Medical Students’ Experiences
Using an
e-Portfolio for Self-Regulated Learning
in the context of the
Intrinsic CanMEDS Roles

by
JENNIFER J. MACKENZIE

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ABSTRACT

Self-regulated learning (SRL) is associated with academic and clinical achievement. Using Zimmerman’s (2002) framework, SRL includes a cycle of forethought, performance, and reflection. To support SRL, a web-based portfolio (e-Portfolio), in the context of the intrinsic CanMEDS Roles, was introduced for undergraduate medical students at a Canadian Medical School.

This exploratory, qualitative study was designed to capture students’ descriptions of their behaviours using the e-Portfolio, to examine the extent to which these were consistent with SRL processes, and to analyze the gaps between intended and actual use.

Data were collected using both semi-structured interviews and a 20-item, 5-point Likert-type instrument to prompt discussion. Second-year medical student volunteers were recruited for data collection until saturation of information was reached (n=14). Thematic and content analysis were used; data were interpreted using constructivist grounded theory (Creswell, 2007). Use of one interviewer, a standardized protocol, and member checking assured consistency and trustworthiness of the data.

Students explicitly described the value of the e-Portfolio as an organizational tool, and as a form of assessment. Participants identified some elements of forethought and reflection but seldom described plans to achieve and measure outcomes. During the process of uploading materials to their e-Portfolio many of the students were able to make connections between the intrinsic CanMEDS Roles they are to assume as practicing physicians and the behaviours that operationalize these roles. Students viewed the e-Portfolio as a working folder compared to the faculty goal of a cumulative portfolio. Students endorsed self-selection of artifacts and faculty mentorship to improve relevance
and future motivation for learning. Limitations included privacy concerns.

Participants described a goal-oriented, in contrast to a process- or learning-oriented, approach to keeping their portfolios. The gap between students’ descriptions of portfolio use and SRL were most significant for the performance phase. The dual use of a portfolio for learning and assessment resulted in some compromises to the students’ use of the portfolio for learning. Strategies to improve SRL could include specific instruction on the nature and value of SRL, faculty mentorship during the learning process, and assessment of students’ learning processes.
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Medical Students’ Experiences Using an e-Portfolio for Self-Regulated Learning in the Context of the Intrinsic CanMEDS Roles

CHAPTER 1

Medical education has transitioned over the last 20 years from a primary focus on the acquisition of medical facts and concepts, the CanMEDS Medical Expert Role, to include competence in six additional areas comprising: communicator, manager, health advocate, scholar, collaborator, and professional. Previously referred to as the “non-medical expert” competencies, these have been formally renamed as the “intrinsic” CanMEDS Roles by the Royal College of Physicians and Surgeons of Canada (RCPSC) (Frank, 2005; Sherbino, Frank, Flynn, & Snell, 2011). These “Roles” are visually trademarked as a “flower” with the Medical Expert Role at the centre (Fig. 1).

![CanMEDS Roles](http://rcpsc.medical.org/canmeds)

*Figure 1. The CanMEDS Roles. Copyright © 2009 The Royal College of Physicians and Surgeons of Canada. Reproduced with permission.*

The intrinsic CanMEDS Roles are more challenging to teach and assess than the Medical Expert Role because the behaviours associated with each intrinsic Role are more
dispositional and thus more complex to measure than factual knowledge. In addition, the CanMEDS Roles were identified as critical to medical education after many of the current clinical teachers completed their training. Because many physicians lack familiarity and experience with the intrinsic Roles as distinct entities, the intrinsic Roles may not be addressed explicitly during clinical teaching. Therefore, a wide range of strategies have been implemented to support the development of these Roles, including: clinical simulation, structured observations, self-reflective essays, and learning portfolios. These strategies all incorporate, to some extent, a reliance on students’ ability to engage in self-regulated learning (SRL).

Although medical students tend to have high levels of motivation/persistence, the degree to which they engage in self-regulated learning (SRL) is unknown (Kusurkar, Ten Cate, van Aspere, & Croiset, 2011). Various theories of self-regulation include: social cognitive cyclical models, information processing approaches, and a model of adaptive learning. To further understand SRL in medical students, medical educators have defined SRL as the cyclical control of academic and clinical performance through several key processes that include goal-directed behaviour, use of specific strategies to attain goals, and the adaptation and modification to behaviours or strategies that optimize learning and performance (Sandars & Cleary, 2011). The definition used is based on Zimmerman’s (2002) social cognitive framework, and includes relationships among the individual, his or her behaviour, and the environment, with the expectation that individuals will monitor and adjust their behaviours to influence future outcomes. The self-regulated learning process can be illustrated as a cycle including: a “before (forethought) phase,” a “during (performance) phase,” and an “after (self-reflection) phase.” The strength of
Zimmerman’s framework is that it takes into account other elements such as motivation and affect, factors that have the potential to shape students’ engagement in SRL in any given context (Sandars & Cleary, 2011; Zimmerman, 2008). Zimmerman’s model was selected for this research because it is constructivist and connects students’ learning with their environment. In medical education the environment is an important consideration because the context for learning has both clinical and academic components. In addition, the model has been used in prior studies of self-regulated learning in medical students (Cleary & Sandars, 2011; Sandars & Cleary, 2011) primarily because it provides a framework that students could use to scaffold their learning.

Differences in self-regulation processes have been identified between higher- and lower-achieving students. Medical students who focus more on the learning process than outcome goals and who have a higher level of self-efficacy are more likely to be successful both in academic and clinical skills (Sandars & Cleary, 2011). Given that the capacity for self-regulated learning is correlated with academic success, one would expect a similar relationship between SRL and success learning the intrinsic CanMEDS Roles. The correlation among self-regulated learning, deeper learning, internal motivation, and achievement, suggests that a purposeful effort to promote and support SRL has the potential to enhance the learning experiences of undergraduate medical students.

The e-Portfolio was designed to enhance both the students’ use of SRL to develop proficiency with the intrinsic CanMEDS Roles and to meet the faculty’s need for documentation of teaching and assessment of the intrinsic CanMEDS Roles. The e-Portfolio required students to upload artifacts for each intrinsic Role. The artifacts
provided the foundation for students to reflect on their progress with respect to the intrinsic CanMEDS Roles over time and to engage in the SRL learning cycle about these Roles. The selection of a portfolio as a tool to scaffold students’ development of skills consistent with SRL has been used in other contexts (Buckley et al., 2009; Nilson, 2013). Key reasons these authors propose for adopting a portfolio approach for learning and assessment include the capacity of the strategy to focus on the learner, be flexible based on individual needs/preferences, and encourage self-reflection. Portfolios, they argue, provide the foundation for students to design and implement learning plans and to subsequently reflect on the outcome of their learning strategies. In addition, the longitudinal nature of a portfolio has the potential to support development or growth of skills in SRL over time. In spite of these strengths, portfolios have not always been successful to support the development of SRL skills, particularly when the implementation lacked: clear goals, ease of use, flexibility, relationship to current context, and engagement of faculty mentors (Driessen, van Tartwijk, Overeem, Vermunt, & van der Vleuten, 2005; Driessen, van Tartwijk, van der Vleuten, & Wass, 2007). Because there is rarely a perfect match between the intended and the actual use of an instrument, it is critical to understand how students in this medical school used their e-Portfolio and the extent to which their use could be linked to the development of SRL skills.

This thesis focuses on the use of an electronic learning portfolio (e-Portfolio) as a tool to encourage and support medical students’ use of SRL to develop and demonstrate their evolving competence in the intrinsic CanMEDS Roles.
Statement of Problem

Because SRL is considered a key process to develop and maintain the intrinsic CanMEDS Roles, the e-Portfolio was designed to support and develop SRL in medical students. The other espoused purpose of the e-Portfolio was to enable faculty members to demonstrate accountability in both the teaching and assessment of the intrinsic CanMEDS Roles. Therefore, the e-Portfolio was designed with a dual purpose of supporting learning and assessment. This research was undertaken to determine students’ perceptions of the purposes and potential benefits/usefulness of the e-Portfolio and the extent to which medical students used their portfolios to support SRL. The results are intended to inform educators about the strengths and limitations of the current e-Portfolio design as a tool to promote SRL in the context of students’ acquisition of the intrinsic CanMEDS competencies.

Purpose

This exploratory study was designed to describe and analyze the potential of a Canadian Medical School’s undergraduate e-Portfolio to motivate and support self-regulated learning in students. The purpose was to better understand the gaps between intended and actual use, between intended and actual benefits, and the extent to which skills in self-regulated learning were being supported and developed as a consequence of the requirement to maintain an e-Portfolio. Three research questions guided the study:

1. How do medical students describe the use of their e-Portfolios?
2. What value, if any, do they attach to the process?
3. To what extent are students' descriptions, self-assessments, and uses of their e-Portfolios congruent with behaviours associated with self-regulated learning?

**Rationale**

Increased knowledge about the nature of medical students’ use of self-regulated learning adds to our understanding about how medical students approach the acquisition of new knowledge and skills. Linking the students’ experiences of their use of the e-Portfolio to the cyclic model of SRL described by Zimmerman (2002) has the potential to inform our understanding about both the extent and the quality of SRL being used by the medical students. In addition, the results should inform medical educators about how explicitly students use an e-Portfolio to support their engagement in the stages of SRL. This understanding should provide a foundation for educators when they are considering how to design educational interventions to narrow the gap between students’ perceived and actual SRL skills. Results from this study should add to the literature with respect to medical students’ SRL skills, ability to self-assess, portfolio use, and acquisition of intrinsic CanMEDS competencies. The development of SRL skills in medical school is critical because these skills provide a foundation for practicing physicians who are expected to undertake continuing medical education (CME) independently. As a result, the development of students’ SRL skills has implications well beyond undergraduate medical education.

**Definitions**

The following definitions are provided to clarify intended meanings of terms used in this thesis.

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Self-regulated learning has been defined as the cyclical control of academic and clinical performance through several key processes that include goal-directed behaviour, use of specific strategies to attain goals, and the adaptation and modification to behaviours or strategies that optimize learning and performance (Sandars & Cleary, 2011).

The e-Portfolio refers to the electronic portfolio used by the medical school for medical students to upload evidence of acquisition of their CanMEDS competencies.

The CanMEDS Roles are defined by the Royal College of Physicians and Surgeons of Canada and include a central Medical Expert Role in addition to six supporting intrinsic Roles: communicator, manager, health advocate, scholar, collaborator, and professional (Frank, 2005).

The Education Developer is a staff member with a Master of Education who is hired to support the teaching and learning mission of the School of Medicine.

Context for the Research

This research is situated within a Canadian Undergraduate Medical Education (UGME) Program. The program uses the CanMEDS Roles as a framework to ensure that students are competent physicians at the time of graduation. “As Medical Experts, physicians integrate all of the CanMEDS Roles, applying medical knowledge, clinical skills, and professional attitudes in their provision of patient-centered care. Medical Expert is the central physician Role” (Frank & Danoff, 2007, p. 644).

The CanMEDS Roles framework, formally introduced by the Royal College of Physicians and Surgeons (RCPSC) in 2005, is a model that explicitly describes the key competencies expected of medical professionals. In competency-based curricula, the
documentation of proficiency in a skill is the criterion to move forward irrespective of the time taken to achieve the competency. The CanMEDS Roles framework is consistent with current discourse in medical education literature, which supports a move away from time-based to competency-based curricula.

The official order in listing the Roles is: Medical Expert, Communicator, Collaborator, Manager, Health Advocate, Scholar, and Professional, suggesting that all Roles are not equal (Frank, 2005; Whitehead, Austin, & Hodges, 2007). Regardless of the order, by the time of certification, physician trainees must have demonstrated competency in each. In addition, programs must demonstrate assessment of these competencies as a requirement for accreditation. In spite of the effort put into the organization of the Roles, most practicing physicians might not necessarily have a general awareness of the CanMEDS Roles (Chou, Cole, McLaughlin, & Lockyer, 2008).

The CanMEDS framework defines the standards and requirements of learners, and provides a basis to evaluate the knowledge, skills, attitudes, and behaviours that are required of trainees to ensure they are effective and competent physicians (Frank, 2005; Whitehead et al., 2007). The incorporation of the intrinsic CanMEDS Roles into the requirement for successful completion of training necessitates specific teaching and evaluation.

Teaching the intrinsic CanMEDS Roles has been a challenge for faculty responsible for implementing the curriculum for several reasons. The first reason is related to familiarity and experience with addressing the expectations of explicit teaching of the intrinsic Roles. Although there is a long tradition of teaching the Medical Expert Role, and a general understanding of the importance of communication, the other Roles,
i.e., manager, health advocate, scholar, collaborator, and professional, are less explicit. Therefore, faculty who trained before the CanMEDS intrinsic Roles were conceptualized as distinct entities may not be as familiar with them nor place the same value as medical educators on educating students about the Roles’ meaning and application (Chou et al., 2008).

Strategies typically used to teach the CanMEDS Roles have included the use of problem based learning (PBL), directed group learning, clinical simulation, and observerships. These approaches have strengths in promoting SRL for individual learning activities, but have limitations with respect to longitudinal engagement in SRL to support the acquisition of the intrinsic CanMEDS Roles (Sandars & Cleary, 2011). Assessment of students’ competency in the intrinsic Roles is also a challenge frequently discussed by medical educators (Norman, 2011). To address this challenge the RCPSC published an assessment guide (Bandiera, Sherbino, & Frank, 2006) but incorporation of the recommendations into practice has been incomplete (Chou et al., 2008; Jeffries, Simmons, Ng, & Skidmore, 2011). Similar to the post-graduate setting, it would be reasonable to expect that undergraduate programs that have formally incorporated the CanMEDS competencies are also struggling to provide opportunities for students to experience and demonstrate longitudinal progression in each Role.

In order to address the challenges imposed by the teaching and assessment of the intrinsic Roles, a method to scaffold and capture students’ experiences was required by a Canadian School of Medicine to meet a) students’ need to engage in SRL to attain the CanMEDS competencies and b) faculty’s need to assess the extent to which students understood the Roles and demonstrated them in practice. To ensure that the teaching and
assessment goals of the intrinsic CanMEDS Roles were demonstrated, a learning and assessment portfolio was created and arranged by each intrinsic CanMEDS competency (Appendix A). Each of the intrinsic CanMEDS Roles were assigned to a faculty lead within the medical school. Each faculty lead determined the mandatory materials for students to upload within each competency. The organizational framework prompted learners to upload evidence and self-assessments of their performance over time. Self-regulated learning was further promoted by the requirement for students to develop a “Professional Development Plan” framed by the phases of the SRL cycle (Appendix B). Use of an electronic version of a portfolio (e-Portfolio) facilitated ease of use such that students could upload materials, which had the potential to be marked electronically and stored under each Role.

To develop the skills to create their e-Portfolio, instructional sessions including an introduction, how to develop and assess reflection, and a writing lab on developing a “Professional Development Plan” were provided to students by the Education Developer and a faculty member. The sessions included content about the definitions of the different Roles and the characteristics of effective feedback. The e-Portfolio was described as a tool for students to use to learn about and record their competence in the intrinsic CanMEDS Roles. The usefulness of the materials in their e-Portfolio for the students’ resume and future interviews was emphasized. Students were advised that completion of the e-Portfolio was required for promotion to the second year. An online website featuring definitions, examples, and resources was available for students to consult. To facilitate ease of use, this web-based portfolio had predefined folders for required items. In addition, students were encouraged to populate these folders with supplementary
material of their choosing. Students were expected to develop the PDP, based on a rubric outlining the phases of SRL previously described, by the end of the first year (Appendix B). Faculty had assessed most of the required material before students uploaded it to their portfolios. After assignments were uploaded to the e-Portfolio, students were encouraged to engage in self-reflection on the material, to support their development of self-regulated learning. The intent for electronic marking was not realized, for most assignments, at this stage of the e-Portfolio development.

The Portfolio Manager assessed completion of portfolios at two points in year one, based on the presence of required materials as assessed by a checklist. There was no formal interview process, but students could share their portfolios with faculty and/or peers. Students were expected to upload material to their portfolios on a regular basis and review their experiences within each Role to design goals for improvement. To support students’ development of SRL skills, the SRL process was outlined for students in order to create their PDP. Faculty mentors, who had undergone a training session, e-mailed students with feedback about the use of the stages of SRL in their PDP at the end of year one. The e-Portfolio was not formally introduced to faculty who did not have direct involvement with the design of the undergraduate curriculum. Students who did not upload the required materials or outline their plans for SRL in their PDP were referred for remediation. The intent was that students would transfer their development of skills in SRL to their use of the e-Portfolio for learning. However, the SRL process was not formally taught or assessed outside of the PDP. Completion of the portfolio was required for promotion to the second year.
Stakeholders were consulted about their perspective of the e-Portfolio as part of a prior initiative. The results of the stakeholder interviews are reported in this thesis to provide insight into prior perceptions about the e-Portfolio. Stakeholders for the use of the e-Portfolio in the previous study included faculty, staff, and a student leader and were identified by the UGME Education Developer as well as by other stakeholders. Discussions with stakeholders revealed two major themes: the first focused on the development of students’ skills in self-regulated learning and the second on student assessment. The emphasis on either SRL or assessment was correlated with the stakeholder’s role in the curriculum. Stakeholders had mixed opinions about the extent to which the portfolio could serve both purposes.
CHAPTER 2

Literature Review

Theoretical Framework – Self-Regulated Learning

Various theories of self-regulation characterize the interaction among one’s behaviour, thoughts, and environment. This interaction results in a modification of behaviour to attain desired outcomes. The major theoretical frameworks of self-regulated learning (SRL) include social cognitive models, information processing approaches, and a model of adaptive learning. Although these theories of SRL are informed by different backgrounds, they all include a cyclical process of goal-directed behaviour, invoking strategies to attain goals, engagement in an activity, and adaptation and modification of one’s behaviours and/or strategies to optimize future learning. The major distinction across the theories is a primary focus on goal orientation compared with a focus on metacognitive processes (Puustinen & Pulkkinen, 2001). Motivation and affect are additional elements contributing to learner engagement in SRL (Zimmerman, 2002; Nilson, 2013).

The social cognitive concept that individuals seek to manage their own lives based on their thoughts, actions, and environment to achieve personal goals provides a basis to understand SRL. Zimmerman’s (1990) model of self-regulation, based on Bandura’s (1986) social cognitive theory, relates the social influences on learning to the development of self-regulation and, pertinent to this research project, SRL skills. Zimmerman’s theory identifies three interdependent attributes: self, behaviour, and environment. Individuals monitor and adjust all of these factors, based on prior learning, to influence future outcomes. The SRL process is framed as a cycle, which consists of a
forethought phase, a performance phase, and a self-reflection phase, each with two components. The forethought phase includes cognitive processes related to task analysis and self-motivation beliefs. The performance phase includes self-control and self-observation, while the reflection phase includes self-judgment and self-reaction. The reflection phase subsequently influences the cycle such that future learning builds upon prior experiences. The development of SRL is organized into four steps including observation, imitation while receiving social feedback, self-control, and self-regulation (Zimmerman, 2002). Ultimately, skilled self-regulated learners are able to invoke forethought, perform, reflect as a way to learn continuously, and improve a task independently in different situations. The basic assumption is that continuous cycling through the stages will result in improved performance (Zimmerman, 2002).

Pintrich’s (2004) model of SRL also involves a cyclical process but uses an achievement goal orientation framework. Achievement goal orientation has the components of approach mastery and performance goals characterized by self-regulation to promote potential positive outcomes. In contrast, avoidance mastery and performance goals are self-regulated to prevent unsatisfactory outcomes (Senko, Hulleman, & Harackiewicz, 2011). Although Zimmerman (2002) discusses motivation, Pintrich’s (2004) model formally incorporates motivation theory. Because the use of any skill by an individual is influenced by the context, Pintrich’s model provides additional support for the relationship between motivation and SRL for the current project (Pintrich, 2004; Zimmerman, 2002). An understanding of the basis of students’ motivation is a critical component of this research because a primary emphasis in medical education is the promotion of SRL to support life-long learning skills.
Affect, including self-efficacy, also influences student engagement in SRL. Self-efficacy – one’s perception about one’s capability to achieve an outcome – links to positive attribution. Attributions, made by individuals to further understand themselves, can be described with respect to three features: locus, stability, and controllability. Students who generally make internal, unstable, and controllable attributions tend to have better success and maintain a sense of self-efficacy compared with those who make the opposite attributions (Sandars & Cleary, 2011). The association of improved performance with positive attributions was demonstrated when students were trained to make positive attributions in a sports context resulting in improved performance (Cleary, Zimmerman, & Keating, 2006). Self-efficacy is correlated with adaptive cognitive and self-regulatory strategies as well as with achievement. At least in some contexts, self-efficacy for self-regulation of learning predicts self-efficacy for academic achievement, ultimately resulting in improved outcomes. Therefore, students who display a higher level of self-efficacy are more likely to be successful (Pintrich, 2004; Zimmerman, 2002).

Although positive attribution and self-efficacy are related to improved performance, when affective issues such as anxiety interfere with performance, students’ awareness of their decreased performance creates more anxiety that perpetuates the cycle. Generally, anxiety results in problems with cognitive performance, difficulties with SRL, and poorer academic outcomes (Pintrich & Zusho, 2007).

Although the students studied were required to identify the stages of SRL for the development of their learning plans using their e-Portfolio, there was the possibility that, for some tasks, students might “shortcut” SRL steps in other learning environments. Other theories of SRL consider students’ potential to engage in more automated learning
styles. For example, Boekaert’s model of SRL uses an adaptive learning theoretical foundation that acknowledges both academic and social goals and students’ potential to change learning strategies depending on environmental feedback regarding these goals (Boekaerts & Minnaert, 1999). Winne (1995) also acknowledges students’ use of ongoing metacognitive monitoring, which may result in a non-linear approach to learning in the context of cyclical stages including task definition, goal setting and planning, enacting tactics and strategies, and metacognitively adapting study techniques with consideration of future needs (Butler & Winne, 1995), similar to Zimmerman’s (2002) model.

Zimmerman (2002) argues that SRL is not a static personality trait but that students may engage in more or less SRL depending on the situation. His inclusion of contextual factors, such as motivation and affect, as part of the theoretical framework is relevant when trying to understand students’ use of SRL in a given situation. Although there is overlap among the SRL models examined, Zimmerman’s model was chosen because of prior use in medical education research, the inclusion of contextual factors, and the clarity of the cyclic model. Grounding the students’ experiences with the e-Portfolio in different phases of the model was intended to provide a framework to understand the extent to which students were using SRL strategies for their learning.

**Assessment of Self-Regulation of Learning**

Various methods have been used to assess students’ use of SRL. Three reported on by Puustinen and Pulkkinen (2001) include scales, for example, the Motivated Strategies for Learning Questionnaire (MSLQ); the use of structured interviews, such as the Self-Regulated Learning Interview Schedule (SRLIS); and trace methodology, which
examines both students’ notes and other artifacts generated by students as they are learning, and a questionnaire about studying tactics. Winne’s (2000) examination of college students’ SRL demonstrated that correlation between the self-report and traces was low, suggesting that self-reports may not be the best avenue to determine the extent to which students engage in SRL (as cited in Puustinen & Pulkkinen, 2001). However, when correlated with other information such as trace methodology, self-reports have the potential to help educators delineate gaps and design interventions that can support SRL. Students’ descriptions of their learning and their uses of the e-Portfolio were important elements of the current study.

In contrast to a standard educational setting, a method used to evaluate SRL in a clinical setting was self-regulated learning microanalysis. SRL microanalysis is a structured approach that involves asking context-specific questions during each phase of the SRL “loop” (goal-setting, self-monitoring, strategy use). A study designed to examine the regulatory profiles of medical students during a venipuncture task allowed researchers to determine to what extent students were mindful or aware of the strategies they were using and the success of their strategies as they proceeded through a task. The information derived from SRL microanalysis provided students and teachers with insight into the students’ cognitive approach to a task and the opportunity to target specific aspects as needed (Cleary & Sandars, 2011). This approach was consistent with improvement in skill level and motivation in athletes after training in SRL towards setting process vs. outcome goals, and to self-monitor during performance (Cleary, Zimmerman, & Keating, 2006). Therefore, SRL microanalysis has the potential to characterize the differences in students who are successful compared to those who
struggle in certain domains and provides a structure to teach students to improve their SRL skills. In addition, the development of a self-assessment tool, based on SRL microanalysis, would provide educators and students with an indication of students’ ability to self-assess their SRL skills. The comparison of self-assessment with observation has the potential to improve students’ awareness of their SRL skills and to inform interventions designed to narrow the gap (Cleary & Sandars, 2011). Other methods used to assess students’ use of SRL include think-aloud protocols and direct observation (Cleary, 2011, Zimmerman, 2008).

The assessment of SRL has been undertaken using a variety of methods and captures students’ experiences in a given context. The choice of assessment tool will depend on the nature of the task being assessed and SRL framework chosen. In this research the assessment of SRL was undertaken by developing an understanding of students’ descriptions of their learning processes and linking their descriptions to Zimmerman’s (2002) SRL framework. The use of semi-structured interviews allowed us to capture students’ prior and current experiences using their e-Portfolio so provided an opportunity to understand whether SRL skills were used over time rather than limited to a specific task. A longitudinal understanding was important because competency in the intrinsic CanMEDS Roles is expected to develop over the four years of medical school.

**Self-Regulated Learning in Medical Students**

Medical students’ education is often broadly categorized into clinical and academic skills, although the domains are not mutually exclusive. Reflection is considered an important element of medical education as it allows students to explore
their own beliefs, attitudes, and values within the context of medical practice (Cleary, 2011; Hall, Byszewski, Sutherland, & Stodel, 2012).

Although medical school is an undergraduate program, all students must have a university education and excellent grades to gain admission. Previous research has identified SRL as a factor in distinguishing high- and low-achieving college students (Sandars & Cleary, 2011). Academic success is correlated with using SRL, internal motivation, and a positive affect. Therefore, the academic success required for admission to medical school suggests that students should have the skills to engage in at least some SRL. A confounding factor, especially in the first year, is that medical students come with a broad variety of undergraduate experiences ranging from undergraduate to postgraduate degrees. Therefore, the characteristics of the students are diverse resulting in different experiences and opportunities to engage in SRL. Although the group is diverse, it is not surprising that the microanalysis of SRL in third year medical students undertaking a venipuncture task revealed that 5 of 7 students demonstrated evidence of SRL, suggesting that the majority of them have SRL skills at least in some contexts. In addition, medical students who attended schools with a “learner-centered” (such as problem based learning) approach, that required students to engage in problem solving activities rather than a standard lecture-based curriculum, have been found to use more SRL strategies (Turan, Demirel, & Sayak, 2009). The Canadian Medical School studied in this thesis endorsed at least 50% of learning activity as learner-centered consistent with an increased use of SRL skills compared to its prior “standard” curriculum, which was largely lecture-based. In spite of students’ ability to engage in SRL, they may not do so in all contexts especially if they are not motivated to do so, for example in subject areas
in which they do not identify as highly relevant or for which they have low expectations of success (Sandars & Cleary, 2011).

Because of the correlation between academic success and SRL, it is essential for us to understand the circumstances in which medical students engage in SRL, and what successful students do to enhance their SRL skills. By articulating the characteristics of the students and contexts that allow the optimal use of SRL skills, it should be possible to provide a foundation to promote students’ skills in SRL, and to implement remediation for those who struggle either clinically or academically.

**Portfolio Use in Medical Education**

Artists have traditionally used portfolios to provide a visual representation of their work over time. The portfolio provides them with a stimulus for reflecting on, analyzing, and revising their work. Perspectives of consumers and critics may also be included. Portfolios have been introduced into medical education for similar reasons and serve as a collection of artifacts, which can be used to improve students’ self-awareness, improve independent learning, and develop self-reflection skills (Pinsky & Fryer-Edwards, 2004). Distinct from an artist’s portfolio, a medical student’s portfolio may contain artifacts of her or his experience such as patient documents; assessments from peers, tutors, and others; articles; drawings; and self-reflective entries regarding events. The Best Evidence Medical Education Collaboration (BEMEC) has defined a “portfolio” for use in medical education as a repository including: a collection of evidence of student activity; an outline of the students’ own learning experience; involvement of some “intellectual engagement” with information; and drawing together more than one item (Buckley et al., 2009). There is significant variation in the format and purposes of medical portfolios,
which can be utilized for learning specific topics or for assessment purposes (Pinsky & Fryer-Edwards, 2004; Ross, Maclachlan, & Cleland, 2009).

In addition to capturing evidence of competencies, portfolios are intended to structure experiences and encourage the development of reflective practice, self-assessment, and self-directed learning skills. A portfolio is a medium used to document progress over time as complex skills are attained, providing a self-directed, longitudinal learning experience. Reflective practice can help learners understand their experiences and structure future learning. This skill is enhanced by mentoring and self- and external assessment (Pinsky & Fryer-Edwards, 2004). All of these components contribute to the development of SRL.

An e-Portfolio has been defined as a “purposeful collection of information and digital artifacts that demonstrates development or evidences learning outcomes, skills or competencies” (Hall, Byszewski, Sutherland, & Stodel, 2012, p. 744). The process of producing the portfolio usually requires students to assemble their ideas, reflect, and articulate their plans for future activities. Therefore, this process should promote SRL. An important aspect of many e-Portfolios is reflection and the ability to demonstrate what students do rather than what they know, which can be assessed using other modalities. Capturing an understanding of what students do is important given that it has been well documented that students’ intrinsic tendencies towards professional attitudes, including altruism and empathy, are at risk to be eroded during medical training; therefore, not only do these elements need to be identified components of the curriculum, they need to be supported (Kusurkar et al., 2011). A number of projects including narrative, small group sessions, and self-reflection have the ability to be incorporated into a student’s portfolio.
In addition, a portfolio provides an avenue for students to reflect upon the “hidden curriculum” that students experience with respect to professional values and attitudes that are not overtly taught (Hall et al., 2012). Therefore, portfolios are particularly useful to capture students’ experiences and behaviours consistent with the intrinsic CanMEDS Roles, not easily assessed on standard multiple-choice examinations or OSCE (Objective Structured Clinical Examination) stations (Bandiera, Sherbino, & Frank, 2006).

**Mixed Success of Portfolios in Medical Education**

In spite of extensive use and applicability to support intrinsic CanMEDS competencies, self-reflection, and longitudinal learning, portfolios have met with mixed success in medical education (Driessen et al., 2007). Difficulties have been encountered when the program did not introduce the portfolio comprehensively or clearly define the goals. If the structure was not accessible and flexible enough to meet individual needs, the portfolio was seen as merely another form of assessment: “a make work project having little benefit” (Sargeant et al., 2011, p. 639). Other learners have reported that they could reflect in their head and didn’t need to write these things down or that they might be overly self-critical of errors and reflecting in a portfolio could exacerbate self-doubt. Although effective self-assessment relies on daily feedback, such feedback may be unusual for medical students: “I am constantly unnerved by the lack of feedback that we get all of the time” (Sargeant et al., p. 643). Students struggle between their recognition of the importance of soliciting feedback and the clinical culture of power imbalance. Portfolio use may be enhanced when combined with other forms of education within the same context and with support from educational staff or mentors, especially when the feedback is focused on deep reflective learning (Driessen et al., 2007). Critical
features of effective supervisors include knowledge of expectations and curricula, skill in providing feedback, and understanding of learners’ levels and performance. Faculty engagement is often highly valued by students; with feedback from patients and peers considered generally useful (Sargeant et al.). Therefore, increased success in portfolio use is associated with a proper introduction and mentoring, integration with context, provision of clear guidelines that allow some flexibility, ease of use including limited time demands for students and mentors, and strong leadership and faculty support (Driessen et al., 2005).
CHAPTER 3

Method

A Review of the Research Purpose and Questions

This exploratory study was designed to describe and analyze the potential of a Canadian Medical School’s undergraduate e-Portfolio to motivate and support self-regulated learning in students. The purpose was to better understand the gaps between intended and actual use, between intended and actual benefits, and the extent to which skills in self-regulated learning were being supported and developed as a consequence of the requirement to maintain an e-Portfolio.

The project was based on three research questions.

1. How do medical students describe the use of their e-Portfolios?

2. What value, if any, do they attach to the process?

3. To what extent are students’ descriptions, self-assessments, and uses of their e-Portfolios congruent with behaviours associated with self-regulated learning?

This exploratory study recruited students willing to talk about their experiences in using the e-Portfolio and what they felt the value was, if any, in keeping their portfolios. Medical students regularly engage in course evaluations to help improve their educational experience. Volunteer medical students often solicit information from non-volunteers, as demonstrated in the results of this study, so it would be expected that the volunteers were representative of the class. Semi-structured interviews were used to explore students’ perceptions. Separate, but related to this study, was this researcher’s interest in learning about the potential of Likert-type items to capture students’ use and attitudes towards the e-Portfolio. To initiate the interview process, and to learn about students’ experiences
and views of the e-Portfolio, students were read a prepared item stem and asked to select (in print) a response from 1 (strongly disagree) to 5 (strongly agree) (Appendix C).

Having participants hear a statement and then select a response that best represented their experience or attitude was used to trigger the conversation between the student and interviewer around the research questions without asking these questions directly. While the Likert items did provide some preliminary quantitative data, these data were used only to round out and help summarize the descriptions provided by students. The quality of the original and revised item stems will be analyzed separately, in the future, to guide this researcher in drafting survey items suitable for a larger-scale study. Together these two forms of information were used to provide insights into the potential of the e-Portfolio to support or develop students’ ability to engage in self-regulated learning.

The implementation of these methods was influenced by the fact that not only was the author the investigator in this study, she was also an attending physician having significant connections to potential participants. An attending physician interacts with medical students at several stages in their program including during their classroom-based instruction, clinical teaching, and clinical placements. Faculty evaluation of students’ developing knowledge and skills is normally conducted during each of these interactions. Medical students face an extremely competitive atmosphere for residency positions, and require reference letters, which makes their prior evaluations and interactions high-stakes for their future careers. Therefore, it was deemed unethical to have the researcher aware of the identities of the participants. A third party, an Education Developer at the Medical School, conducted the interviews to ensure both the anonymity and authenticity of the data.
Preliminary Steps

An extensive literature review resulted in the development of a theoretical framework for this research. The proposed research study received ethical clearance from the Health Sciences Research Ethics Board (Appendix D).

Participants

The Education Developer in the Undergraduate Medical Education office e-mailed the students (n=100) in the second-year medical class at a research-intensive Canadian University to invite participants (Appendix E) to discuss their experiences with the e-Portfolio. At the time of this study, the medical students had 1.5 years’ experience with the e-Portfolio. Demographic data were not collected in order to protect the privacy of participants. Initially 8 medical students responded to the e-mail and were placed on a list to be interviewed on a first come/first served basis. As the interviews proceeded, the transcripts were coded and categories identified and refined on an ongoing basis. Based on the initial interviews, the interviewer became aware that there were some students who had concerns about the e-Portfolio. Therefore, a second e-mail was sent to the class inviting students who had concerns about the e-Portfolio to attend interviews. Six students responded to this request. The researcher was not aware of which students had responded to which e-mail during the data analysis. Using constant comparative analysis, the interview questions were modified to ensure important insights were not being missed. This ongoing analysis and modification resulted in a non-linear approach to data collection and analysis. The process of continually revising the interview scripts based on prior findings was necessary to ensure that the depth and breadth of student experiences were captured. Based on the ongoing analysis, no new theoretical insights
were obtained after 12 interviews. To be certain that saturation of informing data had been reached, two additional interviews were conducted (Creswell, 2007). At this point, e-mail notices were sent to the class thanking all who volunteered for their willingness to participate and advising them that recruitment was closed.

**Data Collection**

In-depth semi-structured interviews were held to explore students’ use of their portfolios and the portfolio’s influence on self-regulated learning. The interview guide was structured into a formal protocol and provided to the Education Developer who conducted the interviews (Appendix F). The selection of a third party interviewer was considered necessary for the protection of the participants and for the quality of the data.

The Education Developer was selected as the interviewer because of her relationship with the students, her credentials and experience, and her understanding of the goals of the e-Portfolio. The role of the Education Developer was to support the administrative and teaching faculty in designing and assessing the UGME program. In the Medical School studied, the Education Developer had regular contact with the students to introduce and support new initiatives including the e-Portfolio. Therefore, the Education Developer had a vested interest in the success of the e-Portfolio. Although the Education Developer contributed to the design of the learning and assessment goals of the e-Portfolio, she was not involved with assessments of individual students. The selection of the Education Developer as the interviewer reduced the power distribution during the interview compared to a faculty interviewer but the power differential remained asymmetric. Some authors would argue that, regardless of the prior relationship, the interviewer is always in a position of power relative to the interviewee.
(Creswell, p. 140). To mitigate the power differential many efforts were made by the interviewer to encourage the participants to be honest and to reassure them that their opinions were valued.

The selection of an interviewer who was involved with the curriculum provided the research team with credibility from the participants’ perspective. Because the Education Developer was familiar with the students’ other activities in the curriculum she had a deeper connection with each student than would have been possible with an external interviewer. Because the purpose of this qualitative research was exploratory, her profile was optimal because it provided the context to allow her to engage in an in-depth dialogue with the students about the e-Portfolio that might not have been achieved by an external interviewer. An incentive for the students to contribute to the study was an opportunity to provide feedback about their experiences using the e-Portfolio to the Education Developer who was in a position to influence curricular change.

The Education Developer had a secondary agenda of learning about the students’ perceptions of the e-Portfolio distinct from the study questions and elicited information that might not have been otherwise identified. Although the use of unscripted questions had the potential to shape some of the responses, the benefit of pursuing a deeper understanding of the participants’ perspective added to the breadth and depth of the data.

While having all of the interviews done by an individual who had no authority to affect their grades was an effort to minimize the error in self-report, students did know that the Education Developer had been involved in the e-Portfolio design. If anything, this knowledge might have inflated the degree to which students reported use. To counter this possibility, there were multiple examples of the developer encouraging students to
report accurately: “be honest, I need total honesty” (P. 2) and “be honest, I need honesty” (P. 5). The developer also made numerous attempts to support the students’ responses: “don’t worry, I am delighted” (P. 4) and “Good, I love that. That’s very clear” (P. 7). A convenient time and location was arranged, and a snack was provided to those interested. Consent forms were signed by all of the participants (Appendix E).

A 20-statement, 5-point Likert-type survey instrument was designed as a tool to elicit the students’ perceptions of their e-Portfolio (Appendix C). Once a student responded to an item, the interviewer used probing questions, based on the interview script, designed to learn how each student had interpreted the question and to provide a comprehensive understanding of each student’s thinking around the question. Because those with previous experience in using a portfolio might be more comfortable, and thus more positive about the experience, participants were asked to describe their prior experiences with portfolios. Interviews were analyzed following their completion. Codes were constructed to capture the data provided by each student. In order to ensure that participants were being asked to describe and comment on similar aspects of e-Portfolio use, Likert items and probing questions were clarified and re-drafted throughout the process. These revisions resulted from regular episodes of discussion and planning, implementing and reflecting between the investigator and the Education Developer. Engaging in this process of instrument refinement allowed the Education Developer and researcher to engage in and test out the utility of the questions in eliciting discussion consistent with the 3-stage cyclic model of SRL (Zimmerman, 2002). The cycle of interviews and revisions continued for the subsequent interviews until saturation was reached as described in the “Participants” section above.
The interviews were held over a 2-month period. None of the participants declined to answer any of the interview questions. Interviews were audio-recorded and transcribed to ensure accurate data capture. Transcripts were reviewed by the interviewer to verify the accuracy of transcription. Any identifying data used by the participants during their responses were removed from the transcripts by the interviewer. Data were stored and managed using N-Vivo. Interviews were identified by participant number (P. is used as an abbreviation for participant). Having a single interviewer ensured internal reliability of the interviews. Member checking was used to ensure the trustworthiness and sufficiency of the data. One student revised his/her transcript to remove experiences that might have revealed his/her identity. The revisions were relatively minor and did not detract from the meaning of the data. On one occasion, two students were interviewed sequentially but both were present and provided additional insights during the other student’s interview. These data were analyzed separately from the other interviews but no additional themes were uncovered.

**Data Analysis**

The investigator is an academic clinician educator with a strong background in the theory of self-regulated learning and an understanding of the relationship between SRL and achievement. Because the investigator wanted to describe and explain how students used their e-Portfolios for learning and the relationship, if any, to SRL, the data were analyzed through a constructivist grounded theory lens (Creswell, 2007). The investigators’ perspective was addressed by carefully crafting the interview questions to elicit participants’ perspectives, using a reflective journal and having discussions with the research supervisor. The investigator was not directly involved in the development and
use of the e-Portfolio. The analysis was ongoing throughout the data collection, as were understandings about how the students used their e-Portfolios and the extent to which they engaged in SRL. Factors influencing their e-Portfolio use for learning were elicited and interpreted. The findings were then compared to the literature in the field.

A combination of thematic and content analysis was used to gain a deeper understanding of the students’ perceptions of the goals of the portfolio, the usefulness and value of the portfolio, and linkages between students’ use of the portfolio and behaviours consistent with SRL. The use of thematic analysis was important to develop an understanding of the students’ experiences. Content analysis was specifically used to analyse whether or not the students described the phases in the SRL cycle as they related to their portfolio use. The combination of both approaches resulted in a richer understanding of these data.

The initial analysis was done by open coding the data and organizing the codes into themes. An understanding of students’ portfolio use was developed based on their descriptions in the interviews. The causal conditions, strategies, and consequences influencing their portfolio use were extracted, on probing, to deepen this understanding. Quotes were selected to illustrate the themes. Constant comparative analysis was used to ensure a complete understanding of the properties within each theme. In reviewing the transcripts it was apparent that, at times, spontaneous probing from the developer shaped the direction of students’ responses. The in-depth probing provided a broader understanding of the students’ experiences than the designated questions would have elicited. Finally, the themes were used to provide the basis to develop an understanding
about the students’ experiences with the e-Portfolio, including their perceptions of the e-Portfolio’s goals and usefulness.

Content analysis based on the phases of SRL, as described in the literature, was done, using the interview transcripts, to elicit an understanding about students’ engagement in the SRL process. These descriptions of their learning experiences were compared to the theoretical framework for SRL described by Zimmerman (2002).

**Limitations**

Interviews with students about how they used their portfolios to develop SRL skills were expected to relate to their actual use but interviews are a self-report mechanism and a single event in time. Therefore, the results assume that the way students described their use of the e-Portfolio is actually how they did use the e-Portfolio.
CHAPTER 4

Results

Likert items were used to prompt discussion with the students. The students’ ratings for each item were discussed using a talk-aloud method to give students the opportunity to discuss why they chose a rating. The interviewer used standard questions and probes to ensure a deep understanding of the students’ rationale. The Likert items were revised until students’ ratings were consistent with their interview responses (Appendix G). Because the Likert scale was not the focus of this study, only the results of two of the items are specifically discussed in this thesis. The descriptive statistics for the Likert items are in Appendix G.

Question 1: Student Perceptions of the e-Portfolio – How do Medical Students Describe their e-Portfolio?

Likert scale results. Eight of 14 students agreed with the statement “I understand why I have been asked to keep a portfolio” (Figure 2). Only two of the 14 students disagreed with the statement. The ratings suggest that students believed that they had a good understanding about why they had been asked to keep a portfolio.

Figure 2. Student responses to the statement “I understand why I have been asked to keep a portfolio.”
Interview results.

Repository. All of the students interviewed perceived that the primary goal of the e-Portfolio was to provide a repository for their assignments. As Student 14 said, “I feel it’s an online filing cabinet more than anything else. … it’s not really highlighting anything for me” (P. 14). Student 1 agreed, “[I] have the exact same folder on my desktop, where all the portfolio documents go, which are just really all my completed documents” (P. 1). Some students uploaded their personal systems to the e-Portfolio, “I keep everything in the portfolio and in a binder at my house” (P. 6). Others only uploaded the minimum requirements from their more comprehensive personal portfolio so didn’t use the e-Portfolio as their primary repository.

I do my own reflections. … take those, edit and put in the portfolio if reflection is required. [interviewer: Why do you edit them?] … more focused … relevant to the questions being asked. … in some cases my own reflections are more critical of the things I am seeing … not necessarily comfortable putting that into the portfolio where other doctors will be able to see it. (P. 2)

Organizational tool. In addition to being a repository, the majority of students (10/14) described the e-Portfolio as an organizational tool. Student 4 talked about “Relevant organization up front” (P. 4). This notion was supported by Student 14, “It’s a way to help us keep organized of all the work we do” (P. 14). The benefits of organization were endorsed by Student 11, “Having all your things together makes your life so much easier” (P. 11) and Student 3, “Keeping track of your documents is a skill. … never had to do it before” (P. 3). Student 14 acknowledged the benefit of an organizational tool when he/she talked about “being encouraged to be more organized
than I am naturally” (P. 14). However, not all students agreed; for example, Student 9 said that he/she was more of a “talking person” and the portfolio was “extra busy work a lot of the time” (P. 9). Therefore, the requirement to submit artifacts to the e-Portfolio was not valued by all of the students because some did not see the benefit of an externally imposed system to organize their thoughts/assignments.

**The e-Portfolio for learning.** When asked about the use of the portfolio for learning, Student 11 continued to endorse the perception of an organizational tool rather than a learning expectation. “I don’t see the portfolio as a learning expectation, I see it as a way of organizing all of the things we have done” (P. 11). Student 3 agreed, “The portfolio itself doesn’t because it doesn’t actually have me generate anything, it’s just sort of organizing. … doesn’t address any unique learning needs on their own” (P. 3). Therefore, students did not explicitly describe the e-Portfolio as a learning tool.

The students were aware that competence in the CanMEDS Roles was required for successful graduation. After Student 11 talked about having everything together making life easier, he/she also discussed, “We have organized it in such a way it outlines with the CanMEDS Roles” (P. 11). All students interviewed recognized the organization of the e-Portfolio by CanMEDS Roles. Although students did not describe the e-Portfolio as a learning tool, they described a learning process when uploading assignments into each Role. “A separate page for each competency. … helps you when you’re trying to put things in your portfolio, … think about where it should be and what competency it should go under” (P. 5). Student 1 supported the learning process, “Actually just knowing what each is … something listed under manager … helps me define oh yeah, that is a manager role” (P. 1). The process of considering the relevant
CanMEDS Role helped one student who struggled with the relevancy of uploading materials to the e-Portfolio. “There are times when there was an assignment that I thought what does this have to do with anything, and then this sort of helps contextualize it” (P. 3). The selection of the appropriate Role to upload materials under was even more challenging for students who chose to upload self-selected materials, but the process was endorsed as a positive learning experience.

If it was submit your own or let the student decide eight different things they can submit for manager … I think we would have a better idea of what to put because I think students right now don’t really know what can even go under there … but that’s a really important part. (P. 1)

Student 1 talked about the process of learning the CanMEDS Roles,

Originally I believe it [the portfolio] was so, at the end, we could print off a resume or CV. … we have had more chats of even just the two of us … and now I know it is a tool to get us ready for CaRMS and also to get us ready for being a professional who reflects, and we should of course know the CanMEDS Roles absolutely. But I do not think it [the e-Portfolio] was piloted as understanding the CanMEDS Roles. (P. 1)

In contrast, the relevance of being able to define the competencies associated with each CanMEDS role was not obvious to one student, “How things fit into the different roles … I don’t foresee in the future how that’s going to help me” (P. 7). On further conversation he/she demonstrated lack of knowledge when discussing the Roles, “knowing that say the Critical Thinking assignment is medical expert … [Interviewer:
No, *Critical Thinking* is scholar]” (P. 7). For educators, this lack of understanding should prompt further emphasis in the curriculum about the relevance of the CanMEDS Roles.

**Assessment using the e-Portfolio.** When asked to describe the reason for the e-Portfolio, Student 5 shared, “To help the UGME [Undergraduate Medical Education] show that we’re achieving competency in the Roles that we are supposed to be” (P. 5). Student 13 asked, “How much of it is for me, to get from my portfolio? … how much is it for someone else?” (P. 13). The notion that faculty was using the e-Portfolio as a tool to assess students’ achievement of the intrinsic CanMEDS Roles was offered by 7/13 students. Student 14 thought the portfolio might be useful for faculty but questioned the value for students. “I suppose it’s valuable on your side, but for me, I can’t imagine I will ever look back on that and be like, this was useful for me” (P. 14). He/she went on to say, “I haven’t found the portfolio useful so far. … struggle to do … trying to find everything in my messy bedroom … more of a source of stress. … hope that later on I will be grateful that I have done the work” (P. 14). Similarly, other students talked about keeping their assignments and uploading them just before the deadline.

Further to demonstrating students’ achievement, 4/13 students discussed that assessment of the intrinsic CanMEDS Roles was a requirement for accreditation of the medical school. “I understand that for accreditation purposes and also for curriculum design purposes, it’s necessary to show that we have been learning all of these competencies in class. I think that’s only possible to a certain extent” (P. 2).

Thus, when discussing achievement, students made a distinction between the assessment of the assignments that they included in the e-Portfolio and the assessment of the e-Portfolio itself. Student 2, in the quote above, raised concern that the assessment of
students’ assignments was not a complete reflection of their ability. Thus, having an assessment of students’ portfolios that students feel more authentically reflects their abilities, has the potential to improve student engagement in their own learning.

**Question 2: What Value, if any, do the Students Explicitly Attach to the Process of Maintaining an e-Portfolio?**

**Likert scale results.** Ten of 14 students did not agree with the statement “The items I need to include in my portfolio are meaningful” (Figure 3). The lack of perceived value of the required items is likely to detract from the students’ use of the e-Portfolio for learning. These data suggest that faculty should re-evaluate how the required items are presented to the students in terms of improving their learning experience.

![Figure 3](image.png)

*Figure 3. Student responses to the statement “The items I need to include in my portfolio are meaningful.”*

**Interview Results.**

**Relevance.**

*Value for learning.* When asked about the value of the e-Portfolio for learning, 10/13 students’ perception was consistent with Student 13 who said, “The portfolio part doesn’t necessarily make me see it [the value], like getting comments back from the
assignment itself will, but like, having it [my assignments] all there doesn’t necessarily make it any easier or helpful for me” (P. 13). Student 4 talked about faculty taking responsibility to articulate the learning intentions of the portfolio.

So using a portfolio, I think that encourages reflection that has good feedback and is relevant, I think most people, me specifically, and easily generalize this because I talked to several people about this today, and they were saying that we find it as busy work, and a large part of that is, the relevance is very poorly articulated and I don’t see a relevance to how we do it right now; however, I can say using something, that if we’re asked to demonstrate a scholarly progression over X-period of time, ya for sure, the portfolio will be very useful. But I think that needs to be very clearly articulated, up front, so I would agree [using a portfolio is relevant]. Using this portfolio, I think I would have to say I absolutely disagree. (P. 4)

Student 5 discussed the difficulty in initially understanding the relevance of the portfolio for learning,

I think at least the general sense in the class that I get is some people just don’t get it and I didn’t get it and so I went and read about it and got the information about it, and realized that I should get it, and then did get it, but people aren’t going to do that. (P. 5)

In addition to understanding the learning intent of the e-Portfolio, Student 3 expanded about whether using the portfolio demonstrated learning; “it doesn’t show we have actually learned anything. … for 100 people to learn 8 competencies … 100 different pathways. … that is the whole point of school and that is the whole point of
education” (P. 3). This student described learning as a personal process and the mandatory requirements as somewhat restrictive. To expand the notion of individual learning, Student 11 said,

I look at my clinical skills assessments. Those are some of the most important assessments for me and I think they really reflect a lot of work you put into the. … seeing the points they [tutors] made on your assessments and how you have kind of responded to those and refreshing on that and needing to keep those in mind as you go along is important … I don’t really see the portfolio as a learning expectation. (P. 11)

It appeared the student was viewing the reflection as a learning experience but not linking the experience to maintaining the documents in the e-Portfolio.

In contrast, 3/13 students described the e-Portfolio as useful for self-assessment, “Grind your teeth. … It’s like going to the gym. … you’re never sorry you did it because you’re like oh ya, I didn’t realize I did do well on that, or I did get a poor mark on that exam but my goal was to get better and I did that” (P. 1).

Medical students need to apply for residency positions, through the Canadian Resident Matching Service (CaRMS), a highly competitive process. Student 1 talked about the value of having his/her material organized by competency to help with CaRMS applications, “I want to be able to say in a CaRMS … yes, … I was an advocate and these are the six reasons” (P. 1). Student 14 discussed, “The big purpose … it’s supposed to help us during CaRMS. … look back and organize our thoughts” (P. 14). Student 13 was aware that having evidence of excellence in the intrinsic CanMEDS Roles would further strengthen his/her application, “I always used to see this little portfolio as a very
sort of other career thing. … not that different from my friends who are in business … like you don’t need to market yourself and you’re like nope, you do. … it’s actually very relevant” (P. 13). Student 2 described the e-Portfolio as “Helpful in terms of my personal development and my career development, in terms of CaRMS” (P. 2), alluding to the need to demonstrate development over time. Even one less enthusiastic student talked about the utility of the e-Portfolio for CaRMS, “Well if I need this for CaRMS then I will do it” (P. 6). Based on the interview data, it was clear that students valued the e-Portfolio as a tool to collect and organize materials to prepare them for their CaRMS interviews.

Students (12/13) agreed that using a portfolio was relevant to becoming a physician. “Professional tracking is really important. … annoying you have to do it … it will be for the rest of your career” (P. 3). Students (10/13) were aware of the need for ongoing professional development and viewed the e-Portfolio as necessary practice to prepare for their future career. Although the need for ongoing professional development had been discussed in class, 2/13 students did not appreciate the future value in maintaining a portfolio. Student 7 read out loud: “Using a portfolio is relevant to becoming a physician. … [long pause] … strongly disagree” (P. 7). However, when the interviewer discussed the need to demonstrate professional development the same student responded,

I am the kind of person that if I want to be doing something later in life, then why not start it now, but … I had no idea. … I do feel already so much better about the portfolio knowing that it’s practice for that. (P. 7)

Students’ comments suggested that they recognized that the artifacts in the e-Portfolio could be used to help them to demonstrate evidence of achievement of
competency in the CanMEDS Roles. Recognition of the importance of having evidence of competency resulted in an increase in students’ perception of the value of maintaining their e-Portfolios. Therefore, although each student was not necessarily personally committed to each artifact required, they demonstrated a pragmatic approach to maintaining their e-Portfolio.

The value of materials to include in the e-Portfolio was important to the students to the extent that one student suggested that the faculty had a responsibility to ensure the relevance of the required assignments.

I think it’s really valuable to upload the ones that I choose but I think a lot of the ones that are asked of me don’t have value. … I think maybe the portfolio could be more explicit in the value of some of those things. … I know this is more work for the instructors but maybe if you … have to be able to justify why it’s going there … there are certain things that people get so aggravated about and it’s work to go hunting for [the assignment] and you know sometimes you have thrown it out. … and then you think, I am never going to open this, ever. (P. 3)

The student talked about the responsibility of the instructors to ensure students were being asked to undertake relevant learning experiences. Although students could not decline to upload mandated materials, 12/13 students were aware that the portfolio was designed so that they could add materials of their choosing. Student 12 talked about the value of autonomy when selecting artifacts,

Fewer restrictions … upload where I want … I know what’s valuable to me, more than you know what’s valuable to me … at this point we’re all very capable of doing that ourselves rather than having someone tell us what to do. (P. 12)
Although students discussed the importance of adding self-selected materials and felt that student choice was critical, rather than faculty direction, what is particularly puzzling about this stance was that only five out of 14 students actually did upload self-selected materials. Therefore, although students discussed that self-selection of materials to include would be optimal, it was not clear that they would follow through without faculty supervision.

Students’ comfort with self-selection might have affected the extent to which they supported student vs. faculty selection of artifacts. For example, Student 8 said, “I have added a few things on my own. … haven’t really been motivated” (P. 8). Students’ enthusiasm for self-selection increased when prompted by the interviewer to generate ideas of what they might include such as, “sometimes we do little writing workshops so maybe I could upload those … different from the school assignments” (P. 13), and “additional reflection just on the interaction I saw, that was separate … I have never thought of putting stuff in there” (P. 8). Other ideas included, “camp evaluations … letter that says I was on the committee and I was useful” (P. 3), and “publications that I have done, or posters” (P. 4). These quotes demonstrate that, when students have the opportunity to discuss their portfolios with an advisor, the relevance increases as does students’ enthusiasm for maintaining a portfolio. This finding would support a mentor role to improve the quality of the students’ e-Portfolio use.

When asked about feedback on the e-Portfolio many students didn’t think they had received any, “I have only gotten comments on a few assignments, but nothing about my portfolio” (P. 13). Other students commented on receiving limited feedback, “the
only thing that helped me see clearly my strengths and weaknesses was the learning plan” (P. 3).

When asked whether or not it would be helpful to have somebody review students’ portfolios in more detail, some students endorsed the idea: “faculty mentors’ comments about my portfolio are helpful to me. … wish I had more of them” (P. 6). However, others were less certain about the value of the feedback, “It depends … would need to be a little bit goal oriented. … if it was more like oh well you are doing a good job … I don’t think that would necessarily help me” (P. 13).

Student 3 also discussed how feedback regarding students’ portfolios and the relevance of self-selection as it related to a future career would be beneficial.

This would be most useful, to be honest, when it comes time for sort of real career counselling and things. Where someone can say to you, you’re interested in orthopedic surgery, as an orthopod I am looking at this and you have some great experiences here but I am noticing some gaps in these areas, like how have you addressed that, I can see you don’t have anything meaningful under scholar and when you go for your interview, they are going to ask you how have you demonstrated scholarship so start thinking about it now, you know, I think that’s where the value lies for the student, I know that’s not what the portfolio is for. (P. 3)

*Value of the e-Portfolio for assessment.* Although students recognized the faculty need to demonstrate students’ competence in the intrinsic CanMEDS Roles for accreditation, thoughts about the usefulness of the e-Portfolio for authentic assessment linked to previous comments about the e-Portfolio for learning as discussed by Student 3.
The only thing the portfolio is assessing is that I am organized enough to hold
onto my documents, take pictures of them and then upload them. … different I
think than what the documents themselves are assessing. … that we are assessing
all of these competencies, it doesn’t actually show that … just that we have done
all of the assignments, it doesn’t show we have actually learned anything. (P. 3)

Therefore, students expressed concerns about the extent to which assessment based on
completion of assignments was an assessment of competence. Student 5 said of one
assessor, “Gave me feedback on the assignment, he didn’t look at my portfolio” (P. 5).
Because items had been evaluated before uploading, subpar performance should have
been detected on an individual assignment basis. With respect to longitudinal
development of students, the e-Portfolio has the potential to be used to provide a more
authentic assessment.

Two of 13 students discussed the use of a portfolio to demonstrate learning in
their pre-medical university courses. Student 5 explicitly described how to use evidence
from a portfolio to demonstrate learning. “We had to show with evidence what we had
learned and that we had met goals … [interviewer: You are going to have to convince
somebody blind.] That’s okay. You use your evidence” (P. 5). This student had also been
on curricular committees so had a deeper understanding than most students about the
intent of the portfolios for learning.

*Professional Development Plan.* Although the students did not necessarily value
the e-Portfolio for learning, the exception was one assignment, the Professional
Development Plan (PDP), which was linked to their e-Portfolio use. Students were
required to write down three short-term goals, a plan to reach each goal, and criteria to
measure success. Eight of 14 students found the PDP useful. “I look back at my learning plans. … you know ones that I fell behind on, I still have them in the back of my mind because I can go back and look” (P. 3), and “the learning plans are awesome. … ones I fell behind on … I can go back and look … I want to go over [xxx] … something I was weak on” (P. 11). A positive outcome of the PDP exercise was some students’ (3/13) commitment to review their learning plans on an ongoing basis.

In contrast, other students talked about the PDP as just “kind of another assignment to do” (P. 6) or only had a vague recollection when prompted with additional details about the PDP and had not referred back to their plan. “It was a good time to reflect. … don’t really remember what I wrote. … writing it was kind of generic” (P. 14). The issue of authenticity was raised,

I remember thinking about this at the time we were doing it, was that it was very frustrating for me to have to like, write down those goals in that sort of way, because a lot of goals that individuals have are kind of personal, so a lot of the times, the stuff that I was putting in was fake. It was like, speak more at FSGL [facilitated small group learning]; stuff like that, even though I didn’t really care about things like that because I have my own goals. (P. 7)

Even when students were aware of the learning objective of an assignment they didn’t always value the experience and, in fact, some fabricated goals to complete the assignment.

Students did not necessarily recall receiving expected feedback on the PDP and discussed that they would have found more value in the process if they had had a prior relationship with their portfolio advisor. Student 1 said it “would have been more useful
to me … nobody looked at it … I was a bit disappointed” (P. 1). In comparison, Student 3 said the feedback was “quite good but it wasn’t personal. … she doesn’t normally personalize stuff. … more helpful to have someone that I knew … ideally someone that I would know throughout the four years” (P. 3).

**Motivation To what extent were students motivated to use their e-Portfolio?**

**Extrinsic motivation.** The major incentive described by the students to complete their e-Portfolio was to meet the requirement for promotion, “It’s just extra motivation to never go before P and P [Progress and Promotions] for me” (P. 3). The students all reported that having deadlines motivated them to upload their assignments on time. Students also indicated that if maintaining the e-Portfolio was not a required activity they might not do it, although some kept a personal portfolio.

Definitely the due dates. … without knowing that someone is going to be looking for it, I wouldn’t necessarily be so good at it. … otherwise I think a lot of people would just never upload anything. … something punitive a little bit … if you just let students have a free for all, they won’t do that. (P. 6)

Although students endorsed self-selection of artifacts, they also expressed that faculty should monitor students’ portfolio use. “I think having more guidance is probably better. … while I am all open for self-directed learning I think that sometimes, some procrastinators or some people who don’t think that way might need the extra push” (P. 13).

A second, consistent incentive for students to maintain their e-Portfolios was to prevent looking bad to the faculty portfolio advisor or other faculty members who might look at their portfolio. Student 14 discussed, “If it’s like a specific person … you don’t
want to look like you are slacking off, and that is a terrible reason to be doing anything, but it works, right” (P. 14).

When Student 14 was asked in follow up if he/she relied on external pressures for work other than on the e-Portfolio the answer related to the personal relevance of the e-Portfolio. “No , I think I have my own motivations for that. … discrepancies between my two answers is that, at this point … the portfolio doesn’t feel like something that is going to help me next week” (P. 14). Therefore, external motivation described in the context of the e-Portfolio did not necessarily extend to other aspects of the students’ learning.

One student described a transition from a goal of achievement of high grades to an internal need to learn. The transition was based on the students’ perception of the clinical relevance of course material. “Med school has definitely changed the way I study, like now … patients, someone’s life … less assignments, grades and … more like I need to do well, I need to … learn how to be a doctor” (P. 13).

Of 13 students, three discussed that they would, independently, use their e-Portfolio to review prior assignments and/or their PDP to determine if they had improved in each Role and/or met their PDP goals. Thus, some students had transitioned from the PDP as a discrete assignment to incorporating their goals and self-assessments into their daily activities.

**Intrinsic motivation.** The students described a perception of personal competence and the need for autonomy to determine items that were meaningful to include in their e-Portfolio. For example, Student 12 discussed,

I know what’s valuable to me more than you know what’s valuable to me. I think letting me decide kind of what are the top 25 things or even if I want to do more,
like let me do them myself and I think at this point we are all very capable of doing that by ourselves rather than having someone tell us what to do. (P. 12)

This thought was echoed by Student 3, “People who are going to get something out of this are going to do it and get a lot more” (P. 3). Mentorship was also discussed as supporting intrinsic motivation; “I think people would put more effort into it if they knew that a professor was looking at it” (P. 2). When students were intrinsically motivated, grades were perceived as less important, “If I think something would be a good learning experience it really doesn’t matter to me if there is a grade or not attached to it” (P. 2).

Of interest, the students’ descriptions of self-selection and mentorship reflect the needs of autonomy, competence, and relatedness, consistent with the Self-Determination Theory of motivation (Ryan & Deci, 2000).

**Privacy and security – limitations of authentic e-Portfolio engagement.** When students discussed their e-Portfolio it became apparent that the majority had a personal filing system or portfolio that they used to consolidate and extract the required materials for their e-Portfolio. Eight of 12 students felt that uploading any negative feedback or comments about the assignments would damage their status with faculty members (Appendix G, item 10). One student talked about, “negative feedback … I would stick it somewhere else” and “I don’t have to worry about making all my sentences sound lovely” (P. 6). Concern about negative faculty perceptions was illustrated by Student 1 who said,

I wrote in my reflection … was honest and really the best reflection I had ever wrote. … I deleted the whole thing. … thought that the person I was sending it to was going to get offended. … I am really nervous to write anything bad that I may
have seen anyone do because those are also people that I would like to impress. (P. 1)

Another student talked about the impact of leaving a poor impression with faculty reviewers.

One of the things you have to accept as a medical student that people who are your teachers are also the people supervising you and evaluating you and who you’re going to want to impress in the future. … paranoid about all my exams … not the marks … thought of the [specialist] seeing my name as someone who has done badly … horrible. (P. 3)

Student 11 endorsed this position but was not as concerned about creating a negative impression.

Common concern that people think maybe uploading negative things to their portfolio is going to affect them. … I don’t think that the faculty looks at it … you can’t expect yourself to be perfect. … critical feedback you get is something that you need to remember and keep in mind. (P. 11)

This student viewed the impact of negative feedback in his/her e-Portfolio as a learning opportunity. Similarly, Student 1 decided to delete a reflection due to writing a negative comment but changed his/her stance to indicate that reporting negative feedback would not be of concern.

Not getting graded on my portfolio … I don’t think [Undergraduate Dean] is going to look and say well that was a negative comment so that is going in your Dean’s letter. … I don’t have a whole lot to hide … I don’t think most students do
at this point … things should be caught when you are a student … thank goodness. (P. 1)

Some students went as far as to say that it would be beneficial to upload negative feedback. “Faculty would be impressed with seeing more negative things because it shows how you have thought about it and developed and that is kind of the point, you want to see how you have gotten from one stage to the other” (P. 8).

Although the students didn’t think faculty read their e-Portfolio, they were unclear and somewhat cautious about who had access to their artifacts. “It’s who might be seeing them and also kind of great unknown it’s like I don’t know. … I don’t want it to be just like open and out there for anyone to read” (P. 14). Even if there was a private section of the e-Portfolio, not all students felt comfortable sharing personal information as illustrated by “Asking someone to discuss their hopes, dreams and something, with someone whom you have no experience and no trust, I think that is a bit of a problem” (P. 4).

In addition to concerns about privacy and reputation, Student 4 had “everything on my computer backed up to three drives” (P. 4). Thus the idea of electronic security with respect to long-term storage of students’ materials was raised.

Students all maintained their e-Portfolio because it was a course requirement. Student 2 compared the artifacts in his/her e-Portfolio with his/her personal portfolio, “I may have put an extra one or two, but then again I keep my own separately as well” (P. 2). He/she described the purpose of a personal portfolio, “I have a separate word document that I do my own reflections in and I sometimes take those, edit it, and put it into the portfolio if reflection is required” (P. 2). Others hadn’t considered adding the
information to the e-Portfolio, “Date … where, who … what competency … little blurb … I do that myself. … cool thing to put in the portfolio” (P. 6). Students maintained their files and then uploaded to the e-Portfolio. Concerns were often related to confidentiality as noted above. A secondary concern was the effort it took to prepare a formal entry into the e-Portfolio compared to a personal note. Although students recognized it would be useful for them in the future, the immediate relevance of the portfolio was evident to only a few. Therefore, students were pragmatic in their approach, likely because medical students are time pressured and need to align their learning activities with materials that faculty are assessing.

**Question 3: Behaviours Associated with Self-Regulated Learning – Students’**

**Implicit Use of the e-Portfolio as a Learning Tool**

When asked to discuss the e-Portfolio as a learning tool, students were not clear about the expectations. “What’s the expectation? Expectations of the assignments themselves … meaningful to me … I don’t necessarily know the learning expectations” (P. 13). As Student 11 said when he/she initially described the e-Portfolio,

I don’t really see the portfolio as a learning expectation, I see it as a way of organizing all of the things we have done, fitting them into the categories … parts of the CanMEDS Roles … to get out of those assignments … reflecting back on it as we do it. (P. 11)

Student 2 talked about the use of the e-Portfolio over time as a “nice catalogue to show progression from 1st to 4th year” (P. 2) but didn’t discuss how the artifacts showed progression in learning over time. Although they described a repository, the process of
organizing their work into the Roles and reflecting on their experiences over time was not perceived by students as a learning expectation of the e-Portfolio.

In contrast, faculty expected the students to engage in self-regulated learning (SRL). The cyclic process of SRL includes: a “before (forethought) phase,” a “during (performance) phase,” and an “after (self-reflection) phase” with an understanding that the extent to which individuals engage in SRL can be influenced by motivation and affect (Zimmerman, 2002). Therefore, an analysis was done to determine if and how students described each phase of the SRL cycle.

**Correlation of students’ descriptions of e-Portfolio use with a self-regulated learning model.**

**Forethought phase (task analysis and self-motivation beliefs).** The forethought phase includes task analysis such as setting goals and self-motivation beliefs. Student 3 discussed the importance of task analysis, “able to document what you have learned or how you have learned it and setting goals to move forward is pretty key and to be able to do that in different domains” (P. 3). The students were required to do the Professional Development Plan (PDP) based on the three phases of SRL. In the context of the PDP, some students reported developing learning plans that they reviewed periodically. As Student 3 described, “I look back at my learning plans. … you know ones that I fell behind on, I still have them in the back of my mind because I can go back and look” (P. 3). Another student talked about extending his/her learning about how to plan, “the planning aspect I will use … strategy I will use in other things as well. … don’t remember the specifics … maybe it wasn’t that helpful like I thought it was” (P. 13).
However, other students struggled with the explicit use of the forethought phase. For example, Student 2 described the experience as “Looking for goals and having difficulties coming up with three. … choosing something that would fit with their plan anyways” (P. 2). Even students who struggled with the creation of specific goals completed the assignments, albeit superficially, to ensure a pass on their e-Portfolio. Of interest, students’ academic success suggests that they have goals. In this context, it could be that privacy concerns prevented students from describing authentic goals. In addition, students described a reliance on extrinsic motivation. For example, Student 14 talked about not meeting deadlines for portfolio completion,

No one has commented to me. [Interviewer: We know, when we can see the red highlights] … I haven’t been getting feedback about it. … expecting a little bit of a slap on the wrist … happy it hasn’t come … if I knew who would be reading it, like a mentor … take their feedback, if I got it, more seriously. (P. 14)

**Performance phase (self-control and self-observation).** With respect to the performance phase, Student 11 said,

Every time I do a CARL [critical thinking] assignment I try to refresh a bit on my epidemiology. … and I want to start going back and making sure I took home not just the points from the studies that we did but also … going back and seeing how we did them. … I will probably read that paper again and then I will also look at our evaluation and make sure I caught all the weak points in it, so that way when I am doing that again later I will probably be a lot better. (P. 11)

The strategy of reviewing documents, completing the review prior to the next assignment, and looking at prior evaluations for feedback are elements of self-control. The student
alludes to self-observation when discussing that the review was done “every time” suggesting that reviewing was an effective strategy to improve future performance. However, he/she did not discuss how he/she would modify the review process depending on the outcome of the subsequent assignment. Student 5 talked about a process of creating review charts,

    I have added I guess the link to my blog, which has a fair bit of reflections and relates to kind of all the competencies. [Interviewer: Did you put it in the multi-competency one?] Yes, and I have added the charts that I make for review of each of the units that we go through. (P. 5)

The use of a chart for review suggests that Student 5 used self-control and self-observation. In both cases described, the students had material in their e-Portfolio that they used for the performance phase, but neither self-control nor self-observation was discussed during the interviews explicitly by any student. Likely, most students had implicit strategies that might include elements of self-control and/or self-observation based on their academic success. Because the PDP required students to document a learning plan, students described the process used for this assignment in more detail.

    The PDP prompted students to consider how they approached their work. Student 1 described, “what are my goals, what did I do poorly, let’s have these strategies, so I do better which makes it a strength” (P. 1). The student alluded to learning “strategies” to achieve a goal consistent with the performance phase. Only the three examples above implicated the performance phase of all the interviews done.

    **Self-reflection phase (self-judgment and self-reaction).** All of the students talked about self-reflection as something they were required to undertake on a regular
basis. Student 13 said, “While I am a little reflectioned out, I see the purpose of remembering those sorts of things” (P. 13). Student 4 agreed, “Reflection is important” (P. 4). Others did not see the benefits as clearly, “Reflections at some times, I think that are done in medical school have kind of been very forced. … feedback was good … just don’t look back at it” (P. 7).

When students evaluated their progress they considered their prior assignments compared to current work. “Reflections are helpful. … being able to track it through time is also helpful. … comparing what I am writing now to what I was writing before” (P. 2). In addition to comparing their assignments, the students made decisions about whether or not they had improved over time. Student 8 talked about, “I have thought more about what I am putting in. … there is an example of something I did wrong and then uploading later, one that showed I had improved on that” (P. 8). However, progression was not always immediately obvious to the students exemplified by the comment, “I think there is a progression that is sometimes difficult to see until you’re on the other end looking back” (P. 5).

Although students were required to reflect on a regular basis, use of the materials they uploaded to the e-Portfolio was less specifically discussed. Student 6 talked about a “little chart … just to track it … ‘Documenting my activities in my portfolio has helped me to see more clearly my strengths and weaknesses.’ [reiterating question] … I would say disagree” (P. 6). This student talked about tracking activities but not necessarily engaging in self-reflection. Similarly, another student did not explicitly value his/her e-Portfolio for self-judgment but acknowledged that the materials were there. “I haven’t really looked back on it, like as in I haven’t been using it maybe as many of my
classmates have been so I haven’t found it terribly useful except for, again, if I did need to pull something I could” (P. 13).

In spite of not describing the e-Portfolio as useful for self-judgment, the students were using the materials. To make the process more explicit, Student 1 summarized how he/she thought about using the e-Portfolio for learning,

I haven’t really been advocating for my patients, I really should increase that … It needs to be like September what are you thinking, December looking back, more goals, end of school year, looking back, more goals [Interviewer: So you are saying you need some check points to do the actual reflection on the pattern?] Yes. We joke a lot about the reflecting on the reflection but we don’t actually because we are reflecting on sort of peer feedback and everything but we should be reflecting on our goals and progress. (P. 1)

The discussion between the student and interviewer clarified how faculty could support students’ use of the e-Portfolio for learning by providing more scaffolding. A consistent finding was that when students discussed self-judgment they focused on self-evaluation, but did not explicitly discuss causal attribution.

As identified for the other phases of SRL, students were more specific when they talked about their PDP although few comments were made relating to self-reaction. Student 3 said, “I look back at my learning plans. … you know ones that I fell behind on I still have them in the back of my mind because I can go back and look” (P. 3). By describing the value of the PDP students implicitly suggested invoking self-reaction to help decide if they were on the right track, as described by Student 11, “incredibly important and those are things that you have to keep going back to and looking and
saying am I sticking to this plan, am I doing all the things I said I wanted to do? So those are the important parts of it for me” (P. 11). These descriptions were examples of comments supporting self-reaction by students who set goals to demonstrate improvement. However, the students did not recount their degree of self-satisfaction, affective response, or the attributions they made when evaluating their progress.

Reflections were perceived to be more valuable if the topic could be self-selected. The idea of personal choice was partially attributed to the diversity of their prior experiences and priorities, as discussed by Student 2, “People who have PhDs already … might not use that time if they have more relevant things they would want to mention” (P. 2). In addition, Student 13 discussed how he/she could see the value in uploading reflections, but some materials, especially group assignments, were not perceived to be as reflective of the “whole big picture” (P. 13). Students described that they expected to have improved feelings of self-satisfaction if they valued the items they were using for reflection. This notion is consistent with the motivational needs of autonomy and competence.

In addition to privacy, discussed previously, students were concerned about the formal nature of the reflections, which were evaluated before being uploaded to the e-Portfolio. Students discussed that self-reflection did not necessarily need to be written down to be useful. “I am pretty good at self-reflecting and knowing where I need to improve and where I don’t. I think I do a lot of that in my head” (P. 6). However, Student 6 went on to say “I never realized how much I actually think about stuff until I had to write it out.” Student 6 raised the notion that reflection did not need to be written to be important but that a written reflection helped to consolidate his/her thoughts.
Student 3 agreed that a less formal approach would improve student engagement in self-reflection, “long reflections turn people off, but I think two sentences show how this demonstrates growth in one area and show how this demonstrates what area you could still use some improvement” (P. 3). While the formality of the self-reflection process did not capture all of the students’ self-reflective activities, it might be that students were more self-reflective than what was suggested by their written work and that some of their reflective activities might have been implicit so they had difficulty in describing the process.

Reflection was discussed both inside and outside of e-Portfolio use with only a few students describing the assignments uploaded within a competency as a continuum. Some noted a competency and decided whether or not they had demonstrated progress over time. To demonstrate improvement they would upload an improved assignment or grade. The process of identifying a weakness required self-observation and self-reaction, as did the evaluation of the “improved” uploaded assignment. However, the students did not discuss any type of system or schedule for self-judgment and self-reaction, and most did not discuss elements of the performance phase before moving to the solution. When asked, the implementation of a scheme to ensure ongoing self-reflection was thought to be of benefit to encourage students’ continued evaluation of their progress over time.

Student 5, who had used a portfolio previously for assessment and had researched the use of portfolios in education, said,

Yes, we all think of the Medical Expert piece and maybe a little bit of the communicator piece but not about a lot of the other roles. I mean we can learn about those, and we did talk about them in Professional Foundations, but I think
forcing yourself to go through your own work and your own reflections and put a piece of you into each of those roles, I have to think that it’s going to help you get there, which is by thinking about it and seeing how you’re developing and growing into each of those roles. And to do that consciously as opposed to just, kind of through some of the curriculums. (P. 5)

The use of the e-Portfolio, as a whole, to engage in SRL was only described by this student. The student’s prior experience with using a portfolio for assessment and initiative in researching the intent of a portfolio likely contributed to this student’s perception of the e-Portfolio as a learning tool. Therefore, making the expectations of the e-Portfolio explicit and providing opportunities for practice has the potential to motivate more students to take a more comprehensive approach to the use of their e-Portfolio. The use of the e-Portfolio for assessment of SRL would also provide evidence to the students that faculty valued the learning process as well as the outcome.

**Confidence in the Quality of the Findings**

The trustworthiness of the findings reported about students’ experiences and use of the e-Portfolio is grounded, in part, in the way the data were collected and analyzed. Data were collected using in-depth interviews, a semi-structured interview script, and a single interviewer. Unanticipated events during the interview process included the loss of part of one transcript due to a technical failure and a joint interview with two students present. The partial loss of a transcript did not affect the data because interviews were held until saturation was reached. The analysis revealed the emergence of common themes. The joint interview also elicited themes that were found in the individual interviews. Therefore, the quality of the data was not compromised.
It is also significant that students’ suggestions on how to make the portfolio more relevant are consistent with guidelines found in the literature for effective portfolio use. Specifically, the findings suggest that the e-Portfolio would be more relevant for learning if students had been provided with detailed information about the intent of the portfolio, flexibility in artifact selection, and faculty mentors.
CHAPTER 5

Discussion

Portfolios have been used in a variety of contexts and include working folders, showcase portfolios, growth portfolios, process portfolios, and cumulative portfolios (Buckley et al., 2009; Pinsky & Fryer-Edwards, 2004). Portfolio use in medical education has been documented for clinical learners but portfolio use in pre-clinical learners is relatively uncommon (Buckley, Coleman, & Khan, 2010).

The goals of the e-Portfolio examined in this study included: (a) development of students’ knowledge of and practice in applying skills associated with the CanMEDS Roles; (b) development of students’ skills in self-regulated learning; and (c) creation of an assessment method. Consistent with the espoused goals, the e-Portfolio had a dual purpose for both learning and assessment.

The intent of this research was to gain an understanding about students’ use of the e-Portfolio and the extent to which they valued the process. Because supporting the development of SRL skills was one of the goals of the e-Portfolio, students’ descriptions about how they used their e-Portfolios were compared with behaviours associated with SRL. These data should provide a foundation to enhance the design of an e-Portfolio for learning, in particular, to promote skills in SRL. The dual use of a portfolio for learning and assessment raised considerations about the optimal design of a portfolio to be used for a dual purpose.

Data Collection

Data were collected using a third party interviewer to address ethical considerations as described previously. The selection of an Education Developer who
had been involved in the original design of the e-Portfolio required careful consideration of the advantages and disadvantages of an internal interviewer. The advantage of an internal interviewer who was involved in the development of the e-Portfolio included a knowledge of the context, trust by the participants, and a vested interest in identifying and operationalizing suggestions for improvement. Disadvantages included a prior perspective about the use and value of the e-Portfolio, which directed some of the questioning at times. Although a prior perspective had the potential to shape the responses, analysis of the transcripts revealed that students were encouraged to be candid. Another potential disadvantage was that the students could have been uncomfortable in providing negative feedback. The disadvantages of an internal interviewer were considered and mitigated by providing reassurance about confidentiality to the students during the interview, a stated goal of seeking feedback to improve the e-Portfolio and acknowledgement of the interviewer’s perspective. Therefore, in balance, the benefit of an internal interviewer outweighed the disadvantages particular because having a vested stakeholder involved with the study increased the potential for timely implementation of the results.

**Medical Students’ Use of their e-Portfolios**

The students studied described the e-Portfolio primarily as a repository and organizational tool. With respect to preparing for their future careers, such as their interviews for the Canadian Resident Matching System (CaRMS), students articulated that the e-Portfolio was a valuable resource.

Students uploaded materials from paper or electronic personal folders into the pre-designated intrinsic CanMEDS Roles categories of the e-Portfolio to meet curricular
requirements. Although they did not view the e-Portfolio as a learning tool, the students learned to define the Roles, with faculty guidance, as they uploaded their artifacts. Although faculty intended for students to develop knowledge and skills in the CanMEDS Roles through their assignments, the uploading process, by which students learned to differentiate the Roles, was an unanticipated, positive learning outcome.

As students discussed uploading materials from their personal files into the e-Portfolio, it became apparent that a subset of students maintained their own files of assignments and reflections. Some of these students reviewed their prior work as part of their approach to learning, although most did not use the e-Portfolio structure to support their learning. Other students did not keep their assignments and it might be this group who would gain more benefit from the organizational structure imposed by the e-Portfolio.

The faculty expected students to upload assignments and reflections, which aligned with the students’ descriptions of the purpose of the e-Portfolio. In addition, the faculty expected students to supplement their e-Portfolios with materials of their choosing. After doing so, students were expected to review and reflect on their materials using strategies consistent with SRL in order to improve their skills in each intrinsic Role over time. The faculty expectation that students use the e-Portfolio for active learning did not align with the majority of the students’ descriptions, which were more consistent with the portfolio as a repository.

In addition to the learning goal of the e-Portfolio, both faculty and students were aware of the intent to use the e-Portfolio for assessment. Students’ perceptions of academic success were tied directly to the timely uploading of assignments – even at the
last minute. Having the required list of uploaded assignments completed did meet the faculty need for explicit evidence of student achievement in the intrinsic CanMEDS Roles for both assessment and accreditation purposes because each assignment, individually, addressed an intrinsic Role. Further, the students were aware that evidence of student achievement of the intrinsic CanMEDS competencies was an accreditation requirement consistent with the School of Medicine’s need for external accountability. For assessment and accountability, the students’ descriptions of the purpose of the e-Portfolio were aligned with the School’s stated goals.

Students’ descriptions of the e-Portfolio were most consistent with a working folder/showcase portfolio. In contrast, the faculty’s goal for the e-Portfolio was most consistent with a cumulative portfolio, including evidence of growth and attention to process.

**The Value of the e-Portfolio**

Students were aware that they would likely be asked for evidence of their competency in the intrinsic CanMEDS Roles in their CaRMS interviews. The e-Portfolio was regarded as a valuable tool to organize their materials within each intrinsic CanMEDS Role such that students could refer to their portfolios to prepare for their interviews.

The e-Portfolio was designed to allow students to upload self-selected materials. Although students agreed that the portfolio would be more relevant if the materials were primarily self-selected, few students actually added their own artifacts. Students’ ideas about artifacts they could add increased, as did their enthusiasm, once they had the opportunity to discuss the idea of self-selection with the interviewer. The depth of the
students’ responses to the interviewer suggested that the students had not really
considered the extent to which they could add their own materials prior to the interview,
which might be the reason few actually added additional materials. Their responses also
supported the importance of personal feedback for the students to optimize their use of
the e-Portfolio.

When specifically asked about feedback on their e-Portfolios, students were able
to describe feedback on assignments that they uploaded and on their Professional
Development Plans (PDP) but did not describe receiving feedback on their portfolio as a
whole except with respect to completion. Students reported that feedback would be
welcomed and would be valued from somebody with whom they had a relationship who
could provide them with a personal perspective. The positive response to a small amount
of feedback in the context of an interview supported the student perception that they
would be more engaged with their e-Portfolio should they receive regular feedback.

Students described the e-Portfolio as a tool used by faculty to assess their
competency in the intrinsic CanMEDS Roles. Because the only requirement was to have
materials uploaded by the deadline, students questioned the authenticity of using the e-
Portfolio for assessment other than as a method to check completion of assignments.
They viewed feedback on each assignment as a more valuable assessment than the
compilation of assignments within a Role over time. Students with prior experience in
using portfolios for assessment saw the potential to use the portfolio for longitudinal
assessment but did not feel the e-Portfolio was being utilized for this purpose in its
current form.
Although use of the e-Portfolio for assessment had limitations, the lack of feedback and assessment of the e-Portfolio for learning affected the students’ motivation. This finding is consistent with research in pre-registration nursing students who were found to give less priority to their portfolio when assessment was not included (Dolan, Fairburn, & Harris, 2004).

Self-determination theory (SDT) provides a framework to understand students’ motivation to engage in the e-Portfolio because the theory has flexibility to explain degree and direction of motivation as well as changes in motivation over time (Ryan & Deci, 2000). In applying SDT to the findings of this study, it is apparent that students were extrinsically motivated to complete their e-Portfolio because they wanted to pass the course (external regulation). Achievement of a pass would maintain their reputation and ensure their long-term goals of attaining a medical degree and good references for the future. Three of students described a shift in the locus of their motivation from external to internal as they gained experience using their e-Portfolio, and the clinical relevance of their work became more apparent. Developing the Professional Development Plan (PDP) using the e-Portfolio supported the use of the e-Portfolio for learning, and a few students began to articulate value in examining whether or not they had achieved their goals over time. Although student motivation may have remained extrinsic, the focus had shifted from external regulation to an identified regulation closer on the continuum to intrinsic motivation (Ryan & Deci). The shift in motivation described was found in students who viewed the e-Portfolio as a learning tool suggesting that clarifying the goals of the e-Portfolio for learning has the potential to promote internal motivation.
A small subgroup of students was intrinsically motivated to maintain their e-Portfolios. Characteristics of these students included a feeling of competence to select their own artifacts and endorsement of a positive relationship with an advisor or mentor. When a portfolio was used with medical students doing clinical rotations, students’ motivations were found to vary depending on students’ personal needs and experiences. Consistent with our findings the value of a supervisor was important. However, those students who voluntarily kept an extensive portfolio did so for personal goals (Deketelaere et al., 2007). The characteristics described by our students and those in the literature were consistent with the needs of competence, autonomy, and relatedness that underpin SDT, and should be promoted to support students’ motivation to maintain an authentic e-Portfolio.

In tension with the intent of the e-Portfolio for learning, was the use of the e-Portfolio as an assessment tool. This juxtaposition influenced the degree to which students uploaded authentic reflections and negative feedback. The students described the content of their reflections as being limited by their concerns about the degree of privacy afforded their contributions. There is a strong likelihood that such concerns would have an impact on the authenticity of students’ goals, self-reflections, and engagement in the PDP assignment such that the quality of the learning experience had the potential to be compromised. A review of the literature revealed that fabrication of self-reflections is not a unique situation, and, in some cases, fabrication was associated with better grades than authentic reflection (Birden & Usherwood, 2013).

In spite of the fact that students might have edited some of their reflections, many students described keeping a personal portfolio with additional details. In keeping a
personal portfolio, students were engaging in self-reflection even if the true extent of their self-reflections was not uploaded to the e-Portfolio.

**Students’ engagement in SRL using the e-Portfolio**

When medical students described using their portfolios, their descriptions focused on achievement rather than on the learning process with the exception of one student who had previously used a portfolio for learning and assessment. The cyclic process of SRL includes: a “before (forethought) phase,” a “during (performance) phase,” and an “after (self-reflection) phase” (Zimmerman, 2002). Analysis of the “forethought phase” revealed that students described thinking or talking about goals but did not necessarily see value in writing them down. Those who discussed goal setting did not always describe it as an intentional process but rather as an afterthought when they uploaded materials to their e-Portfolio. With respect to the performance phase of SRL, students talked about reviewing notes and prior feedback but did not specifically discuss self-control and self-observation. Although students had significant experience with individual assignments on self-reflection, the “self-reflection phase” was not well described in the context of the e-Portfolio. Because these assignments were evaluated before they were uploaded into the e-Portfolio, few students reflected on their growth within a Role over time. In spite of not discussing longitudinal reflection, students did identify suboptimal work and were aware of the importance of uploading materials to demonstrate improvement. Students’ determination of improvement was based on self-assessment and a pass grade, not an articulated process.
Students’ descriptions of their learning processes contained some elements of the SRL cycle but they did not specifically describe a learning strategy that could be interpreted as congruent with any of the major phases of planning, execution, or self-evaluation. The exception was when students were required to create a Professional Development Plan. Because the assignment template outlined the phases of SRL, students were specifically prompted to complete a goal, plan, and outcome measure. Although many students were successful, even with a template, some students had difficulty with the task (personal experience, 2012). In spite of not overtly engaging in SRL, students discussed the concept of demonstrating that they had “fixed” a perceived weakness to solve a deficiency. These descriptions of moving directly from goal setting to achievement may have been due to an implicit approach to learning. “Shortcutting” is described in Boekaert’s (1995) adaptive learning model and in Winne’s (1995) non-linear approach to development of SRL skills and suggests that students use more than one approach to develop effective learning strategies. Alternatively, they might not have found value in using their e-Portfolio for SRL but might use SRL skills in other contexts.

The intent of the faculty goal to support students’ development of skills in SRL is academically sound because SRL skills correlate with academic and clinical success (Sanders & Cleary, 2011). Therefore, students’ lack of descriptions characteristic of the cyclic pattern of SRL is of concern. Because the students interviewed were in their second year they had not yet undertaken many clinical rotations. In a structured and familiar context, such as knowledge acquisition, students quite possibly have successful intrinsic learning strategies so do not need to explicitly engage in SRL. In contrast, the e-
Portfolio focuses on the intrinsic CanMEDS Roles, which are more behaviourally based than the Medical Expert Role.

Students who attribute their success to strategies are more likely to be highly motivated and ultimately successful than those who attribute their successes or failures to personal or external traits such as intelligence or luck (Saunders & Cleary, 2011). A personal understanding of his/her learning process and positive attribution is critical as the student enters the next “loop” of learning because students who are struggling and don’t adjust their approach are likely to encounter repeated difficulties. The e-Portfolio goal of having students overtly engage in SRL makes it more likely that a student will recognize and ascribe success or failure to the learning strategy. Therefore, the paucity of student descriptions of SRL as a learning tool needs to be addressed. The lack of explicit understanding of SRL is especially important if the e-Portfolio is to enhance learning for those who are struggling to meet curricular requirements.

Society values reflective practitioners who engage in lifelong learning (Mann, Gordon, & MacLeod, 2009). As a result, practicing physicians are required to provide annual evidence of Continuing Medical Education (CME) to maintain their qualifications. In Canada, evidence of CME includes a portfolio of self-reported activities. Given the reliance of the health care system on self-assessment for CME, educating students to engage in SRL is highly relevant. Because reflection and self-assessment are essential components of SRL, the inclusion of SRL skill development in a medical curriculum is essential. The question of how best to do this remains open.
Future Directions for the Undergraduate e-Portfolio

The e-Portfolio was intended to provide a meaningful foundation for students to scaffold their learning, but in practice they primarily viewed the portfolio as a repository and organizational tool. Students talked about the importance of increased autonomy with respect to their own learning but the majority did not follow up by self-selecting artifacts or reflecting on their learning plans. Students discussed that their motivation to use the e-Portfolio could be enhanced by a clear understanding of the intent of the portfolio for learning and mentorship. Limitations of the e-Portfolio included privacy concerns because the context of medical school includes interaction with teachers as future employers. Therefore, students are judicious about revealing negative observations or personal weaknesses in the e-Portfolio.

Dual use of an e-Portfolio for assessment and learning. Over the last 5 years, portfolio use has received increased attention in the medical education community, and has potential benefits particularly for the development of behaviourally-based skills such as the intrinsic CanMEDS Roles (Buckley et al., 2009). The goal to use an e-Portfolio for both formative (learning) and summative assessment was ambitious because these goals may work counter to each other. The provision of a safe learning environment that allows students to take risks and learn, requires students to reveal real or perceived deficiencies that they are working on improving. Using the same material for summative assessment risks authentic engagement in the learning process due to the high stakes of the outcome. Therefore, dual use of a portfolio requires careful planning to ensure that the assessment process does not negatively impact the learning purpose. The misalignment between the learning and assessment goals of the e-Portfolio, as identified
in this study, contributed to students’ difficulties in articulating the intent of the portfolio for learning. The extent of this misalignment was apparent when one student clearly stated that reflection and planning were not his/her perception of the purpose of the portfolio. Therefore, the intent of using a portfolio for both learning and assessment was not realized to its potential. One approach to using a portfolio for the dual purpose of learning and assessment was reported in a post-graduate setting in which the trainees’ portfolios were divided into working and performance sections. By separating the sections, the program addressed the residents’ need for control over who viewed their working portfolio and promoted honest self-assessment by highlighting the difference between areas that need improvement and areas of achievement. The approach of separating the two components was resource intensive and required a careful introduction of the goals of each aspect of the portfolio and how they fit together to both students and faculty (Pinsky & Fryer-Edwards, 2004). To further support a dual purpose, the expectations and limitations of the e-Portfolio for both learning and assessment need to be transparent to students and faculty.

In order to improve the e-Portfolio to support learning, students could use their portfolios to illustrate to a faculty mentor or advisor how they used skills in SRL to support their development of competence in the intrinsic CanMEDS Roles over time. This explicit approach to developing SRL skills is supported by Entwistle (2000). He argues that to increase their metacognitive abilities students need to possess and be aware of three kinds of knowledge: declarative, procedural, and conditional. The notion of three kinds of knowledge applies to learning strategies as well as course content. For example, students need the declarative knowledge to know that not all learning tasks are
the same, the procedural knowledge to apply different strategies to different tasks, and the conditional knowledge to know when each strategy is appropriate.

Alignment of learning with an assessment practice, which rewards personal development of SRL, is consistent with literature correlating a deep approach with high academic achievement (Entwistle, 2000). Thus, the expectation that students would develop skills in SRL without instruction and assessment of the learning process was not realized for the majority of students. The addition of an assessment component focused on the learning process has the benefit of promoting students’ personal development as was discussed by the one student who had a prior experience of evaluation using a portfolio.

Methods to support assessment for learning include written scaffolding of learning similar to the PDP, discussion with students based on this scaffolding, and examination of artifacts. Over time, self-selection of artifacts could increase compared to faculty-directed artifacts increasing student autonomy to support internal motivation. Care would be required to ensure the required artifacts are manageable and relevant, and reflect depth in addition to breadth of experience. Students’ concerns about time, privacy, grammar, and reputation would need to be addressed to ensure these issues did not compromise their learning experience. The concern about time is consistent with limitations described by other authors (Buckley et al., 2010).

Training in SRL and time to devote to each student are challenges faced by faculty. These two conditions have been highlighted as important for the ultimate success of a portfolio both in this study and others (Driessen et al., 2005). Medical students, among others, have difficulties with self-assessment (Blanch-Hartigan, 2011). Therefore,
in addition to student self-report, a secondary method to assess achievement of the CanMEDS Roles would be optimal to provide students with an external benchmark and to ensure they are meeting the required performance standards.

In the context of limited faculty resources, peer feedback, group feedback, and e-mail feedback might provide some of the necessary secondary support for effective use of the e-Portfolio for learning. In addition, replacement of some of the current evaluations with evaluations based on evidence from the students’ e-Portfolio is a potential solution. It is important that these solutions do not replace the personal interaction of faculty with students to ensure an understanding of progress in the students’ learning. The importance of personal interaction is especially true given that very similar appearing portfolios have been associated with different student motivations (Deketelaere et al., 2007). To promote the e-Portfolio as a tool to move towards intrinsic motivation in students’ learning it is likely they require a far more in-depth understanding of the purpose, processes, and expectations of the portfolio. Increased investment in mentorship and a more focused approach to assessing SRL would help the students appreciate that faculty value the learning process as well as achievement.

**Recommendations for improvement of the e-Portfolio.** The e-Portfolio has the potential to be used by students and faculty for multiple purposes. Students can use the portfolio for learning and to display their achievements. The institution can use it to meet the goals of both formative and summative assessment. To ensure that the needs of both students and faculty are realized, institutional goals need to be made explicit to both students and faculty. Formal sessions and ongoing updates would ensure alignment of students and faculty perceptions over time. The e-Portfolio could be divided into a private
section with limited access for formative assessment. Regular meetings with a trained advisor or mentor, during which students demonstrate their learning based on materials from their portfolio, has the potential to support students development of SRL skills over time. Self-selection of materials to illustrate examples of performance and growth within each competency could increase as students became more experienced with the use of the e-Portfolio. The increase in autonomy, competence and support of a mentor should promote a shift towards internal motivation. To address the need for summative assessment, students could pick examples of their work to illustrate their growth in each competency, consistent with a performance portfolio. The approach of maintaining privacy with respect to formative assessment would address authenticity limitations. The allocation of time to maintain the portfolio, faculty mentors, explicit expectations, and formative assessment confirms the value placed on the process of learning as well as achievement. Other possibilities include provision of near peer mentors to review portfolio materials. Because improved academic and clinical achievement is associated with SRL, further institutional investment in using the e-Portfolio would add value to the curriculum. The decrease in scaffolding of the e-Portfolio over time should help to prepare physicians to engage in SRL as required for independent practice.

**Conclusions**

Self-regulated learning is a cyclic process based on social cognitive theory, and the use of SRL is correlated with academic and clinical success in medical students. The students interviewed did not view the e-Portfolio as a learning tool, but they did value it as a repository and organizational tool. Although students did not specifically discuss the use of SRL, they did discuss some components of their learning process including
identification of personal weaknesses, setting goals to improve, and evidence of that improvement. The development of SRL skills is particularly relevant as students enter new contexts and undertake more complex tasks. To support student learning, explicit use of SRL provides a framework to improve suboptimal outcomes and for faculty to coach students.

The findings in this study are consistent with improved success with portfolio use in other contexts. Factors contributing to success included a proper introduction and mentoring, integration with context, provision of clear guidelines that allow some flexibility, ease of use including limited time demands for students and mentors, and strong leadership and faculty support (Buckley et al., 2009, Driessen et al., 2005).

Given the accessibility of information in an electronic society, medical educators need to promote the learning processes required for effective knowledge acquisition. The data from this research should help to improve portfolio design to further support the use of an e-Portfolio to develop medical students’ SRL skills. A solid underpinning in SRL has the potential to provide the foundation for students to become reflective practitioners engaged in lifelong learning.
References


Class of 2015

Professional

Use this space to store documents related to the professional role.

For more information about the professional role please click [here](#).

- **Physicianship Reflection 1**
  
  Please upload a marked copy of your first physicianship reflection.

- **Physicianship Reflection 2**
  
  Your second physicianship reflection will be uploaded here. You do not need to upload your reflection but please feel free to comment on it, or on the feedback you received.

- **Ethics - Small Group Oral Presentation**
  
  Updated December 7: In this space please upload whatever you have available that best represents your presentation. This could include your group's powerpoint slides, a written outline of your presentation, research notes, etc. Apologies for any confusion regarding this entry in the portfolio.

- **Law Assignment 1 Battery**
  
  Once you have received your marked assignment back please scan it and upload it here. You should include the rubric you received with the assignment. Please note: you can only upload one file so please make sure both the assignment and rubric are in the file you upload.

- **Law Assignment 2 Negligence**
  
  Once you have received your marked assignment back please scan it and upload it here. You should include the rubric you received with the assignment. Please note: you can only upload one file so please make sure both the assignment and rubric are in the file you upload.

- **Ethics - Small Group Oral Presentation Feedback**
Posted December 7: xxxx has received confirmation that feedback regarding your ethics oral presentations should be sent to you no later than this week. Please post that feedback here.

- **Palliative Care/Geriatrics Home Visit Critical Reflection**

  Please scan and upload a copy of your marked critical reflection here.

- **Palliative Care/Geriatrics Home Visit Checklist**

  Please post a copy of your checklist here.

- **Term 2 Ethics Assignment**

  Please upload a copy of your marked ethics assignment here.

- **Observership Reflection - Professional Role**

  Please copy and paste your observership reflection here.

- **Law Assignment Term 4**

  Please upload a copy of your marked Law Assignment (repro. case).

  UPDATE April 25: The due date for this has been moved to May 31, 2013 as not all students have received their assignments back. Thank you.

**Scholar**

Use this space to store documents related to the scholar role.

For more information about the scholar role please click here.

- **Professional Development Plan Term 1**

  Please upload your Professional Development Plan here.

  **Update January 6**

  From xxxx: Some of the instructions may have been confusing. Ideally we would like you to focus on 3 learning goals to work toward attaining your professional goals. These should be as real and meaningful as you can make them. Relate the learning goals to as many of the roles/competencies as you can. Some may only be related to one goal, but others may take in a few. I think that this will be more relevant for you than to create goals starting with competencies. However, if you have done it this other way, please don't worry or change things. When you meet with your advisor, we'll ask you to focus on the goals that have the most meaning for you.
• Heroes and Villains Essay

Please scan and upload the marked copy of your Heroes and Villains essay.

• Evidence Search and Rescue Assignment

Once you have received your completed assignment back from Dr. xxxx please scan it and upload it here.

• Normal Human Structure Essay

Please upload a copy of your Normal Human Structure essay here.

• Professional Development Plan Term 2

Please upload a copy of your term 2 Professional Development Plan here.

• Drug Literature Evaluation Library Report

Please scan and upload a copy of your marked DLE Library Report here.

• Microbiology Essay (MOD)

Please upload a copy of your marked MOD essay here.

• Critical Appraisal (Peds. and Dev. Human)

Please upload a copy of your marked critical appraisal exercise from Pediatrics and the Developing Human.

• Critical Appraisal (MSK)

Please upload a copy of your marked critical appraisal exercise from MSK.

• Critical Appraisal (Blood and Coagulation)

Please upload a copy of your marked critical appraisal exercise from Blood and Coagulation.

• Critical Appraisal Circ. and Resp. 1 (Atrial Fib.)

Please upload a copy of your critical appraisal.

• Critical Appraisal Circ. and Resp. 3 (COPD)
Please upload a copy of your critical appraisal.

- **Critical Appraisal Endo. and Renal**
  
  Please upload a copy of your critical appraisal.
  
  Update Dec. 4, 2012: Dr. xxxx is confirming with Dr. xxxxxx what you need to post for this. The due date to the portfolio has been moved to January.

- **Observership Reflection - Scholar Role**
  
  Please copy and paste your observership reflection here.

- **Critical Appraisal GU Oncology**
  
  Please upload a copy of your GU Oncology Critical Appraisal.
  
  UPDATE: The due date for this has been pushed back to May 31, 2013 as it has not yet been returned to you. Thank you.

**Collaborator**

Use this space to store documents related to the collaborator role.

For more information about the collaborator role please click [here](#).

- **Interprofessional Session Reflection (PC 1)**
  
  Your interprofessional reflection will be uploaded for you. Do not be concerned if your reflection has not been posted by January 16, 2012. The reflection will be uploaded for you as soon as it becomes available from Dr. xxxxxx.

- **FSGL Final Assessments (Term 2)**
  
  UPDATE May 13, 2012: You are no longer required to upload copies of your FSGL assessments due to problems retrieving the online assessment forms. Sorry for the confusion.

- **Nursing Observership Reflection**
  
  Please copy and paste your nursing observership reflection in the space below.

- **FSGL Assessments Term 3**
  
  Please upload a copy of your self and tutor assessments from FSGL.
• FSGL Assessments Term 4

Please upload a copy of your FSGL Assessment from Term 4. If you are unable to access your FSGL Feedback on MEdTech please email xxxxx@xxxxx.

• Observership Reflection - Collaborator Role

Please copy and paste your observership reflection here.

**Communicator**

Use this space to store documents related to the communicator role.

For more information about the communicator role please click here.

• Mid-Term Self and Tutor Assessment (CCS Term 1)

Please upload a copy of your term 1 mid-term self and tutor assessment here.

• Final Self and Tutor Assessment (Term 1)

Please upload a copy of your Clinical and Communication Skills 1 final self and tutor assessment.

• Ongoing Multisource Feedback (Term 1)

Posted December 7: Please select pieces of feedback you have received in term 1 regarding **2 or 3 areas or types of communication skills** from a selection of peers, tutors, residents, and patients (where applicable) and briefly describe how the feedback illustrates your strengths and, or weaknesses in the communicator role and what you plan to do to address or maintain your skill.

• Communication Skills Journal (Term 1)

**Updated December 7**: Please upload your 4 journal entries from term 1. By **April 2012** you are asked to review your journal entries and briefly comment on **one aspect of one entry**, looking back over time. You can use the comment feature of the portfolio for this. You might comment on an area where you have improved, a question you had which has now been answered, how your viewpoint has changed, etc.

• Final Self and Tutor Assessment (Term 2)

Please upload a copy of your Clinical and Communication Skills 1B final self and tutor assessment.
• **Mid-Term Self and Tutor Assessment (Term 2)**

Please upload a copy of your Clinical and Communication Skills 1B midterm self and tutor assessment.

• **Ongoing Multisource Feedback (Term 2)**

Please select pieces of feedback you have received in term 2 regarding 2 or 3 areas or types of communication skills from a selection of peers, tutors, residents, and patients (where applicable) and briefly describe how the feedback illustrates your strengths and, or weaknesses in the communicator role and what you plan to do to address or maintain your skill.

• **Midterm Assessments Clinical and Communication Skills 2 (Term 3)**

Please upload a copy of your term 3 midterm clinical skills assessments.

• **Final Assessments Clinical and Communication Skills 2 (Term 3)**

Please upload a copy of your term 3 final clinical skills assessments.

• **CCS Midterm Assessments Term 4**

Please upload a copy of your Term 4 Midterm Assessments.

• **CCS Final Assessments Term 4**

Please upload your final CCS Assessments from Term 4.

• **Observership Reflection - Communicator Role**

Please copy and paste your observership reflection here.

**Manager**

Use this space to store documents related to the manager role.

For more information about the manager role please click [here](#).

• **Manager Checklist Community Week**

Please scan and upload a copy of your Community Week Manager Checklist.
• Observership Reflection - Manager Role

Please copy and paste your observership reflection here.

**Advocate**

Use this space to store documents related to the advocate role.

For more information about the advocate role please click here.

• Culture Reflection (PF 1)

Your culture reflection will be uploaded for you. You do not need to upload your PC 1 Culture Reflection.

• Culture Reflection Rubric

Please scan and upload a marked copy of the rubric used to assess your Culture Reflection.

• Advocacy Online Module

Dr. xxxxx has asked that you upload a copy of the pdf of answers produced through completion of the Advocacy Module. You can access the module here: [http://collaborativecurriculum.ca/en/modules/CanMEDS-advocate/](http://collaborativecurriculum.ca/en/modules/CanMEDS-advocate/)

Please upload this by Feb. 10; ignore the listed date - there is a problem with the automated due date at the moment.

• Community Based Project

Please scan and upload your CBP rubric.

• Community Based Projects Narrative

Please upload a copy of your narrative with comments from faculty.

• Nutrition Project

Please upload a copy of your pamphlet here.

• Advocate Checklist Community Week

Please upload a copy of your Community Week Advocate Checklist.

• Observership Reflection - Advocate Role
Please copy and paste your observership reflection here.

**Medical Expert**

Use this space to store documents related to the medical expert role.

- **No artifacts in this folder**

**Multiple Roles**

Use this space to upload documents that touch on multiple CanMEDS roles.

- **First Patient Report (Winter 2012)**

  Updated May 9, 2012: It has been noted that your first reports have not yet been returned to you. As such, please upload a copy of what you handed in - you do not need to upload a scanned copy of your marked report.

- **First Patient Program Report 2**

  Please scan and upload a copy of your second First Patient Report. The report should include your supervising physician's signature.

- **First Patient Program Report 3**

  Please scan and upload a copy of your third First Patient Report. It should be signed by your supervising physician.

  **Update Dec. 5:** I have heard from xxxxx that several students will not be able to submit the third report on time due to difficulty scheduling their final visits. If this is the case for you, please email arush@queensu.ca so that this piece of your portfolio is not marked as incomplete. Thank you.

**Year 2 Portfolio Assignment**

Use this space to store your Year 2 Portfolio Assignment. You can find instructions for the Year 2 Portfolio Assignment on MEdTech in the ePortfolio Community or on the PF 3B Course Page.

- **Year 2 Portfolio Assignment**

  Please use the text box to write or copy and paste your portfolio assignment. Detailed instructions, including the assignment rubric, can be found at [https://meds.queensu.ca/central/community/portfolio](https://meds.queensu.ca/central/community/portfolio)

**Clerkship Portfolio Assignment**
Use this space to upload your clerkship portfolio assignment during the C2 block.

No artifacts in this folder
Physicianship Reflection 1 Nov 19, 2012 Edit Permissions
Mark as Reviewed  Mark as Flagged
Nov 19, 2012 1:48:15 PM Sheila Pinchin has unflagged this entry.
Reflection on the "Being a Medical Student" session: Why being a professional is about "thou shalt" and not just "thou shalt nots"

Add a comment ...

Observership Reflection – Professional Role – Edit
Due: May 31, 2013
Submitted: May 31, 2013

Law Assignment Term 4 – Edit
Due: May 31, 2013
Submitted: May 31, 2013

Palliative Care Home Visit Reflection – Edit
Due: May 31, 2013
Submitted: May 31, 2013

RLS Certificate – Edit
Due: Apr 24, 2013
Submitted: Apr 24, 2013

Physicianship Reflection 1 – Edit
Due: Nov 19, 2012
Submitted: Nov 19, 2012

Ethics – Small Group Oral Presentation
Due: Jan 14, 2012
Submitted: Jan 14, 2012

Palliative Care/Caregivers Home Visit Critical Reflection – Edit
Due: May 15, 2012
Submitted: May 15, 2012

Term 2 Ethics Assignment – Edit
Due: Jun 8, 2012
Submitted: Jun 8, 2012

For more information about the professional role please click here.
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<tr>
<th>My Artifacts</th>
<th>Due</th>
<th>Submitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observership Reflection – Advocate Role</td>
<td>May 31, 2013</td>
<td>May 17, 2012</td>
</tr>
<tr>
<td>Culture Reflection (PF 1) – Edit</td>
<td>Jan 16, 2012</td>
<td>May 15, 2012</td>
</tr>
<tr>
<td>WHS – Edit</td>
<td>May 18, 2012</td>
<td>May 16, 2012</td>
</tr>
<tr>
<td>Community Based Project – Edit</td>
<td>May 18, 2012</td>
<td>May 16, 2012</td>
</tr>
<tr>
<td>Community Based Projects Narrative – Edit</td>
<td>May 16, 2012</td>
<td>May 15, 2012</td>
</tr>
</tbody>
</table>

Use this space to store documents related to the advocate role.

For more information about the advocate role please click [here](#).
APPENDIX B - Professional Development Plan

Personal Learning Plan for Term 1: Specific Goals and Projects

<table>
<thead>
<tr>
<th>Prompting Incident or Event</th>
<th>Learning Objectives and Competency</th>
<th>Strategies and Resources</th>
<th>Evidence</th>
<th>Evidence and Criteria for Review/Assessment</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>anatomy—failed the first RAT</td>
<td>everything? Spoke to Dr. R. who said I needed to do a basic review of anatomy Try not to feel overwhelmed MEDICAL EXPERT—SCIENCE PROFESSIONAL?</td>
<td>Dr. R. suggested: Anatomy TV (librarians) Anatomy tutorial (he’s doing one in 2 weeks) Coaching by an anatomy student if possible Consult Dr. M. before this gets worse</td>
<td>Pass my RATs Coaching by xx, a classmate who is helping a few of us Attend tutorial Meet with Dr. M.</td>
<td>Identify crucial body systems on RATs, mid-term Manage time and panic</td>
<td>by mid-term</td>
</tr>
</tbody>
</table>

SMART goals:
Specific (straightforward, not ambiguous)
Measurable (It is clear under which conditions the goals are achieved)
Acceptable (The goals should be acceptable to all stakeholders)
Realistic (The learner should be able to achieve the goals)
Time-bound (It should be clear when the goal is to be achieved)
<table>
<thead>
<tr>
<th>Prompting Incident or Event</th>
<th>Learning Objectives and Competency</th>
<th>Strategies and Resources</th>
<th>Evidence</th>
<th>Criteria for Review/Assessment</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. W. taught about diabetes in NHF—my mom was just diagnosed with type 2</td>
<td>Learn more about diabetes esp. type 2 How to manage it MEDICAL EXPERT SCHOLAR: LIFELONG LEARNING</td>
<td>articles (not Wikipedia—see CARL) Interview someone in diabetes clinic—observership—IP—nutritionists?</td>
<td>Annotated articles Diet plan for my mom? Observership reflection</td>
<td>Identify causes, presentations and management of type 2 diabetes</td>
<td>By end of term 1</td>
</tr>
</tbody>
</table>

Signature of Learner: ___________________________  
Signature of Advisor/Mentor: ___________________________
### APPENDIX C – Likert Scales Version 1

**Likert scale version 1 January 24, 2013**

<table>
<thead>
<tr>
<th>Portfolio use scale question</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I understand why I have been asked to keep a portfolio.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. I understand why the portfolio is designed as it is.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. The learning expectations are meaningful for me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. I can see value in uploading artifacts to my portfolio.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. The portfolio assignment (Learning Plan) was useful to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. I engage in learning tasks without relying on conventional external pressures to do so (e.g., attendance checks, assignments, grades).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. The items I need to include in my portfolio are meaningful.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. I find ways of making learning expectations meaningful for me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. I have added extra material to my portfolio than what was required</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Uploading negative comments or feedback will affect supervisor’s perception of me. *</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. I have sufficient input into what is uploaded to the portfolio.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. Using my portfolio is time well spent to optimize my opportunity to learn.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. Documenting my activities has helped me to learn about the different roles of a physician</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
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<td>---</td>
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<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>14. Documenting activities in my portfolio has helped me to see more clearly my strengths and weaknesses.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. I am willing to approach those who have skills and insights that can inform my learning</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>16. Faculty mentors’ comments about my portfolio were helpful to me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>17. Using a portfolio is relevant to becoming a physician.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18. The portfolio is useful.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>19. The portfolio should be in a different form.*</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20. The portfolio is easy to use.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

*reverse coded
APPENDIX D – Ethics Clearance

PAED-319-13 Medical Students’ Experiences using an e-Portfolio for Self-Regulated Learning File # 6007657
APPENDIX E – Consent Form and E-mail to Students

Title of Study: Medical Students’ Experiences using an e-Portfolio for Self-Regulated Learning

Principal Investigator: Dr. Jennifer J. MacKenzie
Department of Pediatrics

Purpose
The purpose of this study is to gain a deeper understanding of students’ experiences using the UGME e-portfolio. We hope to obtain insight into which aspects of the portfolio, if any, are most useful in promoting higher learning. The study will also be used to validate a scale to determine how students use their portfolios. The long term goal is to improve the use of the e-portfolio in UGME. This study has been reviewed for ethical compliance by the xxxx University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board. Your participation is voluntary.

Study requirements
If you decide to participate, you will need to attend one interview of of approximately 60 minutes in length. This interview will be conducted by xxxxx, Manager of Educational Development for UGME. The interview will take place at a time convenient for you in January or February, 2013. The interview will be audiotaped. In some cases, participants may be contacted to ensure that their contribution has been accurately recorded.

Confidentiality
All information obtained during the course of this interview is confidential and your anonymity will be protected at all times by the interviewer. You will not be identified in any publication or reports. All data collected will remain in a locked office with a password-protected computer. Interviews will be transcribed and identifying information will be removed by the interviewer prior to the analysis by the research team. Please note that we may quote participants’ words directly in presentations and publications related to this study, provided you consent to this on the following page.

Risks
There are no foreseeable risks to participating in this study.

Benefits
While you may not benefit directly from this study, your participation may help future generations of medical students.

Study contacts
This research is being conducted by Dr. Jennifer MacKenzie MD, FCCMG, FAAP, FRCPC (Pediatrics, Medical Genetics). Dr. MacKenzie is a physician who is studying the use of portfolios for learning in medical education as part of a Masters in Education thesis supervised by Dr. Lyn Shulha and Dr. John Freeman in the Faculty of Education,
Queen’s University. The educational developer for UGME, xxxxx, and the Associate Dean of UGME, xxxxx are participating in this study.

Your signature below acknowledges that you have volunteered to participate in this interview conducted by xxxxx of the Office of Undergraduate Medical Education, as part of this research. Prior to providing consent please read the following statements regarding your participation in the study.

- This study focuses on student learning in and the design and function of the UGME e-Portfolio
- Involvement in this research will require participating in one, one-on-one private interview.
- The interview will be tape recorded.
- Your identity will not be known outside of the interview and will be removed from the transcripts of the interview.
- This study will not involve any greater risks than those ordinarily occurring in daily life. It is not possible to identify all potential risks in any procedure, but that all reasonable safeguards have been taken to minimize potential risks.
- The results of this study will be shared with members of the Faculty of Health Sciences potentially, in a publication across xxxx University or beyond, through an article or poster submitted to journals or to conferences. You will not be identified by name, and the results will be published, as from a body of students in undergraduate medicine.
- Quotes are sometimes used to illustrate important points. The source of the quotes is not identified. Quotes will only be used if consent is provided.
- The purposes and the procedure of the study have been satisfactorily explained.
- I have read and kept a copy of the consent form.

We value the opinions of our students and employ student feedback in all curricular innovation. Your participation in this interview is voluntary. You may choose to not participate. You can withdraw at any time. Your decision to participate or withdraw from this study will not affect your educational program or assessment as a student in any way.

If you have questions or concerns about this study you may contact Dr. Jennifer MacKenzie, the Principal Investigator, whose contact information is given at the top of this page. You may also contact the Head of the Department of Pediatrics, xxxxx, at 613-548-6046; the Chair of the xxxx University Health Sciences Research Ethics Board, xxxxx, at 613-533-6081 (email: clarkaf@queensu.ca).

By signing this consent form, you are indicating that you fully understand the above information and agree to participate in this study.

Name (please print): ________________________________________________________________

Signature: ___________________________ Date: ____________________________
Telephone: ____________________________  Email: ____________________________

With regards to being quoted in presentations or publications related to this study, please initial next to any of the following statements that you agree with:

<table>
<thead>
<tr>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>I agree to be quoted directly if my name is not published (I remain anonymous).</td>
</tr>
<tr>
<td>I agree to be quoted directly if a made-up name (pseudonym) is used.</td>
</tr>
<tr>
<td>I agree that the researchers may publish documents that contain quotations by me.</td>
</tr>
</tbody>
</table>

I, have carefully explained to the subject the nature of the above research study. I certify that, to the best of my knowledge, the subject understands clearly the nature of the study and demands, benefits, and risks involved to participants in this study.

________________________________________________________
Name of person obtaining consent

________________________________________  ____________
Signature                                Date
E–mail to Students

January 3, 2013

Dear students of the Medicine class of 2015:

We are looking for volunteers for interviews to evaluate the e-Portfolio used in Undergraduate Medical Education (UGME).

We are seeking up to 15 volunteers from the class who will give us feedback in one-on-one interviews using a set of questions matched with your rating on a scale of 1 to 5.

Ideally, the interviews will take place during the last 2 weeks of January and first 2 weeks of February. Refreshments will be provided.

xxxx, Manager of Educational Development in UGME, will conduct the interviews. Your identity will not be revealed outside of the interview, and confidentiality will be preserved. (An information/consent form is provided.)

If you are interested in volunteering for interviews in order to give us feedback about the e-portfolio, please email xxxx xxxx at xxxx@xxxx.

We will select the first 15 students who volunteer.

Thank you for your help in evaluating the e-Portfolio.

Sincerely,

Ms. xxxx
Manager of Educational Development, UGME, xxxx University

Dr. Jennifer MacKenzie
Associate Professor, xxxx University

Dr. xxxx
Associate Dean, UGME, xxxx University
APPENDIX F – Interview Guide

xxxxx School of Medicine has introduced an e-Portfolio. Portfolios have been used in different areas of education for different purposes. The focus of this interview is to understand how students at xxxxx use their e-Portfolio. This will help to provide feedback about areas that are working well and areas that require additional work.

1. Forethought Phase
2. Performance Phase
3. Self-reflection Phase

<table>
<thead>
<tr>
<th>Faculty Perspective</th>
<th>Student Interview Question</th>
<th>Portfolio use scale question</th>
<th>Location in SRL cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the purpose of the portfolio? <em>(to facilitate SRL, to document CanMEDS competencies)</em></td>
<td>What is your perception about why you have been asked to keep a portfolio?</td>
<td>1. I understand why I have been asked to keep a portfolio.</td>
<td>Goals (1)</td>
</tr>
<tr>
<td>What design will facilitate evidence of the CanMEDS competencies? <em>(uploading evidence in different competencies)</em></td>
<td>Tell me how the portfolio is designed. What is the most useful part of the portfolio?</td>
<td>2. I understand why the portfolio is designed as it is.</td>
<td>Goals (1)</td>
</tr>
<tr>
<td>What is the learning goal of the portfolio? <em>(SRL, CanMEDS)</em></td>
<td>Does using the portfolio fit with your learning needs?</td>
<td>3. The learning expectations are meaningful for me.</td>
<td>Goals (1), Performance (2), Self-assessment (3)</td>
</tr>
<tr>
<td>How do we document students’ activities in the CanMEDS roles? <em>(upload artifacts for review)</em></td>
<td>How do you manage the documentation that is required for the portfolio?</td>
<td>4. I can see value in uploading artifacts to my portfolio.</td>
<td>Performance (2), Self-assessment (3)</td>
</tr>
<tr>
<td>How do you engage students in an SRL process? <em>(Professional Learning Plan assignment)</em></td>
<td>Tell me about your experience with the Professional Learning Plan assignment.</td>
<td>5. The portfolio assignment (Learning Plan) was useful to me.</td>
<td>Goals (1), Self-reflection (3)</td>
</tr>
<tr>
<td>Students are motivated to complete their learning portfolios.</td>
<td>When you are completing your tasks for the portfolio, what approach(es) do you use? What helps you focus on completing tasks for your portfolio?</td>
<td>6. I engage in learning tasks without relying on conventional external pressures to do so (e.g., attendance checks, assignments, grades).</td>
<td>Performance (2)</td>
</tr>
<tr>
<td>The inclusion of artifacts reflecting each of the CanMEDS goals is important.</td>
<td>How are the items you are required to include relevant to you? How are they not?</td>
<td>7. The items I need to include in my portfolio are meaningful.</td>
<td>Task engagement, Performance (2), Self-reflection (3)</td>
</tr>
<tr>
<td>Students will engage in SRL.</td>
<td>Have portfolios been of use to you in your learning in the past? Is this a tool that helps you learn?</td>
<td>8. I find ways of making learning expectations meaningful for me.</td>
<td>Goals, Engagement with learning task, Performance (1,2)</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Students will add additional relevant material at their discretion.</td>
<td>What could you add to your portfolio in addition to the material required?</td>
<td>9. I have added extra material to my portfolio than what was required.</td>
<td>Engagement with learning, Performance, Self-assessment (2,3)</td>
</tr>
<tr>
<td>Students will upload authentic material.</td>
<td>Who gives feedback on your portfolio? How does access by faculty have the potential to influence what you include in your portfolio?</td>
<td>10. Uploading negative comments or feedback will affect supervisor’s perception of me.</td>
<td>Engagement, Performance (2)</td>
</tr>
<tr>
<td>The criteria laid out for the students will ensure that the artifacts support the development of each of the CanMEDS competencies.</td>
<td>The current portfolio has required documents that need to be uploaded. There may be materials that students think are important to add to their portfolios. Can you describe whether the portfolio is flexible enough to meet your learning needs? To meet your learning needs, what do you think the</td>
<td>11. I have sufficient input into what is uploaded to the portfolio.</td>
<td>Engagement, Performance (2)</td>
</tr>
<tr>
<td>Students should be spending time uploading material and engaging in SRL.</td>
<td>Being a medical student there are many pressures on your time. What priority is the portfolio when managing your time? Are there ways to improve the time it takes to work on your portfolio?</td>
<td>12. Using my portfolio is time well spent to optimize my opportunity to learn.</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>An important goal of the portfolio is to support the development of the CanMEDS roles.</td>
<td>What have you learned about being a physician and about yourself from keeping your portfolio?</td>
<td>13. Documenting my activities has helped me to learn about the different roles of a physician.</td>
<td></td>
</tr>
<tr>
<td>Students will develop SRL skills by using their portfolio.</td>
<td>14. Documenting activities in my portfolio has helped me to see more clearly my strengths and weaknesses.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students will use external sources to help develop their portfolio.</td>
<td>Could you describe any resources/people that you would discuss your portfolio contents with?</td>
<td>15. I am willing to approach those who have skills and insights that can inform my learning.</td>
<td></td>
</tr>
<tr>
<td>Review of the portfolio by a faculty mentor will provide students with valuable feedback.</td>
<td>What is your perspective on the quality of the feedback you</td>
<td>16. Faculty mentors’ comments about my portfolio were helpful to me.</td>
<td></td>
</tr>
</tbody>
</table>
What skills do physicians need to develop in order to engage in ongoing professional education?

One of the areas we are teaching is called Self-Regulated Learning. This involves …
To what extent do you think about how you learn? Can you describe this?

How do you use the portfolio to help with your learning process?

Are there any areas that we have not covered that will be helpful?
APPENDIX G – Likert Scale Results
<table>
<thead>
<tr>
<th>Portfolio use scale question</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. S. 1-14 I understand why I have been asked to keep a portfolio.

![Question 1](image1.png)

2. S. 1-3 I understand why the portfolio is designed as it is.
   S. 4-11, 13, 14 I understand why the portfolio is organized as it is.

![Question 2](image2.png)
3. S. 1-3 The learning expectations are meaningful for me.
S. 4-11, 13, 14 The learning objectives of the portfolio are meaningful to me.

4. S. 1-11, 13, 14 I can see value in collecting and uploading artifacts to my portfolio.
5. S. 1-11, 13, 14 The portfolio assignment (Learning Plan) was useful to me.

6. S. 1-3 I engage in learning tasks without relying on conventional external pressures to do so (e.g. attendance checks, assignments, grades).
S. 4-11 In the portfolio, I engage in learning tasks without relying on conventional external pressures to do so (e.g. attendance checks, assignments, grades).
S. 12-14 I require a deadline, monitoring, or grading to keep me on task with the portfolio.
7. S. 1-14 The items I need to include in my portfolio are meaningful.

8. S. 1,2, 4-14 I customize the portfolio to meet my own learning/career goals.
9. S. 1-14 I have added more material to my portfolio than what was required.

10. S. 1, 3 Uploading negative comments or feedback will affect supervisor’s perception of me.
   S. 5-14 Uploading negative comments or feedback from faculty/peers will affect faculty perception of me. *
11. S. 1-11 I have sufficient input into what is uploaded to the portfolio. S. 12-14 I have sufficient input into what is required material uploaded to the current portfolio.

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Question 11**

12. S. 1-3 Using my portfolio is time well spent to optimize my opportunity to learn. S. 4-12 The portfolio is a top priority on which to spend my time in learning.

<table>
<thead>
<tr>
<th>Responses</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

**Question 12**
13. S. 1-3 Documenting my activities has helped me to learn about the different roles of a physician. S. 4-12, 14 Documenting my activities in the portfolio has helped me to learn about the different roles of a physician.

14. S. 1-14 Documenting activities in my portfolio has helped me to see more clearly my strengths and weaknesses.
15. S. 1-3 I am willing to approach those who have skills and insights that can inform my learning.
S. 4-14 To learn more about the roles of a physician, I am willing to approach those faculty/peers who have skills and insights that can inform my learning.

16. S. 1-14 Faculty mentors’ comments about my portfolio are helpful to me.
17. S. 1-11 Using a portfolio is relevant to becoming a physician.  
S. 12,14 Using any portfolio is relevant to becoming a physician.  

<table>
<thead>
<tr>
<th>Question 17</th>
<th>1</th>
<th>2</th>
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<th>4</th>
<th>5</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>S. 1-11</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>8</td>
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<td>S. 12,14</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>2</td>
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</tbody>
</table>

18. S. 1-11 The portfolio is useful.  
S. 12,14 This portfolio (xxxxx UGME) is useful.  

<table>
<thead>
<tr>
<th>Question 18</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>S. 1-11</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>S. 12,14</td>
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<td>2</td>
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<td>4</td>
<td>5</td>
<td>6</td>
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</tbody>
</table>
19. S. 1-3 The portfolio should be in a different form. S. 4-12,14 The portfolio should be changed.*

20. S. 1-3 The portfolio is easy to use. S. 4-11, 14 The portfolio is easy to use. (eg. e-features) S. 12 The portfolio is technically easy to use. (e.g. e-features)