- What are your attitudes towards the electronic portfolio?
- What drove the positive/negative reaction? If negative, how could it be rectified?
- What are the main issues around actually using the electronic portfolio here?
- What are the barriers to using the electronic portfolio? What are the enablers?
- Did you feel comfortable with using the electronic portfolio? Do you think there is a need for training? (If yes, explore who would need training, how and where?)
- What are your thoughts if the electronic portfolio was used to provide documentary evidence and tied in with your mid-term and end of term assessments?
- What are your thoughts if the electronic portfolio was made compulsory for your internship training?
- Do you think the electronic portfolio is likely to improve your learning? If not, why not?
- What do you think about the aims of having the electronic portfolio as an approach to facilitate reflective learning of procedural skills?
- What are your thoughts on the format of the electronic portfolio?
- What are your thoughts on the content? Is there anything that needs to come off? Is there anything you feel should be on and is not? Was the language easy to understand?
- When thinking back to how the electronic portfolio was introduced to you, are there ways that could have been introduced to make it easier/better for you?
- How would you make it easier to use/implement?