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The *One2One* Structured Oral Examination is a Valuable and Positively Rated Science Education Tool that Drives Academic Success

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Abstract

Structured oral examinations (SOEs) result in higher test scores than traditional written assessments, but there lacks reproducible quantitative evidence supporting knowledge acquisition and retention. A modified SOE—called the One2One—whereby students present prepared answers to an instructor was evaluated for effectiveness in large classes despite its resource-intensive nature. This study used a post-assessment survey (Efficacy Assessment Survey, EAS) to measure the effect of the One2One on knowledge acquisition and retention, as well as student perceptions of its usefulness and perceived value. The One2One helped students learn and retain content better than by didactic lecture alone as demonstrated by significantly higher scores on One2One content as compared to control content ($p<0.05$) on the EAS (t-test) and this knowledge was retained until the end of the semester as measured by regression analysis. A previously identified drawback of SOEs is student-reported anxiety, however students' perception of the SOEs' usefulness and value are understudied. Here, thematic analysis of student feedback identified the One2One as being useful, a driver of learning, and of high professional value, albeit stressful. Though more resource intensive than traditional assessment methods, the One2One is a positively rated, authentic evaluation tool that motivates student learning.

Les examens oraux structurés permettent d'obtenir des résultats plus élevés que les évaluations écrites traditionnelles, toutefois il n'y a pas de preuves quantitatives reproductibles qui soutiennent l'acquisition et la rétention. Un examen oral structuré modifié individuel – appelé le One2One – où les étudiants et les étudiantes présentent des réponses préparées à un instructeur ou une instructrice, a été évalué pour son efficacité dans de grandes classes malgré son caractère intensif en ressources. Cette étude a utilisé un sondage post-évaluation (Efficacity Assessment Survey, EAS) pour mesurer les effets du One2One sur l'acquisition et la rétention des connaissances, ainsi que les perceptions des étudiants et des étudiantes sur son efficacité et sa valeur perçue. Le One2One a aidé les étudiants et les étudiantes à mieux apprendre et à davantage retenir le contenu du cours que le seul cours magistral, comme en témoignent les scores considérablement plus élevés relativement au contenu du One2One en comparaison du contenu de contrôle ($p<0,05$) sur le EAS (t-test) et ces connaissances ont été retenues jusqu'à la fin du semestre, tel que mesuré par l'analyse de régression. Un inconvénient préalablement identifié de l'examen oral structuré rapporté par les étudiants et les étudiantes est l'anxiété, toutefois la perception par les étudiants et les étudiantes de l'efficacité et de la valeur de l'examen oral structuré n'a pas été suffisamment étudiée. Ici, l'analyse thématique du feedback des étudiants et des étudiantes a identifié le One2One comme étant utile et comme étant un moteur d'apprentissage ayant une haute valeur professionnelle, malgré qu'il soit stressant. Bien qu'il nécessite davantage de ressources que les méthodes d'évaluation traditionnelles, le One2One a été évalué positivement comme un outil d'évaluation authentique qui motive l'apprentissage des étudiants et des étudiantes.

Post-secondary health science courses are often challenging for both students and instructors due to the volume and complexity of the material, as well as students' varying baseline knowledge. Instructors also encounter challenges assessing the retention of newly learned material using meaningful and applicable evaluation tools. The traditional oral exam (TOE) is a longstanding assessment tool (Akimov & Malin, 2020) in which students give spoken answers to questions during one-on-one interactions with examiners (Scott & Unsworth, 2018; Huxham, Campbell, & Westwood, 2012). Typically, students are not privy to the exam questions beforehand and the examiner has wide latitude in which questions are asked and what prompts, if any, are offered should students struggle. Oral examinations are used widely in professional schools, including medicine and dentistry, but to a lesser extent in other post-secondary science fields, (see Scherer, et al, 2019; Bhardre, et al, 2016; Verma, et al, 2013; Dicks, et al, 2012; Huxham, et al, 2012) despite superior student test performance as compared with traditional written assessments (Hounsell et al. 2007; Huxham, et al, 2012; Roecker, 2007).

Historically, oral examinations have been criticized for a supposed lack of reliability (meaning repeatability) and validity (meaning the exam's ability to accurately assess a student's knowledge or skills) (Scott & Unsworth, 2018; Memon, Joughin, & Memon, 2010; Davis & Karunathilake, 2005). Recent evidence, however, argues that oral examinations—in particular, structured oral examinations (SOEs) —are both reliable and valid forms of assessing academic success (Akimov & Malin, 2020; Imran, Doshi, & Kharadi, 2019; Ohmann, 2019; Hungerford, Walter, & Cleary, 2015; Huxham, et al, 2012; Rahman, 2011; Memon, Joughin, & Memon, 2010). In contrast to the wide latitude and variability afforded examiners in TOEs, the reliability of SOEs is higher due to the questions and prompts being standardized between students. Not surprisingly, students also perceive SOEs to be less biased and more consistent, fair, and transparent than TOEs (Haque et al, 2016; Bhadre, et al, 2016; Davis & Karunathilake, 2005).

Oral exams may be designed to reflect real work scenarios—this is referred to as an 'authentic assessment.' The more closely an assessment mirrors the true work environment, the greater its authenticity (Joughin, 1998). This is particularly true when students are training for careers that require significant one-on-one personal interactions both with colleagues in their field and members of the public (Joughin, 1998). When students can directly link the interpersonal skills, oral communication, answer creation, and confidence developed in the oral exam to their future professional competency, they are more motivated to invest the time and energy required to be academically successful (Scott & Unsworth, 2018; Seale, Chapman, & Davey, 2000). This aligns with evidence that assessments and examinations can be important external motivators for performance *if* students perceive the assessment tool as being valuable in helping them learn the material or develop skills (Seale, 2000; Joughin, 1998). Oral exams, in particular, are perceived by students to be useful in learning content, making this examination style a powerful motivator for learning (Ohmann, 2019; Dicks, Lautens, Koroluk, & Skonieczny, 2012; Huxham, et al, 2012; Roecker, 2007). Because students perceive SOEs to be more authentic and valuable than TOEs, these exams can serve as especially powerful external motivators and lead to better academic success (Imran, 2019; Bhadre, 2016; Verma, Mahajan, & Patel, 2013; Oakley & Hencken, 2005).

While the advantages of SOEs are well documented, some studies have identified elevated levels of student-reported anxiety or stress (Akimov & Malin, 2020; Haque et al, 2016; Hungerford, 2015; Huxham, et al, 2012). These studies, while advancing understanding of best practices in oral evaluation, only included small numbers of students, did not report statistical power or saturation, and used closed-ended survey questions, necessitating further investigation of this particular issue. A second major consideration when deciding to incorporate a SOE into a

course is the significant amount of time required for the instructor/examiner to meet with each student individually. This is potentially prohibitive when class sizes are large. To justify the resource-intensive nature of SOEs, it is important to objectively ensure its positive impact on student learning, satisfaction, and academic success. While Akimov and Malin (2020) have recently explored the feasibility of using oral exams in an online setting, to our knowledge, no published studies have assessed the feasibility and acceptability of providing students with SOE questions ahead of time and allowing students the opportunity to purposefully prepare answers and then present them in a face-to-face setting. This study explores whether a modified structured oral exam – called the *One2One* – which provides students with potential examination questions beforehand can improve knowledge acquisition and retention. Additionally, student perceptions of the usefulness and professional value of this oral evaluation tool are measured to ensure usability and user satisfaction.

Method

The One2One

The One2One is a modified SOE (worth 15% of students' overall course grade) used in the anatomy and pathophysiology-based course FSE150: Disease, Death, and The Body in the Funeral Service Education (FSE) program in the Faculty of Health Sciences and Wellness at Humber College in Toronto. FSE is a two-year diploma-level program that draws a mix of domestic and international direct-from-secondary-school and mature students. FSE150 is a required first-year course in the FSE program. At the beginning of the semester, students are provided with a description of the One2One assessment including the background and rationale, instructions for how to prepare for and complete the assessment, and general mark breakdown (see Appendix A and B). All students are privy to the three exam questions (based on the didactic course content) ahead of their meeting or 'interview' with the professor and informed that their interview will be video recorded. The questions used in this iteration of the course were: *(1) Describe the process of atherosclerotic plaque formation; (2) Describe capillary exchange and the causes of edema formation as discussed in class;* and *(3) Describe inflammation in general and the vascular and cellular phases of acute inflammation in particular*. Students are instructed to prepare answers to all three questions with the following instructions: (1) prepared answers are to be 5 minutes or less in length with one mark deducted from the final grade for each minute over this time limit; (2) answers are to be created to the depth of knowledge that was covered in class; and (3) answers cannot include any previously prepared written material, diagrams or other aids, and answers are to be presented from memory.

Students self-select a 10-minute timeslot outside of class time during which they meet individually with the professor. Due to the size of the class (111 students) completion of the One2Ones took place over the span of five weeks. Before the student enters the room, each One2One question is written on a separate card and placed face-down in a random order on the table in front of the student's seat. Upon arrival at the interview, the students are asked to put away any notes, textbooks, or other materials. The student is welcomed to the interview, reminded of the instructions, and then asked to choose one of the cards. The student then presents their prepared answer to the randomly selected question revealed on the card. The professor provides non-verbal feedback (e.g. nodding) during the students' presentations to maintain the 'conversation-like' atmosphere of the assessment in addition to providing standardized prompts if key content is

missing from the students' answers. If a student's answer is incorrect, the professor asks for clarification; if misperceptions persist, the professor corrects/explains these misconceptions and marks are deducted as per the rubric (see Appendix A and B). Marks were compiled immediately after students left the interview and were posted to the course online learning management system at the end of each week.

Study Timeline

Figure 1 provides a timeline for the study. The didactic course material was presented during Weeks 1–5 of the Winter 2019 semester. During Weeks 8–12, One2Ones were conducted in-person as described above with all students complying with the instructions. Online meetings were not an option for this class cohort. A letter of information describing the study protocol was posted to the course online learning management system following the final One2One interview. Students were invited to participate in the Efficacy Assessment Survey (see below) in class during Week 14 of the semester.

Figure 1
Study Design Timeline
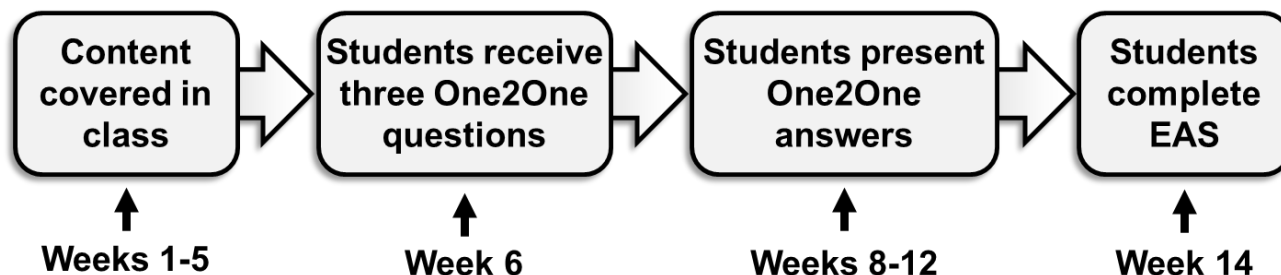
Data collection

The Efficacy Assessment Survey (EAS) was developed to quantitatively measure the impact of the One2One on knowledge acquisition and retention, as well as qualitatively measure student perceptions of the One2One experience. The quantitative component of the survey consisted of 12 multiple choice questions—three on each of the content areas covered by the One2One questions and three control questions on lecture material from Weeks 1–5 that was not part of the One2One evaluation. The multiple-choice questions were independently evaluated by two other Faculty of Health Sciences and Wellness faculty members to ensure consistency in difficulty level across topics; specifically, the faculty were asked to rank each question as 'easy,' 'medium,' or 'hard.' Revisions were made to questions until all faculty agreed as to their levels of difficulty. To bolster confidence in the question difficulty rating, Humber College's learning management system (LMS) analytics were used to rate the difficulty level of questions on a traditional written term test completed before the students knew the topics that would be part of the One2One. The questions were rated by the LMS as of 'medium' difficulty. The questions that were eventually included on the EAS were similarly worded to these test questions thus likening the difficulty between control and One2One content questions. To assess students' perceptions of

the One2One, the EAS employed a Likert scale and three open-ended questions (see Figures 5 and 6). The EAS was created in Survey Monkey (www.surveymonkey.ca).

Participant Recruitment and Informed Consent

All students registered in the FSE150 (Winter 2019) course were eligible for participation. A formal Letter of Information detailing the study was posted to the course online LMS following the final One2One interview. In order to limit impact of the professor-student power differential and the perception of coercion to participate in the study, the letter clearly stated that: (1) participation in the survey would have no impact on their progress or grade in the course; (2) the professor would not be privy to the identities of those who did or did not participate and the professor would not have access to the de-identified data until after final marks were submitted to the registrar; (3) their participation was voluntary and they could revoke their consent to use their information at any time with no negative consequences. To limit sample bias (Nulty, 2008), advanced notice of the date/time of the EAS availability was provided both in-class and on the LMS allowing students time to plan to participate if they so chose. All students present in class on the posted date/time were invited to access the link using their personal electronic device (or using one provided by the research team). Thirty minutes was allocated for the completion of the EAS. The EAS was administered by two student research assistants without the presence of the professor to limit real or perceived coercion. When students accessed the link they were asked to provide consent for the collection of their anonymized EAS responses and One2One grades in accordance with the study protocol approved by Humber College's Research Ethics Board. Regardless of whether consent was given, the final screen on the electronic survey would read "survey complete" and students were offered a $5 coffee gift card for their participation to remove perceived social pressures to participate.

Data Anonymization and Blinding

Following the completion of the EAS, each student was assigned a randomly generated study participant number by the research assistants. This 'coding key' (student ID numbers and assigned study participant numbers) was given to a third-party staff member in the Humber College's Centre for Teaching and Learning (CTL) who matched the anonymized One2One grades and the week when the One2Ones were completed with EAS responses. This de-identified data was then provided to the authors for blinded analysis. The authors (including the course professor) did not have access to the EAS data until after final grades were submitted to the registrar nor were they privy to the identity of the students who did not participate in the study.

Data Analysis

Quantitative analyses (t-tests and linear regression) were completed using Microsoft Excel 2016. Students' responses to the open-ended EAS questions were subjected to inductive qualitative (thematic) analysis as described by Thomas (2006). Using the standard technique for thematic analysis, one coder reviewed all responses to each question and identified common themes that became the preliminary 'codes'. These preliminary codes were refined through repeat readings to form the final codes. In keeping with the literature (Thomas, 2006), a consistency check was performed by a second coder to ensure the reliability of these final codes. Inter-rater reliability was

assessed by comparing the degree to which each of the two coders assigned student comments to the same code (Thomas, 2006).

Results

All 111 students in the FSE150 course were eligible for participation in the study. Six students did not complete the One2One assessment and their data were removed from the study. Of the remaining 105 students, 78 completed the EAS and the remaining 27 students were presumed to have declined to participate in the study. This gave an overall response rate of 74%. Two of the students who completed the EAS declined to have their One2One grade information included in the study and their data were removed from the components of the study involving One2One grades but the rest of their EAS responses were included in the study. One survey was disqualified due to a lack of identification and all of their responses removed from the study (Figure 2). Thus, 77 responses were analyzed for all components of the study except for those results presented in Figure 5b where 75 responses were analysed.

**Figure 2**
Study Participant Flow Diagram
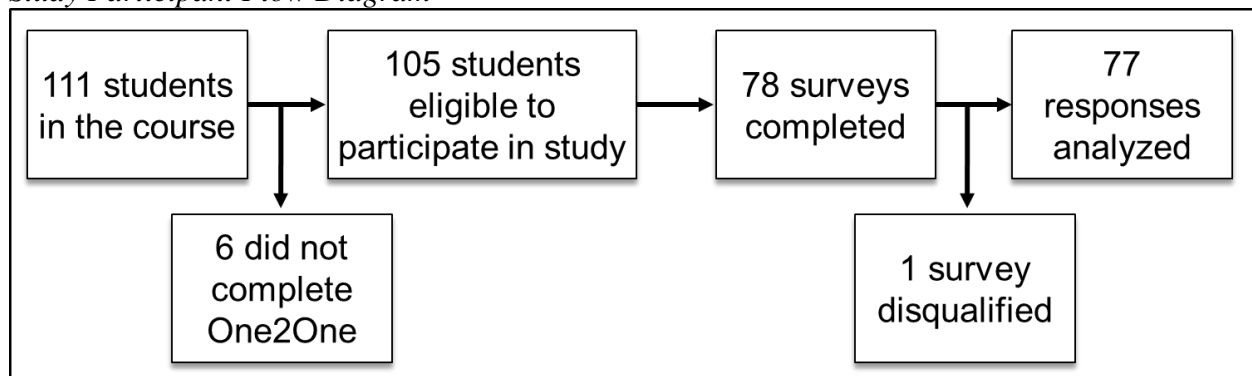
Knowledge Acquisition

Mean scores on the EAS One2One content questions were compared with mean scores on EAS control questions using a paired t-test. The mean score on the One2One content questions was significantly higher than for control content questions (1.9/3 versus 1.2/3, $p<0.05$) (Figure 3a). Mean EAS scores for One2One topics that students prepared and presented were compared with mean EAS scores for One2One topics that students had prepared but did not present. There was no significant difference in performance (as measured by EAS score) between topics that the students prepared and presented versus those that they prepared and did not present as assessed by a two-sample t-test (topic 1 $p=0.76$, topic 2 $p=0.77$, topic 3 $p=0.09$) (Figure 3b). Error bars indicate standard error of the mean (SEM).

Figure 3

Students EAS Scores on One2One-related Content Questions as Compared to Control Questions (A) and Comparison of Preparation for versus Presentation of the One2One (B)
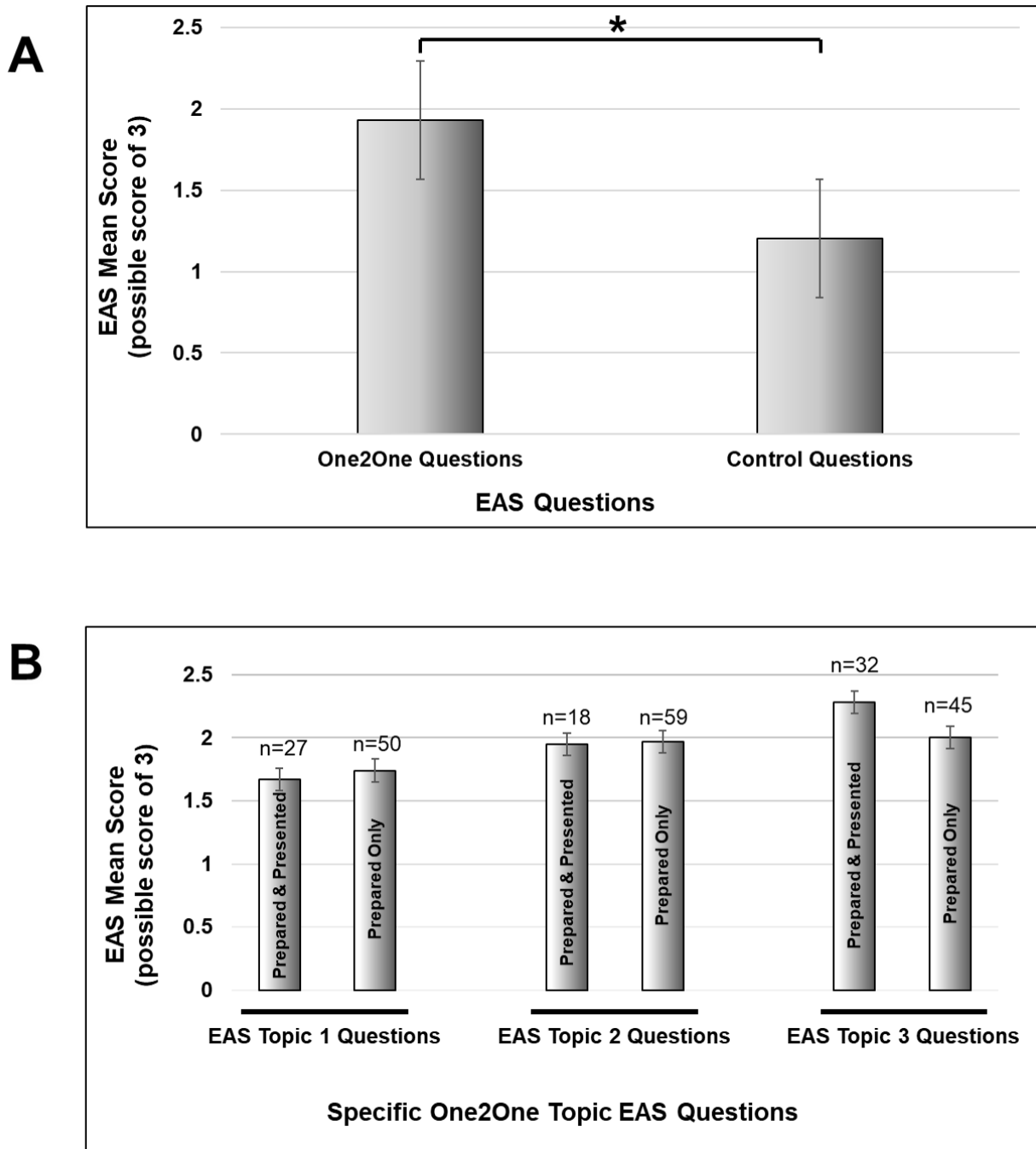

Knowledge Retention

To gauge content knowledge retention over time, the week that the One2One was completed was compared to the score on the EAS One2One content questions. Specifically, each student's EAS score on the One2One content questions was plotted against the week during which they completed the One2One and compiled into a jitter plot with a trend line with negative slope

($\mathbf{y}$ = -0.3749x + 6.824) as displayed in Figure 4. Linear regression analysis was performed on these data which demonstrated that the elapsed time between the completion of the One2One and the writing of the EAS is not a predictor of the EAS One2One content score (R^2=0.049, p>0.05). To bolster this observation, a further regression analysis (not shown) of these data was performed assessing the correlation between EAS One2One content score and a dichotomous collapse of completion week. Weeks 1 and 2 were collapsed together and Weeks 3, 4, and 5 were collapsed together. This analysis also demonstrated that One2One completion week is not a predictor of EAS One2One content score (R^2=0.061, p>0.05).

Figure 4.

One2One Content EAS Score as Compared to the Week During Which the One2One was Completed
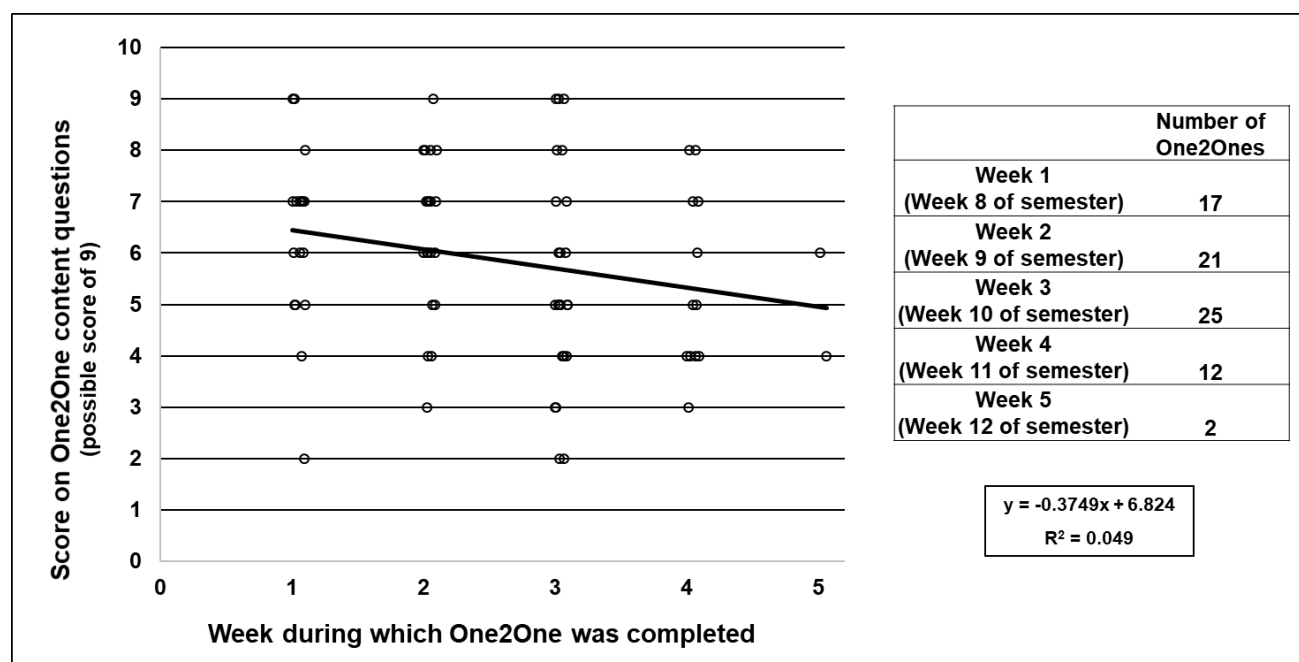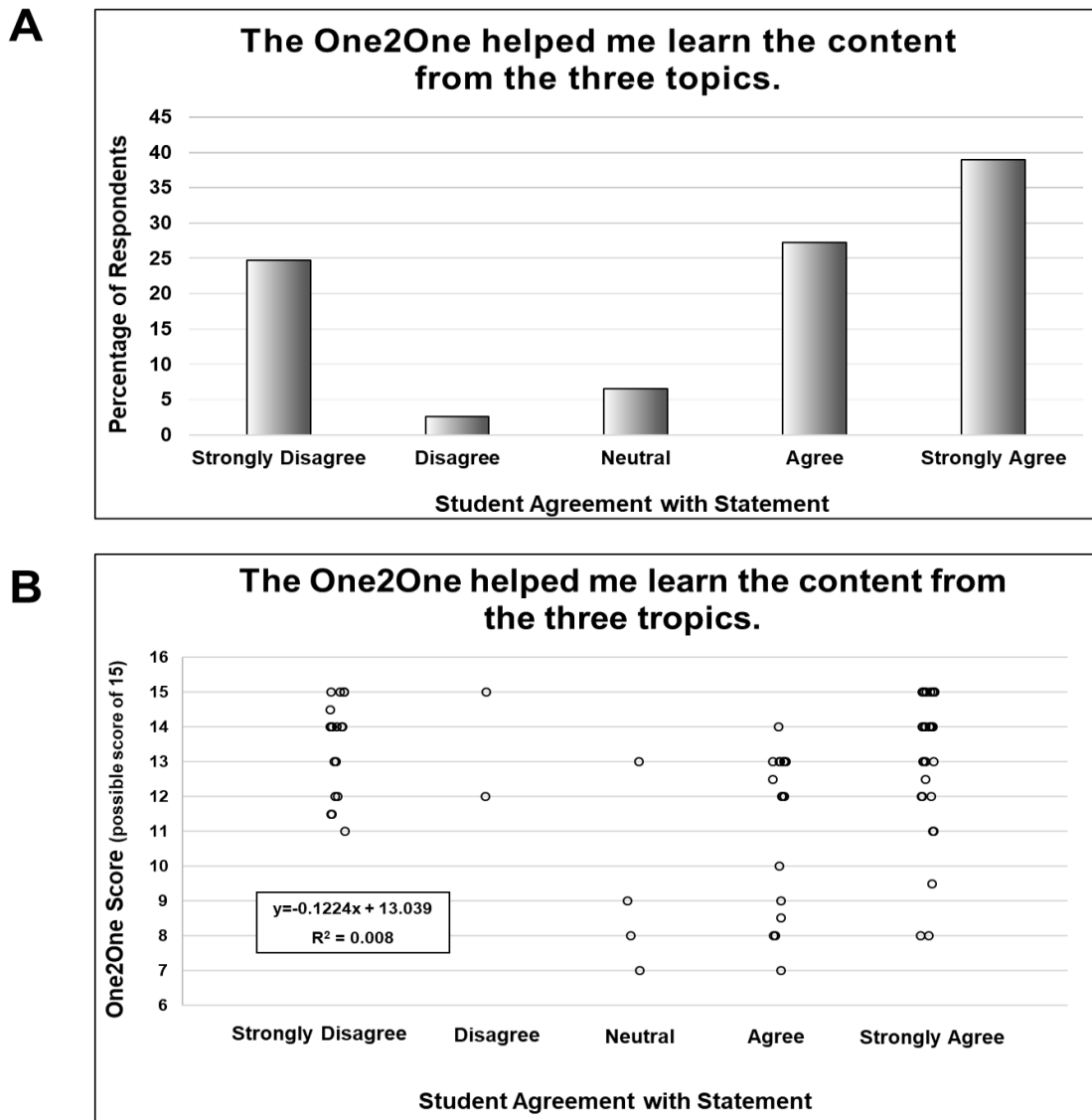

Student perception of the One2One

Student perception of knowledge acquisition

Student perception of the One2One's helpfulness in learning the three topics was assessed using a Likert scale asking their agreement with the statement: *The One2One helped me learn the content from the three topics.* The majority of students either agreed or strongly agreed (66.1%, 51/78) while 27% of students either disagreed or strongly disagreed (21/78) (Figure 5a). The degree to which the students' grade on the One2One assessment correlated to their Likert response was analysed using linear regression (Figure 5b). No correlation was observed between the One2One score and the students' perception of its usefulness (R^2=0.008, p>0.05).

One2One usability and user satisfaction

Student responses to three open-ended questions related to the One2One's perceived usefulness, drawbacks, and value to future career goals were subjected to inductive qualitative (thematic) analysis (Figure 6). Analysis inter-rater reliability was 0.84 (good).

Figure 5.
Student Perceptions of the Helpfulness of the One2One in Learning Content

Figure 6.
Student Self-Identified Perceptions of the Positive, Negative, and Valuable Aspects of the One2One's Perceived Usefulness
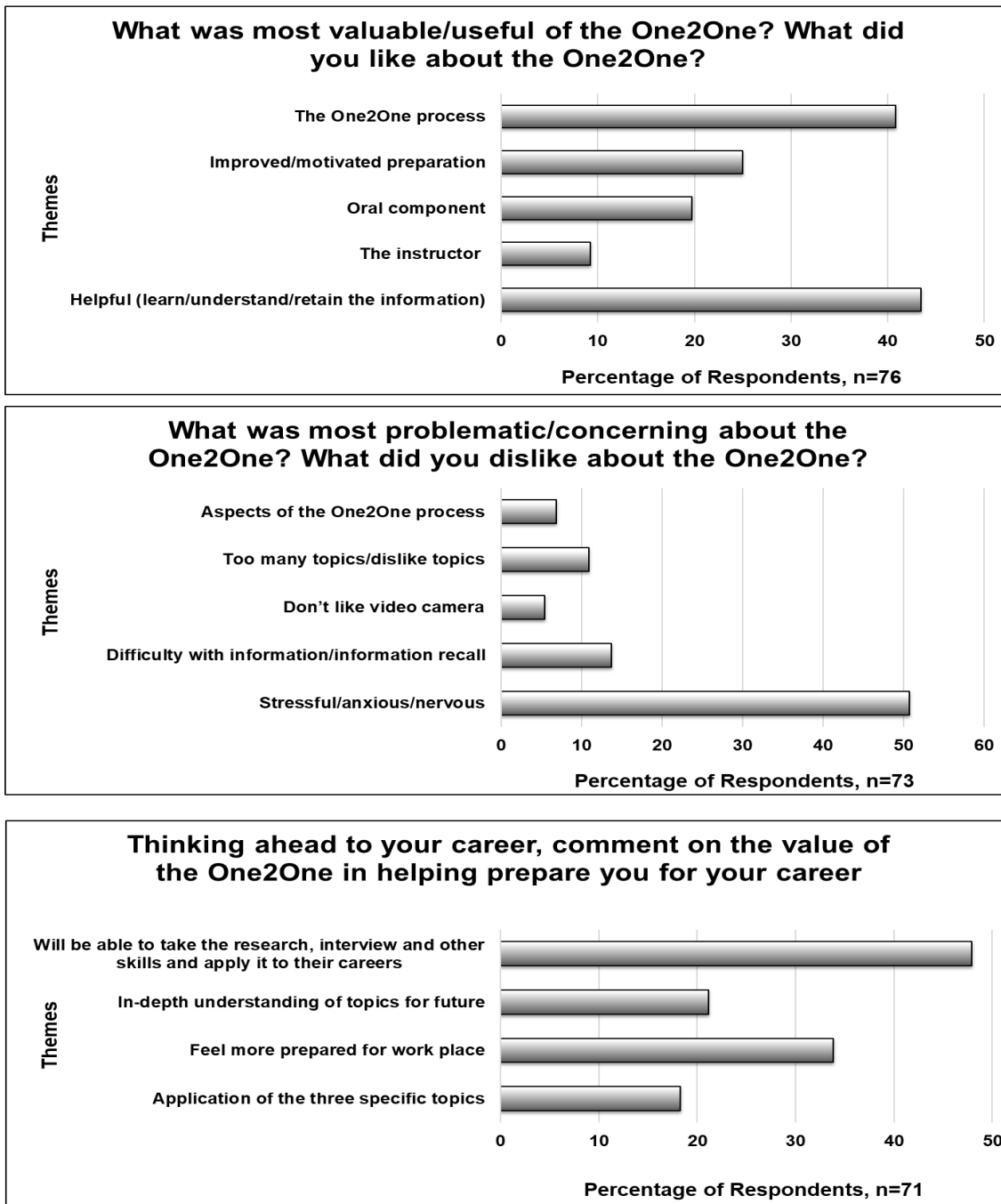
In response to the question '*What was most valuable/useful about the One2One? What did you like about the One2One?'* 43.4% of respondents' comments fell within the theme of 'helpful' for learning, understanding, and retaining the information on the One2One topics. Examples of students' comments included:

"Instead of just remembering facts, I came to a place where I actually understood what I was talking about which made it less stressful"

"The chance to phrase ideas learned in class in my own words, which helped to internalize the knowledge beyond route [sic] memorization."

"Having to prepare an explanation for each response greatly reinforced my understanding of each topic"

Forty-eight percent of respondents commented on the One2One process, including the structure of the interview itself. Students welcomed the opportunity for individual time with the professor and they felt they had a safe space to explore their knowledge.

"It was a great opportunity to sit down and have a one to one with [the professor], it was beneficial."

"I liked the fact that the teacher and I were in a room and it was quiet and he made it less stressful."

One fifth of the respondents appreciated the oral nature of the assessment as it provided the opportunity to discuss content in their own words (e.g. "Really helps me to [sic] when I talk about things") and reinforce the understanding of the material, including:

"It was super helpful to have a conversation and learn at the [same] time"

"You got one on one time with the professor, it also gave you the opportunity to explain the material verbally rather than writing it on paper or answering multiple choice questions."

Respondents' noted the One2One motivated them to explore the material in more depth to better prepare for their interview with the professor.

"Encouraged a deeper understanding of three topics that were the foundation of the course. By knowing these topics well it helped with understanding later on in the course."

"It encouraged me to study harder because I didn't want to show up and look like a fool during the interview."

"Made me look further into topics I didn't understand beforehand [sic]."

A final theme that emerged was related to the importance of the professor's attitude and calm demeanor during the process which they felt improved their performance and experience of the One2One process (e.g. "I really appreciated that [the professor] treated the One2One as a casual conversation between two adults. It relieved my stress").

One2One's perceived drawbacks

When asked "*What was most problematic/concerning about the One2One? What did you dislike about the One2One?*" more than half of the 73 responses fell into the theme 'stress/anxiety/nerves' (these terms were treated as interchangeable during the analysis). This theme included comments related to the pressure of learning the material (e.g. "I was stressed to get to a place where I understood it but when I did, it was fine"), anticipatory stress around what to expect during the One2One (e.g. "The pressure beforehand was very stressful as we didn't know what to [expect]"), and performance anxiety (e.g. "I developed a lot of anxiety around performing well"). Numerous responses also recognized that the process was actually less stressful than anticipated, including:

"It gave me a bit of performance anxiety but otherwise, it was a positive experience."

"At first it was anxiety provoking then it was really chill and relaxed."

"Once I did it, I realized a lot of the anxiety I had beforehand was unwarranted."

"I stressed needlessly before going in."

Other minor themes that emerged for this question included uncertainty of the One2One process, the number of One2One topics or dislike thereof, the presence of the video camera, difficulty with learning the information and information recall.

One2One's perceived professional value

There were 71 responses analysed for the statement *Thinking ahead to your career, comment on the value of the One2One in helping prepare you for your career.* The most common theme to emerge was 'application of skills gained in the One2One to their careers.' Common responses within this theme included being better able to explain difficult scientific topics to another person, research skills, interview skills/techniques, and social skills:

"It helped me to simplify a complicated issue, so I feel that will help me learn to simplify technical matters when speaking with families."

"If I don't understand something, I know how to research it so that I can personally not only comprehend it but talk about it with others so that they can know too."

"[The One2One] certainly forces you to prepare for speaking succinctly as a professional."

"Builds confidence with chatting to other people."

A large cohort of respondents reported feeling more prepared for the workplace:

"We have to talk to people as part of our day to day work lives. Explaining concepts to people is a huge part of it. Keep the One to One!"

"Very valuable, because making funeral arrangements with a family is like an interview, and we must be comfortable with our material."

Two final and related themes emerged from this question—students indicated that they now had an in-depth understanding of the One2One topics and that they would be able to apply their knowledge of the three One2One topics in the careers.

Discussion

Our modified structured oral examination, the One2One, is purposefully designed to encourage students to engage in 'learning by doing' (Anzai & Simon, 1979) as it requires students to actively prepare answers to given questions. This is in contrast to more traditional and passive methods of reviewing course content (e.g. reading notes or watching online tutorial videos). The One2One helped students learn and retain content better than didactic lectures and traditional studying methods as demonstrated by the statistically higher scores on One2One-content questions as compared with control-content questions on the EAS (Figure 3a). This improved academic success can be attributed to the One2One's incorporation of all six of Bloom's cognitive domains: creating, evaluating, analyzing, applying, understanding, and remembering (Bloom, 1956). The One2One requires students to synthesise complex concepts and create answers and explanations, forces them to analyse and evaluate their own understanding of the content, and self-identify knowledge gaps. As students refine their answers, their understanding of the topics deepens, and they become better positioned to apply this knowledge in practical settings. Another potential explanation for the observed improved performance on the One2One-related EAS questions is the increased perceived stress associated with the One2One. This is consistent with the Yerkes-Dodson model whereby a moderate level of stress increases academic performance, and indeed oral exams have been shown to increase cortisol levels (Slavin, 2018; Harl, Weisshuhn, & Kerschbaum, 2006).

It was important to determine whether the One2One's positive impact on knowledge acquisition was driven by the *presentation* of a topic versus the act of *preparing* for the topic, as facilitating the presentation of multiple topics would be considerably more resource intensive. As shown in Figure 3b, students' scores on presented topics did not significantly improve as compared with non-presented topics. Given that deeper learning occurs during the preparation for the One2One, when instructors design similar assessments they should consider weighting the preparation of student answers more heavily with the act of presenting being secondary. Eliminating the presentation may be ill-advised, however, because without the pressure of a presentation, the motivation for preparing (and thus learning) may be diminished. To assess this, a future study could randomly select some students to present the One2One, while selecting other students to only prepare answers. An additional confounder in the interpretation of these data may be the presence of intrinsic differences between survey respondents and non-respondents (Nulty, 2008); however, administration of the EAS during protected lecture time with the availability of electronic devices with internet access serves to limit this potential sampling bias.

Retention of newly learned information is an important factor in the synthesis of knowledge. As shown in Figure 4, the time elapsed between the One2One and the EAS is not a

predictor of the EAS score. This indicates that students retained the knowledge gained in the One2One until the end of the semester (when the EAS was administered). Given the lack of correlation between week of One2One completion and EAS score, the negative slope of the trend line in Figure 4 was unexpected. The dichotomous collapse regression analysis argues against Week 5 outliners as driving this negative slope, however, it could be a result of self-selection bias if academically stronger students selected earlier timeslots. To address this, a future study could collect other course assessment data allowing for multivariate regression analysis to control for this possibility. A drawback of this study was the relatively short period of time between the One2One and the assessment of knowledge retention. To assess longer-term retention, a future study will re-administer the EAS questions during students' preparation for their licensing exam held approximately one year after the initial EAS reported here. Our retention data, taken together with the fact that students performed better on the One2One EAS questions as compared with control questions, means that the One2One is a quantifiably effective assessment tool that promotes knowledge acquisition and retention.

Given the positive link between a student's perceived value of an assessment and their motivation to prepare for it (Seale, et al, 2000), it was vital to understand our students' perceptions of the One2One. As shown in Figure 5a, 66% of students agreed or strongly agreed that the One2One helped them learn the assigned content. Considering the measurable benefit on learning and retention (Figure 3 and 4), it was surprising that more than a quarter of students disagreed or strongly disagreed that the One2One had been helpful in learning the content. It may be that these students misinterpreted the Likert scale statement as referring to the act of presenting whereas the intent of the statement was meant to include all aspects of the One2One process including answer preparation, practice, presentation, and feedback; future iterations of the EAS Likert statement will clearly reference the entirety of the One2One process. The divide between the measurable and perceived benefit of the One2One may also reflect the lack of awareness of its positive impact on grades; thus, to optimize student engagement in the future, it may be beneficial to inform students of these results. Together, these modifications may reconcile student perceptions of the One2One's helpfulness with the measured benefit.

To discount the possibility that performance on the One2One influenced students' perceptions of it, the relationship between the One2One score and the Likert rating of 'usefulness' was assessed. Since no correlation was observed (Figure 5b), this suggests that students were able to separate their personal achievement from their perceptions of the overall value of the assessment.

Unlike previous studies soliciting student perceptions of oral exams (Akimov & Malin, 2020; Haque, 2016; Hashim, 2015; Fabrizio, 2013), the EAS included open-ended questions. This, combined with our large sample size, generated a substantial catalogue of student-driven responses. Our students' feedback was consistent with previous work (Fouad, 2019; Dicks, 2012), in that our students found the One2One 'helpful' in learning, understanding, and retaining the One2One content (Figure 6a). Students recognize that the creation of their answers for the One2One drives a deeper understanding of the material, largely by self-identifying gaps in their knowledge. Furthermore, their desire to perform well for the instructor acts as an external motivator for students to self-evaluate and revise their answers in preparation for the interview. A limitation of combining questions about perceived value/usefulness and likeability on the EAS may have been that students provided an answer to only one of these questions. Future iterations of the EAS will differentiate these aspects as we recognize that they are different domains.

Students' responses indicated that the major drawback of this assessment was stress/anxiety (Figure 6b). This is in keeping with both physiological and survey-based studies showing higher stress associated with oral exams as compared to other forms of assessment (Guraya, et al, 2018; Schoofs, Hartmann, & Wolf, 2010; Harl, Weisshuhn, & Kerschbaum, 2006). In this study, students who reported anticipatory or performance stress and anxiety also commented that the stress itself acted as a motivator for better preparation. Additionally, several students commented that the interview was considerably less stressful than anticipated and this was attributed to the calm and positive demeanor of the professor. This finding is in line with other work that demonstrated the positive influence that professors and instructors can have on students' experience and performance (Carrell & West, 2010).

For some students, the "pressure beforehand [was because] we didn't know what to expect." To address this concern, a sample One2One video will be created demonstrating a standard One2One interview. A future study will assess the degree to which perceived stress can be reduced by this intervention.

One highly valued marker of institutional success for Humber College is creating competent, career-ready graduates. Previous review articles have noted the potential for oral exams to develop valuable career-oriented skills that extend beyond learning of content (Rahman, 2011; Roecker, 2007). This study expands on the Likert scale responses reported by Akimov and Malin (2020) and provides the missing evidence for Rahman (2011) and Roecker's (2007) postulation that oral exams can cultivate career-oriented skills—our students indicated that the One2One developed research and interview skills valuable to their careers while also noting that they feel more prepared for the workplace (Figure 6c). Our students are training to become Funeral Service professionals (licenced funeral directors), a profession that requires strong oral communication, interpersonal and conversational skills, and the students recognized the One2One as authentically developing these key attributes.

While having the professor meet with each student individually may be less burdensome in smaller classes (40 students or less), meeting with 200 or even 1600 students (as is the size of many first-year university and college courses) is not feasible. This does not mean, however, that the benefits of oral exams such as the One2One are unattainable for large classes: Roecker (2007) suggests that upper-year teaching assistant could be used in place of the professor. Alternatively, self-evaluation, peer-evaluation, or group evaluation could be used to reduce the time constraints placed on the professor (Fabrizio, 2013). Future work will test whether upper-year student teaching assistants—provided with a strong rubric and instruction—are suitable One2One examiners, thereby, reducing the burden of assessments for the professor.

This paper advances our knowledge of assessment practice as the course-specific topics covered in this iteration of the One2One could be easily adapted to a wide variety of courses and post-secondary education levels by changing the topics and altering their level of difficulty. The One2One is a valuable education tool driving student learning and retention while being highly motivating and positively rated by students. Given its demonstrated success and the value placed on it by student and professor alike, this method of assessment should be considered for inclusion in other courses.

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Appendix A

One2One Interview

The Task - During your arranged meeting time you must be prepared to give a **five-minute** oral explanation of each one of the following topics.

Topics:

- The three topics will be posted later in the term

*At the time of your meeting you will randomly draw which topic you will present. You will have only **5 minutes** to present your answer. Your professor might interrupt you with a question or two in order to make sure that they understand your answer and your answer is going in the correct direction. It is important to place the topic in a common knowledge context and then build in the details as you go through. Your slot is for 10 minutes so that afterwards you can together go over any details that you may have missed.*

Be prepared to give an oral explanation of **any one** of the above topics. **You may not use any written material or notes during the meeting**, but you may bring blank paper and use this like a "blackboard" to help explain your ideas.

Background:

Since this will be a meeting just between you and your professor, the sort of skills that you will be using will not be the same as for giving a formal oral presentation. This encounter is meant to be informal and relaxed. This type of situation arises many times in your career and this exercise is meant to help prepare you for these types of interactions.

Know each of the topics well enough to make the explanations without notes in easy-to-follow conversational sentences.

When you are describing a complex idea to someone who has limited background in a subject it is important to:

- put the idea in a context that they can understand
- build the idea as you go along
- be concise
- define important terms that are relevant to what you are explaining
- draw diagrams neatly and use informative text sparingly

How are the One2One interviews graded?

- One2One interviews will be **marked out of 15**.
- Two-thirds of the One2One mark is based on content. You should have a general understanding of the topic at the level of detail you were taught in FSE 150. Make sure you read the topic carefully and address all parts of the question in your presentation.
- If you forget to mention a piece of information we were looking for, your professor will prompt you or ask you to clarify. You will not lose content marks as long as you provide the correct answer when you are prompted.
- The other third of the mark is based on your presentation skills. Your professor will evaluate how well your ideas flow, how much prompting you required, whether your explanation made sense, and whether your diagrams were concise and effective (if you used any).
- You have a maximum of 5 minutes for your presentation. You will lose 1 mark for each minute that you go over the 5 minute maximum.
- You don't have to rush or be nervous, just relax and explain what you know about the topic and you will be fine.

What happens if I miss my One2One appointment?

Once you have signed up for your One2One timeslot, you may not change it. **Re-scheduling is NOT permitted**. Missing your scheduled session is similar to missing an exam. If you are ill on the day of the appointment, you must submit a doctor's note, as detailed in the Course Outline and your One2One interview will be rescheduled to another available timeslot. If you have not met the conditions detailed in the Course Outline regarding missed assessments, you will be assigned a mark of '0'.

Appendix B

Sample Rubric and Sample Standardized Prompts

Atherosclerosis   **Student Name:**

Describe the process of atherosclerotic plaque formation

Up to 2 marks for each of the following:

> Plaque formation starts when there is an injury to the endothelial cells that line the blood vessel wall, inflammation _____

> Injured endothelium attracts macrophages (WBCs) which move into the intima and accumulate there _____

> Macrophages ingest (engulf) lipids (LDLs) and become foam cells, these continue to accumulate forming fatty streak _____

> Foam cells release lipids that accumulate as well as growth factors for fibroblasts and smooth muscle cells, fibrous cap grows over the fatty streak forming the plaque _____

> Complicated lesion – The lesion could hemorrhage, a thrombus could form blocking blood flow to tissue downstream _____

Subjective mark up to 5 marks for how well it's explained

> Did the student attempt to put the idea in an understandable context? _____
> Did the student require prompts to hit the key content? _____
> Did the student attempt to define important terms? _____
> Did the student present fluidly and concisely? _____
> Did the student have a friendly and approachable manner as they spoke? _____
>   Total out of 15: _____

Sample Standardized Prompts:

"What do macrophages ingest at the site of injury?"
"What do macrophages become once they ingest the LDLs?"
"What is the accumulation of foam cells called?"