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Supporting Student Self-Regulated Learning via Digitally Enhanced Feedback Workshops

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ABSTRACT

Current educational research demonstrates the importance of equipping students to be active participants in their own learning. However, more work is needed to provide students with the metacognitive skills necessary to engage in Self-Regulated Learning (SRL). Feedback is a crucial component of the learning process and can be used by students to develop these skills but remains a source of dissatisfaction for students and educators. We contend that this is a result of a gap in students' understanding of the feedback process and the lack of dialogue between students and educators. This paper presents a methodology to conduct a feedback workshop as a means to improve the feedback experience while equipping students with the metacognitive skills needed to facilitate SRL. The methodology was evaluated in four workshops conducted with students from engineering and business at a university in the United Kingdom. In each workshop (excluding the pilot) students were requested to complete pre and post-workshop questionnaires and there was also opportunity for group discussion and reflection. Results demonstrate the potential benefits of such workshops in deepening the student understanding of the process and use of feedback.

Key words: digital feedback; metacognitive learning; self-regulated learning strategies

INTRODUCTION

As students begin to play a more active role in their learning experience, their metacognition, ability to self-assess, and understanding of the role of feedback are critical to their ability to regulate their own learning (Andrade, 2019). In order for students to grow in these abilities, training can be beneficial (Rahimi, 2013). An essential component of this process is students' understanding and perception of the feedback process. We contend that enhancing students' ability to give and receive effective feedback supports their metacognition and ability for Self-Regulated Learning (SRL).

Self-Regulated Learning and Metacognition

One of the major challenges for education is providing a suitable environment where students can develop the ability to learn independently to sustain a journey of life-long learning (Baas, Castelijns, Vermeulen, Martens, & Segers, 2015; Boekaerts, 1999). Zimmerman (2008) further describes this ability as the degree to which students are metacognitively, motivationally, and behaviorally active participants in their own learning process, what we term in this paper as SRL. Zimmerman (2008) maps SRL into three sequential stages: forethought, performance, and self-reflection. The forethought stage is where students analyze the task, set goals, and plan their learning activities. Within the same stage, students tend to determine the task interest/value and set the task outcome expectations (i.e. self-motivation beliefs). In the second stage, while performing a task, students control their progress and observe the efficiency of the tactics they are following. In the final stage, students evaluate their overall performance in terms of the expected outcome and the followed learning strategies and tactics (i.e. metacognitive skills). In an ideal SRL process, self-reaction follows that determines the student level of satisfaction.

Metacognition is an important component of the SRL model and involves "the knowledge and regulation of one's own cognitive (or thinking) processes" (Cunningham, Matusovich, Hunter, McCord, 2015; Flavell, 1979). Schunk and Greene (2017) define metacognition as "what a learner knows about cognitive events, including the probability they generate a successful product". In this case, the product is the understanding of how feedback is produced and its usefulness for the learner. According to Zimmerman (1989), metacognition empowers learners to think consciously about what they know and have control over personal processes of acquiring knowledge. In addition to helping learners with awareness, metacognition also helps them to evaluate their learning process, identifying the strategies that move them closer to their goals (Sadler, 1989). For these reasons, the premise of our study was to equip students with metacognitive strategies throughout their learning experience via feedback workshops.

Assessment and Feedback

From the educator's perspective, the practice of assessment is seen as a way to equip students with cognitive information on their performance (Black & Wiliam, 2009; Clark, 2012). Feedback is further effort to help students develop their metacognitive skills. Conventionally, assessment and feedback are used to identify where the students are in their learning, where they need to go, and the best strategies for instructors to achieve learning objectives. Despite the crucial importance of assessment and feedback, current practices remain insufficient for educators and students (Blair, Curtis, Goodwin, & Shields, 2013; Smith & Williams, 2017). From one perspective, some educators believe that students mainly focus on the given mark rather than the value of provided comments (Higgins, Hartley, & Skelton, 2002). In addition to that, with the increasing cohort sizes and formal procedures around moderation among multiple educators, there is less time available for educators to write comments on the students' assignments. This can adversely impact the clarity of the feedback provided, especially with limited subsequent opportunity for face-to-face interactions (Bailey, 2009; Catt & Gregory, 2006; Sadler, 1989). Failure to close the feedback loop either by students or educators via face-to-face interaction may result in feedback being considered as void (Retna & Cavana, 2009).

In addition to challenges for educators, students perceive assessment and feedback as the biggest source of dissatisfaction when asked about their overall learning experience (ElShaer, Casanova, Freestone, & Calabrese, 2019; Ferrell, 2014). In the United Kingdom, the National Student Survey (NSS) is a survey conducted every year by an independent body to measure the level of satisfaction of final year undergraduate students about their degree. The survey covers eight areas of interest with 28 questions. The questions in the area of assessment and feedback focus on: (1) Clarity of pre-handed marking scheme; (2) Fairness of marking and assessment; (3) Timeliness of the provided feedback; and (4) Usability of the received comments on their work (ElShaer et al., 2019). Since the start of NSS in 2005, student satisfaction with assessment and feedback practice has consistently scored below the overall satisfaction and is not improving (Grove, 2014) as shown in Figure 1, reproduced from (Walker et al., 2019).

Other researchers have highlighted how these concerns are not limited to the UK (Nicol, 2010), citing similar findings in Australia. Various studies have focused on reasons that might cause student dissatisfaction with the assessment and feedback practice. Hattie and Gan (2011) as well as Nicol (2010) claimed that students think that educators' feedback is confusing, inconsistent, non-reasoned, and difficult to apply in their learning process. Other authors provide further reflections that students are dissatisfied with the feedback clarity and quality (Higgins, Hartley, & Skelton, 2001). Another cause of the students' dissatisfaction is feedback timeliness. Students tend to appreciate prompt feedback: feedback received within a timeframe where the feedback is still relevant to them

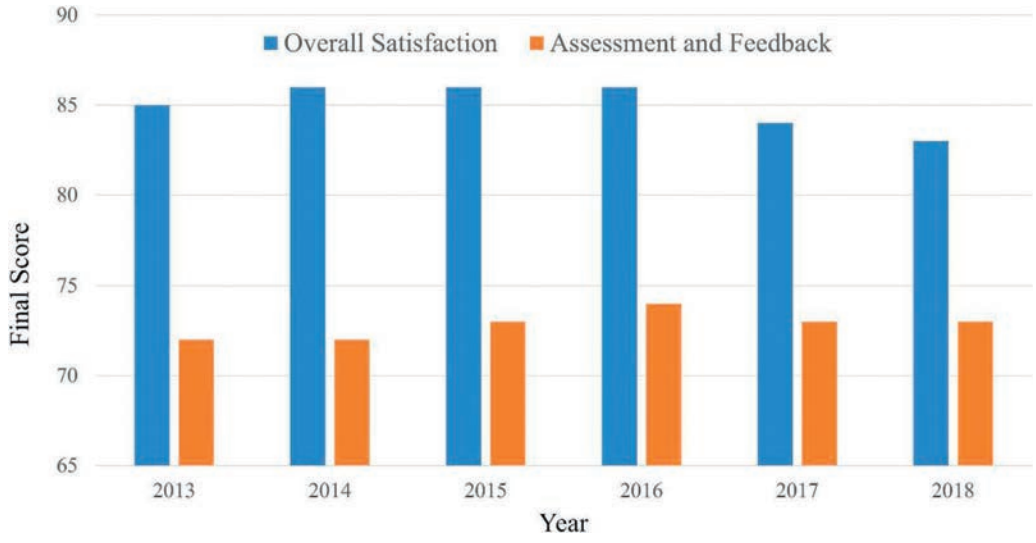

Figure 1. NSS assessment and feedback satisfaction is flat (Walker et al., 2019).

(Mutch, 2003). The sooner the feedback is received the more likely that students will engage and use the feedback for their learning which is very challenging to achieve with the factors mentioned above (Zimbardi et al., 2017).

The power of feedback relates to how and when the feedback is given and also how students perceive it (Hattie & Gan, 2011). Students may lack the skills and training needed to respond effectively to the provided feedback (Mccann, Saunders, et al., 2009). Butler and Winne (1995), Boud and Molloy (2013), and Carless (2019) agreed that the feedback will be more beneficial in the learning process when it modifies the student's thought process. Being exposed to more exemplars gives the student more insight into what is appropriate. More generally, students' agency over the assessment, which can be achieved only with increased assessment literacy of learners, is an important step in achieving the ultimate goal of assessment and feedback: to help students to be more autonomous in their SRL (Clark, 2012; Klenowski, 2009; Smith et al., 2013; Charteris & Thomas, 2017).

Cheng and Warren (1999) and Li, Liu, and Steckelberg (2010) also demonstrate how student learning and performance on similar tasks in the future improves by providing peer feedback. Research by Jensen and Fisher (2005) further supports this, demonstrating that the process of peer review improved student performance in technical writing and based on surveys, "the majority of students thought the additional time and effort were well spent in learning to write more effectively". The timing of peer review is also important with Baker (2016) noting that peer review can be used to encourage students to begin working on assignments earlier in the semester. Therefore, consideration should be given to the timing of when peer review should be incorporated into the learning journey.

Self-Assessment

Self-assessment is recognized as a mechanism for developing autonomy in SRL (Brown & Harris, 2013). The process of self-assessment involves self-generating feedback (Andrade & Cizek, 2010) and is defined by Andrade (2019) as the act of monitoring one's processes and products in order to make adjustments that deepen learning and enhance performance. Self-assessment is most beneficial when there is an opportunity for the students to adjust their processes and products; and so, should be a formative process (Andrade, 2019). Students who engage in assessing their own work and generating advice they can possibly use in future assignments generally show awareness of their preferred learning style and are better able to handle metacognitive learning devices such as reflection and improvement in their own learning practices. Less self-motivated students rely more heavily on external factors (i.e. tutors' comments) for feedback rather than self-regulated strategies (Hattie & Timperley, 2007), so developing self-assessment skills should be supported by training students in this area (Andrade, 2019).

Standards-based self-assessment (Andrade & Boulay, 2003) with highly structured processes, i.e. rubrics or checklists, where students are guided through the self-assessment process by a scaffolding approach (Kollar, Fischer, & Hesse, 2006), have been shown to result in improved performance and development of SRL techniques (Panadero & Romero, 2014). In fact, these scaffolded approaches can be thought of as training in self-assessment as they enable students to modify their learning approach to become more self-regulated. The scaffolding is recommended to be in the Zone of Proximal Development (ZPD), which represents the distance between what students can do without help, and what they can do if a guide is provided by a knowledgeable person (Vygotsky, 1980).

One way to enhance the ability for students to self-regulate their learning is by equipping them with the means to objectively evaluate their own work. Prior studies have found that training students in the process of providing feedback can improve the quality of their future work and ability for self-regulated learning (Rahimi, 2013). Also, assessing sample papers provides an opportunity for peer feedback, enhancing the students' own performance on similar tasks in the future (Cheng & Warren, 1999; Li et al., 2010).

Research

The aim of this study is to enhance students' understanding of the feedback process, and better equip them for Self-Regulated Learning. Our research has focused on developing students' understanding of the feedback process, which we believe not only enhances the students' perception of feedback but also their ability to self-assess. This equips students with the metacognitive skills needed for their immediate studies and ongoing studies within the discipline, which we hope are transferable to other areas. In order to develop this understanding, this paper proposes a reproducible workshop, with instructional scaffolding, that can be integrated by educators within their teaching

practice. A Software Integrated Feedback Tool (SWiFT) has been developed in concert with the workshop enabling educators to give consistent, easier to understand, and applicable feedback to students within an acceptable time frame. This tool has been used as a key enabler for providing the scaffolding to run the workshops and is presented as such. However, the tool's technical features do not fall within the scope of this paper. The development of understanding of the feedback process and metacognitive skills for SRL have benefits in terms of student perception and satisfaction of feedback, improving their overall learning experience. The rest of the document is outlined as follows: the next section describes the methodology, then the results of the workshops are provided, and following this the implications for curriculum design and the overall feedback process are discussed.

METHODOLOGY

Student perception of feedback was evaluated through a pilot workshop (Workshop 1) with 14 undergraduate School of Engineering students to test the methodology. The workshop was further developed from the feedback given and three subsequent feedback workshops were conducted with students from the University of Birmingham. Workshop 2 was held with 10 undergraduate students from the School of Engineering, using a preliminary questionnaire, mostly with free-response questions. We then used the responses to this questionnaire to refine the questions and format of the workshop. Two additional workshops were then run with different groups of students. Workshop 3 was held with 31 Birmingham Business School (undergraduate economics students) to evaluate efficacy on non-engineering students. Workshop 4 was conducted with 8 School of Engineering MSc (postgraduate taught) students to explore their perspectives and the benefit in their learning process (Evans, 2013), as the previous workshops had been conducted exclusively with undergraduate students. The workshops consisted of three major components which align with the main sequential stages of SRL outlined by Zimmerman: forethought, performance, and self-reflection (Zimmerman, 2008). In each workshop students were first surveyed and asked to summarise their current expectations and understanding of feedback and critique current practices. Next, students were placed in the role of assessor and asked to provide feedback for two assignments. Finally, focus group discussion was organised at the end of the workshop allowing students to explore and reflect on two areas: (1) the experience of being an assessor, (2) how the participation in the workshop influenced their perception on feedback. The discussion was recorded via written notes so that it could be later analysed to identify key themes. An overview of the workshop structure can be seen in Table 1. The project and associated data collected were reviewed by the University of Birmingham's Ethical Review Committee and received full ethical approval (ERN 18-2113).

Table 1. Sample Workshop Agenda.

Task	Time	Aim for students	Aim for workshop
Hand out consent form as soon as students walk in. Then direct them to complete the pre-workshop questionnaire.	Before workshop	Reflection exercise for students to think what they know and understand about feedback (pre-workshop)	Gain consent Collecting data: Gauge pre-workshop understanding and use of feedback
Introduction: Task 1 Overview	5 minutes	Clear understanding of the instructions and structure of the workshop	Ensure a smooth workshop
Feedback Related Task 1			
Read Assignment	10 min	Individual work – to get in the mentality of being the assessor	Collect free-hand feedback to compare and analyse with the rest of the data
Provide Feedback on Assignment	10 min		
Group Discussion	10 min	Exchanging ideas with peers using flipcharts and probing when opinions differ	Flipcharts and notes from Task 1 – capturing the thoughts and impressions
Feedback Related Task 2			
Task 2 Overview	5 min	Clear understanding of how to use SWiFT	Ensure a smooth workshop
Read Assignment	10 min	Individual work – to get in the mentality of being the assessor	Collect feedback in SWiFT to compare and analyse with the rest of the data
Provide Feedback on Assignment	10 min		
Group Discussion	10 min	Exchanging ideas with peers and academics	Primary means of hearing students' perspective of the feedback process
Ask them to complete the post-workshop questionnaire.	5 min	–	Gauge the shift of opinion/ understanding of feedback

Workshop Structure

The overall workshop takes approximately an hour and a half including time for dialogue and questions. Table 1 contains an example agenda which has been used as a starting point to conduct the workshops.

Workshop Questionnaires

Questionnaires serve as one effective means of gathering empirical data (Berends, 2006). Pre- and post- workshop questionnaires were designed, based on the student's perspective of receiving feedback, to capture the views of the students regarding feedback before and after the session to gather empirical data. The main purpose of these questionnaires was to understand how effective the workshops were at improving student understanding about importance of feedback. A secondary purpose was to assess how future workshops could be employed more effectively. The pre-workshop

questionnaire was conducted when students entered the workshop and the purpose of the questions was to evaluate the students' understanding of feedback, their experience with feedback, and the overall efficacy of feedback they had received. The post-workshop questionnaire was conducted at the culmination of the workshop and assessed how students' perception changed as a result of the workshop experience and their perception of the usefulness of the workshop. Questionnaire data was collected for Workshop 2, 3 and 4 with the results from the prior workshop used to inform the questions asked in subsequent workshops. For workshop 2, the questionnaires consisted of written forms. The questionnaires were converted to electronic forms for workshops 3 and 4. The number of questions varied across the workshops with the pre-workshop questionnaire containing 6, 13, and 34 questions and the post-workshop questionnaire containing 5, 9, and 13 questions for Workshops 2, 3, and 4 respectively. For each workshop the pre- and post-questionnaires were adapted to meet the experience of the students in terms of year of studies, level of studies (i.e. undergraduate or postgraduate) and the programme of studies. Pre- and post- workshop questionnaires were made up of four types of questions: demographic, open-ended questions that allowed students to describe their understanding and experience, multiple choice questions to capture the style of feedback, and close-end questions on a Likert scale of 5 opinions relating most favourable to least favourable opinion (p391; Cohen, Manion and Morrison, 2011). As will be evident in the results, the open-ended questions served to encourage students to express their range of views on their understanding and experience with feedback.

Providing Feedback

To facilitate this skill and stimulate thinking regarding the process of giving feedback, during the workshop students were tasked to provide feedback on two assignments. Voluntary anonymized reports were used for the workshop. The assignments selected for evaluation were ones that the students had previously completed, allowing a base level of familiarity with the instructions and intended content of the assignment. Students were also provided with the marking rubric, and the assignment instructions to support their provision of feedback. For the first assignment students were given a blank document and asked to provide free-form feedback without further instructions as to the structure, quantity, or content. For the second assignment, students were given the same amount of time to read and mark another assignment. However, feedback was provided using a Software Integrated Feedback Tool (SWiFT) which provided a structure for feedback. This tool was pre-populated with "positive" and "constructive" feedback comments prepared by educators for each of the sections of the assignment. This tool semi-automated the feedback process, allowing students to click and add predefined comments for each section as well as giving them the ability to add their own comments or modify any of the pre-defined language. Digital feedback tools

can improve efficiency and allow more time to enhance the quality of feedback (Heinrich, Milne, Ramsay, & Morrison, 2009) and do not reduce the students' perception of the constructiveness of the feedback (Bayerlein, 2014). Further information around SWiFT can be found in Appendix A. For the students, use of a digital feedback tool served as a scaffold (Evans, 2013; Frank et al., 2018) to guide them in structuring the feedback including example phrases to use for each section. Exposure to these phrases which were pre-defined by educators, as the important points they considered when assessing, is intended to improve their SRL ability as they had the opportunity to gain insight into the mind of the assessor (Nicol, 2010).

Group Discussion

Choi, Land, and Turgeon (2005) highlight how "verbal interactions among peers can be essential for aiding learners to detect cognitive gaps, negotiate meanings, and modify their perspectives." After each task students were given 10 minutes to discuss in groups of 3 or 4. Students were encouraged to discuss the following questions:

- How does the feedback that you gave compare with the feedback provided by other members of your group?
- How did you find the exercise? (easy/difficult, why?)
- How did you feel providing feedback?
- What type of support would make you feel more comfortable providing feedback?

Following the second task, students were also asked to compare their experience using SWIFT as opposed to the unstructured feedback process. A group discussion followed at the end to allow all participants to express, exchange, and debate their views and help the research team better comprehend both student views and change of perception. Prior to discussion, students were asked to gather towards one side of the room, enhancing visual proximity, which has been shown to stimulate more robust dialogue (Steinzor, 1950). This discussion was given ten minutes on the schedule, but in practice, due to the engagement of the students typically 20-30 minutes of discussion would result.

RESULTS

The first workshop was conducted as a pilot to evaluate the student engagement and dialogue with the material. As the pilot ran longer than scheduled, we learned that students were keen to discuss feedback with their educators. Three subsequent feedback workshops were then conducted. By running the workshop across multiple cohorts and two different disciplines,

we were able to evaluate the workshop impact on students' perception of feedback and the effect on their metacognition and SRL capabilities. The main findings from Workshops 2, 3, and 4 (i.e. excluding the pilot) are presented in the following areas: student foreknowledge, task performance, impact on student metacognition and SRL, and the impact for educators. An initial comparison of the feedback from Workshops 3 and 4 revealed general consistency in results across the workshops. As the feedback from Workshop 2 was used to refine the questionnaires for Workshops 3 and 4, the figures below primarily present the combined results from these two workshops. The results are combined due to the smaller number of participants in Workshop 4 and as a result of the questions themselves being similar, rather than the participants. As not all participants replied to each question on the questionnaire, the number of participants is included for each Figure.

Student Foreknowledge

As students entered the workshop, they were asked to complete the pre-workshop questionnaire. This questionnaire consisted largely of questions exploring the student perspective of feedback. Figure 2 depicts word clouds showing the sentiments from student responses in the pre-workshop questionnaire for Workshops 3 and 4 to questions asking them to define features of good and bad feedback. A total of 28 responses were received for the question regarding good feedback and 26 regarding bad feedback. Students responded that good feedback is that

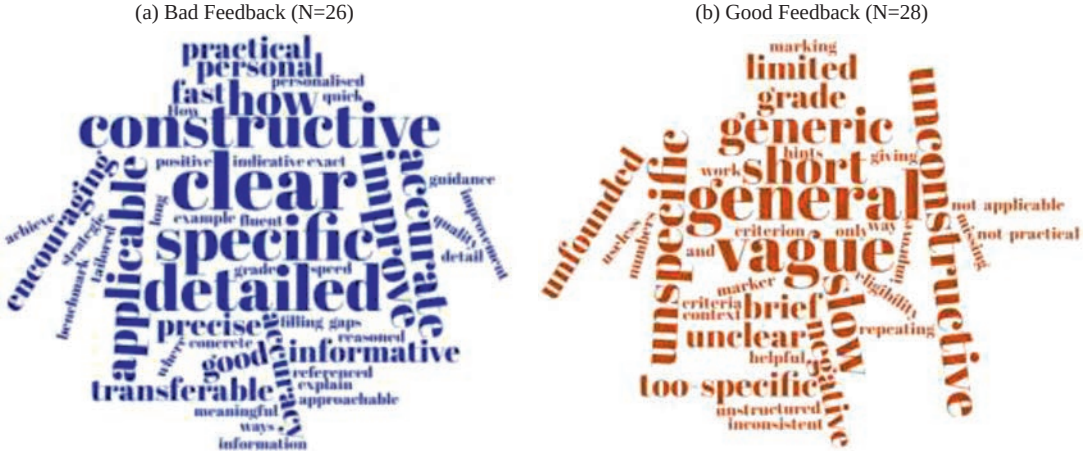

Figure 2. Word clouds depicting the sentiment from student feedback provided in response to the pre-workshop questionnaire from Workshops 3 and 4 showing clear differences between the characterization of good and bad feedback.

which is “constructive”, “clear”, “accurate”, and helps guide the student to make improvements in the future. Students used the words «general», «vague», «unclear», «short», and «generic» to describe bad feedback.

Task Performance

Once students completed the pre-workshop questionnaire, they were asked to provide feedback on two reports. The first task presented students with a blank document along with the rubric and the second provided scaffolding through use of the feedback structure, bank of comments from educators, and rubric made available through SWiFT. By comparing the average word count generated by students between the two tasks (Figure 3) it can be seen that there is an average increase in word count of ~280% from the first to the second exercise. As the digital feedback tool provided structure for the feedback which was aligned with the structure of the report, the comments from the second assignment also revealed much more structure than the first. There was also more consistency in structure across the feedback provided by students. Hence, in a disparate group of markers, the use of structured feedback tool may improve standardization.

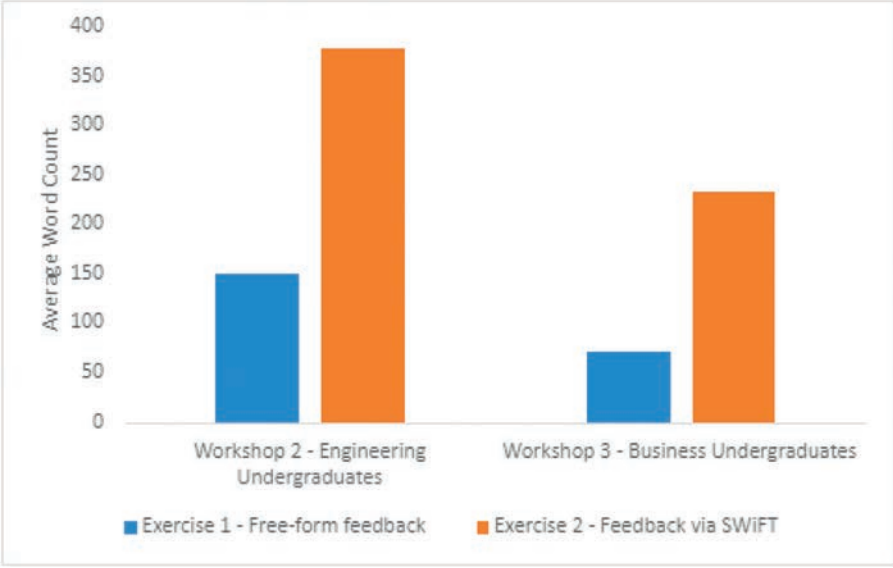

Figure 3. The amount of feedback provided by students increased when given SWiFT as a scaffold. Workshop 2: Task 1 N=10, Task 2 N=8. Workshop 3: Both tasks N=25. Note: the assignments were discipline specific so the comparison in word count between disciplines should not be made.

Impact on Students' Metacognition and Self-Regulated Learning Skills

The purpose of the workshops was to enhance students' metacognitive skills, which are necessary for them to regulate their own learning (Zimmerman, 2008). Following Workshop 2, additional questions were added to the post-workshop questionnaire to better identify the impact of the feedback sessions. The pie charts displayed in Figure 4 and Figure 5 show the combined responses from post-workshop questionnaires in Workshops 3 and 4, conducted with business and engineering students. These were self-selecting students in response to an email which invited them to develop their understanding of feedback within their discipline. An email invitation was sent to a diverse range of students for each workshop and the response was in general dependent on their availability to attend. The questions were identical with a total of 30 responses for each question. By reviewing Figure 4, it can be seen that over 75% of the students said that the session had altered their perception of feedback. As there was no guidance for standardizing the responses, there is a degree of variance in interpretation from each student. However, regardless of the interpretation, the trends are clear. We attributed this high positive response to the active

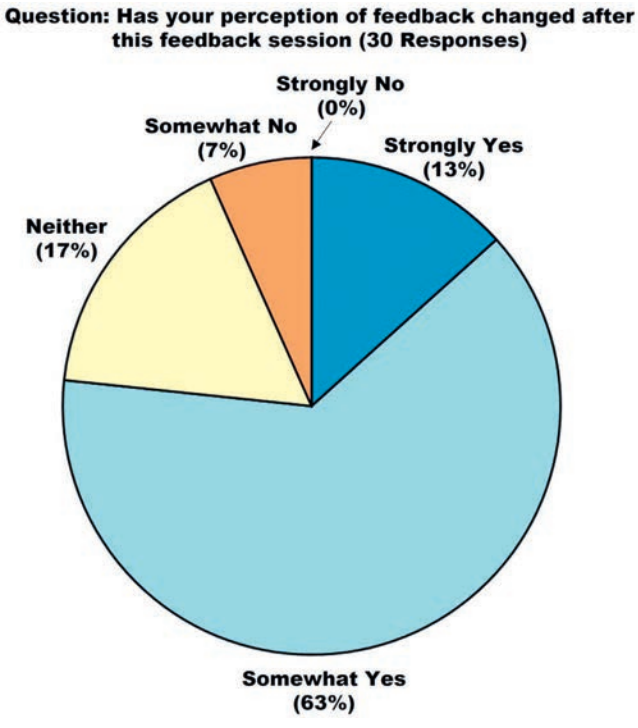

Figure 4. Most workshop participants stated that their perception of feedback changed Responses from Workshop 3-Business School (BSc) and Workshop 4-School of Engineering (MSc).

role that students undertook assessing the reports during the workshops, as these responses were from the post-questionnaires at the very end of the focus group discussion. In the post-workshop discussion, students highlighted that before the session they had a very passive role in interacting with feedback as they submitted a report and would then wait for the feedback from the marker. This task gave them the active role of assessing and deconstructing reports to allow them to provide formative feedback. During the group discussion students discussed that before the session they had not considered how staff marked reports and that after the two tasks they had a better understanding of the feedback process undertaken by educators. By showing students the feedback generation process, it was possible to improve or reinforce their understanding of key areas to focus on when generating reports. Understanding and application of this process enables students to demonstrate improved metacognitive and self-regulated learning abilities with respect to assessment literacy, thus a recommendation is to roll out these workshops more widely and regularly.

Within the free-text sections of the post-workshop questionnaires, students were able to display higher metacognitive and self-regulated learning understanding when answering the question, "Post-workshop how might you better use the feedback you receive to improve performance/assessment/assignments in your studies?":

- "I will put my mind into that of the assessor during writing of assignments. I will look at the feedback in my assignments more closely"
- "I have seen the common errors which are made in other lab reports and I would attempt not to make similar mistakes in the future."

Figure 5 further reinforces the positive learning outcomes acquired by the students during these sessions. The data displays that 80% of students believed that the sessions aided in improving their skills for understanding previous feedback attained. This again highlights the potential to acquire self-regulated learning skills as students believed that they would be able to review their previous feedback. This greater learning experience has the potential to aid in student metacognitive ability to suitably prepare themselves for the completion of future assignments. However, for this to occur, the feedback must be transferable. During the group discussion students highlighted that they rarely referred to previous feedback as typically they did not find it engaging. With the new skills attained, students may be equipped to process a wider range of feedback that they would not have engaged with previously. During the discussion, we observed the use of more precise language regarding feedback from students while they also shared and explained how they understood received feedback in the echo of the workshop. These observations were consistent with metacognition strategies because students expressed planning how to improve their future assignments and interaction with feedback (Sadler, 1989).

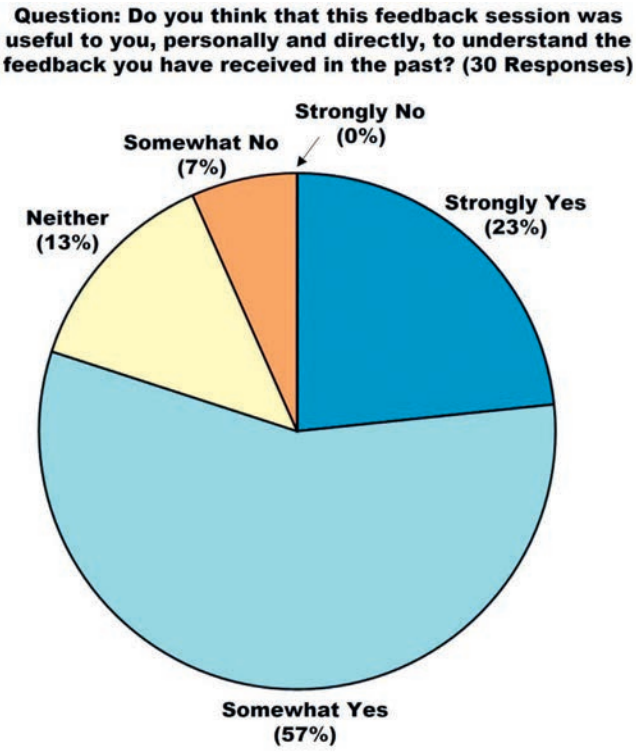

Figure 5. Most participants found the workshop useful in understanding feedback. Responses from Workshop 3-Business School (BSc) and Workshop 4-School of Engineering (MSc).

Figure 4 and Figure 5 are key indicators in displaying the efficiency of improving students' meta-cognitive and self-regulated learning. The graphs highlight that students had a positive experience which will enrich their interaction with feedback. This may indicate potential (or capacity) for students› growth in their ability to understand and apply feedback. As students grow in their SRL ability, this will give the greatest student enrichment experience, where students will be able to review previous feedback in greater detail, generate a plan of how to produce their next report, and monitor their progress along the way (Andrade, 2019). The most important aspect of the overall workshops is that students will develop and practice the skills to critique their own reports and further improve their reports before submitting a final product. This is a topic that was brought up and discussed by students at length during the group discussion, with students noting the workshop's positive impact in this area.

Impact on Academic Self-Regulated Learning

Although these feedback sessions were designed with the intention of altering the perception of the students, it is worthwhile to consider the perception of the educators. In conducting the workshops,

we found that the dialogue at the end was enhanced by having students engage with educators from within their own subject area. Having educators from the same discipline is also helpful in so that students can be given example reports and questionnaires that are most relevant. However, it is most important when including experts from within the same discipline to ensure that the students feel comfortable in voicing their opinions. We encourage educators conducting the workshops to invite students to give candid feedback as a means of supporting robust dialogue. We also observed educators learning from their students about their interaction with feedback, their difficulty in understanding the language of feedback, and what types of feedback students find valuable, confirming the findings presented in Duncan (2007) that feedback is not optimized to assist further learning.

The questionnaires were designed with free text questions to allow educators to use the student responses to aid in their own self-regulated learning about the manner in which they give feedback to students. A selection of questions were asked including if students found feedback constructive, if positive feedback was helpful and if there is something they would like to receive in future feedback. The results found that:

- Constructive feedback is helpful to students, but they thought that the comments ideally needed to be relatable to future work
- Students required both positive and constructive feedback so that they could compare the feedback to the marking rubric to understand why they had got the received mark.
- Positive comments were required to positively enforce the students' practices and to improve mental health during their study

Impactful Workshop Implementation

The final area to consider regarding the efficacy of the workshops is the most suitable academic year to invite to the feedback session. The post-workshop questionnaires asked students to say how effective the session would be for first year, second year and final year students. This was asked to understand students' mentality about the point at which this session should be implemented. If the session is given too early into students' university life, then they may not have the necessary experience in writing reports and receiving feedback to fully engage with the workshop. However, if the workshop is given too late into a student's university life, then valuable lessons could be missed by the students prior to the workshop as they will not have had the opportunity to attain a deeper knowledge of the feedback. From the results of the questionnaire presented in Figure 6, it can be seen that students suggested that these workshops would be highly beneficial across all academic years. Ideally these workshops would be integrated into the curriculum within and across years of studies. Workshop content could also be refined as the students develop, to further reinforce learning.

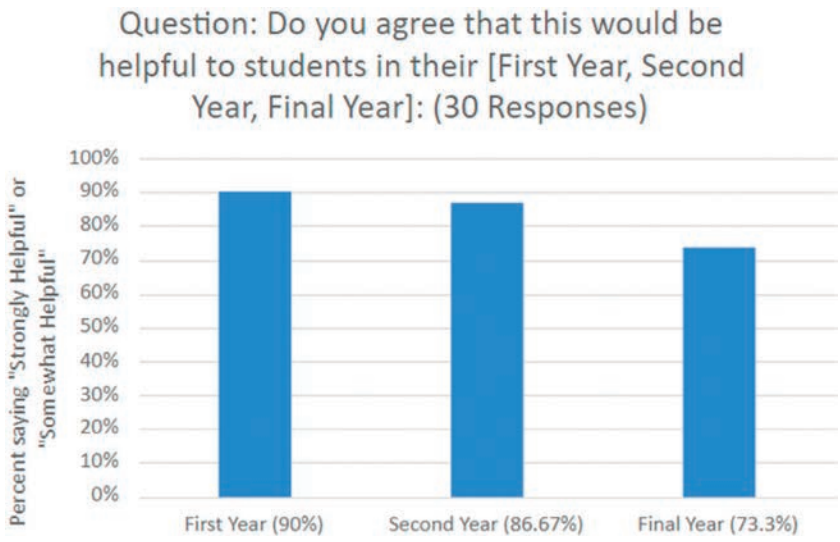

Figure 6. Most workshop participants indicated that the workshop would be helpful for future students across all years. Responses from Workshop 3-Business School (BSc) and Workshop 4-School of Engineering (MSc).

DISCUSSION

While these results were obtained from student participants, the results can also be informative for educators who provide feedback. The trend for higher word count, seen in the use of the feedback tool by the students at the workshop, provides a good indication of the potential of the tool to improve the efficiency of the feedback process for educators. But it is more than just being able to provide more feedback in the same time. The pre-populated phrases in the tool have been written based on best practice in the production of feedback and are also organized into a structure that matches the marking scheme structure (i.e. actionable, consistent, and goal-referenced, as described in Wiggins (2012)). Hence, the SWiFT-based feedback is considered to be of 'high quality'. The efficiency savings when using the pre-populated tool therefore allows the academic to deliver more, higher quality, feedback to each student; making the time spent on generating feedback more effective.

Placing students in the role of assessor as part of feedback workshops, leads to these students encountering a threshold concept in their SRL journey. A *threshold concept* represents "a transformed way of understanding, or interpreting, or viewing something without which the learner cannot progress" (Meyer & Land, p3, 2006). Better understanding of this threshold concept allows them to perceive and engage with feedback in a new way (Meyer & Land, 2006). The results obtained demonstrate the improved confidence of students in approaching and assessing their work.

However, the results also identify the need for the feedback language employed to be transferable to future assignments and linked to the marking rubric (be it implicitly or explicitly). The fact that such assertions follow from students' own feedback following workshops using SWiFT evidences the premise of students breaking through the barriers of a threshold concept on feedback. The results from our study emphasise the potential for using digital tools such as SWiFT, as scaffolds to aid the metacognitive learning of students and assist them during a cycle of life-long learning. Reported results of students' surveys show, across cohorts, an improvement in assessment literacy (Figure 5); this is likely to indicate not only increased students› satisfaction and understanding of the feedback provided, but also to lead to a more in-depth learning via self-reflective practices.

Opportunities for Integration of Self-Regulated Learning into Curriculum

Boud and Molloy (2013) highlight the importance of purposefully designing curricula to create opportunities for students to develop their SRL ability. The feedback workshop we present in this paper provides an activity that can be incorporated into the curriculum of first year university students. We recommend that it be delivered as a workshop following the first teaching period to allow students to have some experience with university feedback while still at the formative stages of their learning. The format of the session encourages all students to engage and participate in the activities, which are often not practical in large lecture settings. These workshops promote and encourage deep learning because students are encouraged (or provided opportunity) to be immersed in the activity and take responsibility for their learning as the literature suggests (Lynch, McNamara, & Seery, 2012). The workshops would also provide an opportunity for students to become more familiar with the vocabulary used by educators. Beyond our recommendation that the workshops be conducted across all years of study to maximise their life-long learning and provide an annual refresher and opportunity to build upon the lessons learned in previous years, the design is flexible to allow the workshops to be customised for different stages of the students› university experience. For instance, more robust discussion could take place in the second or later years as students become more familiar with the process. As the workshop remains applicable, it may still be worthwhile to hold a separate refresher course for final year students. This can encourage students to take and sustain these metacognitive and self-regulated learning skills in the workplace. With more mature students, we observed greater willingness to provide direct feedback to assessors. This is supported by the students' responses as detailed above. Previous students involved in these sessions have noted they found the task to be helpful when generating future reports. It has also been informative for educators involved in these sessions to better understand the student perspective and expectations surrounding feedback. The robustness of these results is verified by very similar responses across different cohorts. More specifically, while economics students are known to have

different behaviours in cooperative contexts (Carter & Irons, 1991; Zsolnai, 2003; Bauman & Rose, 2011), their feedback was remarkably similar to the engineering students.

Feedback in the Digital Age

When approaching feedback in the digital age, it is paramount to identify that the digital component enables efficient approaches to the process of feedback generation. Therefore, technology can be regarded as aiding the means by which feedback is provided to enhance learning. However, the quality of feedback through use of a digital tool such as SWiFT is directly linked to the quality and time invested into creation of the statement bank. The quality of the statement bank may be enhanced by a regular review and knowledge sharing across educators providing feedback on similar assignments. The tool enables statement banks to be shared across such courses, facilitating this review. In addition, rather than building a bank from scratch, new educators could seek to start from existing statement banks provided by experienced educators to enhance the quality. Overall, the important thing is to seek continuous improvement, rather than relying on static feedback. By facilitating enhanced consistency and quality of comments, SWiFT tackles student concerns about format and quality of feedback during the assessment process. As discussed in the paper and from our experience, SWiFT provides semi-automated feedback that enhances the process by reducing the time taken to generate student-specific feedback while also reducing the fatigue factor. Additionally, our study showed that student perception of feedback after the workshops was that of more transparent assessment of the work submitted even when multiple markers may be associated with a piece of work. Vitally, the digital tool SWiFT does provide access for students to engage in metacognitive learning via a process which can be sustainably delivered to large cohorts of students. The potential benefit is enabling a threshold-concept on feedback to be broken through to support self-evaluation of their work, ergo lifelong learning.

Value of Digital Feedback Tools

The feedback application used in the workshops is also easily adaptable for students to use as part of their independent learning and self-appraisal of their work. For example, if the students are provided with a typical example of a set of applicable feedback phrases for their assignment, before submission, they can self-assess and identify areas that require improvement. Planning is required to generate a quality feedback bank. Nicol (2010) posits that exposure of students to such banks of comments would be beneficial to encourage inner reflection. Furthermore, this supports student assessment literacy which suggests that students are the ones best equipped to provide formative feedback (Andrade & Cizek, 2010).

The use of SWiFT in the feedback process is valuable to educators and students alike. Aiding the academic to better package their feedback message, can better inform students due to the

enhanced consistency of feedback. However, the process needs to be regulated to ensure that any increased word-count is well received by students. For example, this might include explanation which is more pointed in identifying key points for the student to follow: inducing change, or encouraging a learner to stay on course. Timely feedback should enable a learner to improve, and personalized feedback is important because it enables improvement one step at a time; i.e. lifelong learning which is sustainable and the semi-automated feedback from tools such as SWiFT can facilitate this timeliness. Critically, the concept of timeliness relates to when a learner perceives the feedback as being pertinent (e.g. before writing a thesis) as well as 'fresh' (e.g. no undue delay following submission of work).

Enhancing Metacognition and Understanding of Feedback

The findings from the questionnaire were consistent with the literature in the way in which students described what constitutes good and bad feedback (Bailey, 2009; ElShaer et al., 2019; Hattie & Timperley, 2007). One drawback to the study was the change of the questionnaire format and questions across the workshops. While this was done to tailor the questions to be more relevant across different audiences, it created difficulty when comparing some of the findings across the workshops. Therefore, the authors recommend that future work use a series of control questions across workshops to further enhance comparison of key concepts. From the results of the questionnaires, we argue that students went through a threshold concept on feedback. Specifically, in asking students to compare their experiences for providing unstructured, free-hand feedback to the structured task with the use of the SWiFT template, we witnessed students identifying a link between structured evaluation and feedback. Probing the metacognitive process, we aimed to transfer that experience back to the process of writing assignments with the purpose that this feedback task would reinforce better structure and understanding of the actual assignments. This was consequential to taking the role of the assessor, viewing feedback through the Teacher's lens (Brookfield, 2017), leading to the evaluation of feedback, and its interpretation to which students would not otherwise be exposed. If feedback is intended to induce change where needed, and/or encourage maintaining course, then the ability to evaluate that message is paramount. Meaningfully, by taking a teacher's lens approach, it is argued that students take on roles and engage in tasks that enhance strategies for metacognitive learning (Sadler, 1989). Some of these tasks that were evident in the workshops were: learning to self-evaluate, moving away from trying to understand feedback received, towards evaluating and assisting creation of it, reflecting a higher level of cognitive function as identified via Bloom's taxonomy (Bloom et al., 1956). This form of directed student learning is invaluable, as it reduces reliance on a teacher, instead supporting students' ability to self-learn. It is proposed, therefore, that semi-automation

via a digital feedback tool provides a best-of-both-worlds combination: structure to guide the learner, but also the freedom to interact with that structure (e.g. free-text) in this new role as an assessor; thus, aiding self-assessment. This benefit is not only the case for a learner attending the workshop, but also for a new evaluator using the SWiFT tool; i.e. it is a framework enhancing self-regulated learning.

One strategy employed during the workshops was use of a dialogic feedback cycle (Beaumont, O'Doherty, & Shannon, 2008), where preparatory guidance was given, students were guided in a task, and then performance feedback was provided through discussion at the end of workshops. The dialogic feedback process provides students with a right to reply, which is central because this reply allows identification of student misconceptions, which can then be easily corrected. This highlights the importance of 'timely' feedback: which we suggest be viewed not solely in terms of timescale but the best moment at which the message of the feedback will most likely be assimilated by students. The use of dialogic processes to aid the student in identifying their misconception (be it on the feedback process, what is feedback, or how to perform a specific task) facilitates the process of self-regulated learning. Many aspects of the teacher-learner experience are teacher-dependent (Hofstein & Lunetta, 1982). Although this is likely to be the case to some extent for the dialogic process of learning which aid the conclusion of workshops, the process of supported feedback synthesis is independent of the assessor and so unlikely affected by this component of workshops.

CONCLUSION

Equipping students with the metacognitive and self-assessment skills needed to regulate their own learning is key to the academic experience (Andrade, 2019; Zimmerman, 1990). This paper has presented a methodology to conduct a feedback workshop with the aid of a digital feedback tool to allow students to develop these skills. Results from conducting this workshop across various cohorts with students from engineering and business demonstrate that the workshop can enhance students understanding of the feedback process, and better equip them for Self-Regulated Learning.

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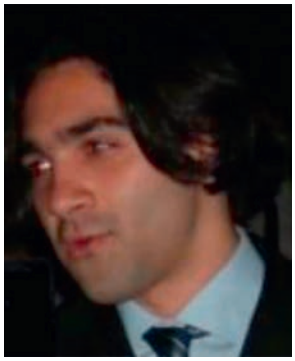

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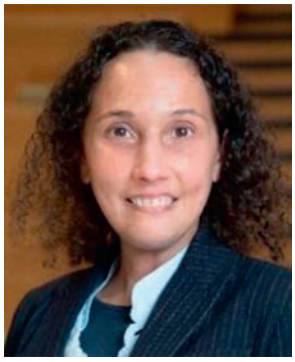

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APPENDIX A. SWIFT

The SoftWare integrated Feedback Tool (SWiFT) used for the feedback workshops consisted of a Homepage which way displayed to students as they entered the workshop. This can be seen in Figure A1. The home page displays links to the pre and post workshop questionnaire as well as the two assignments for the students to assess.

Figure A1. SWiFT Homepage.

When providing feedback in SWiFT, the reports to be assessed are loaded on the left hand side of the screen and the comments are provided on the right hand side. This can be seen in Figure A2.

For each section, a series of pre-populated feedback phrases are available grouped into positive and constructive comments. The user is able to click on the phrase and it will be added to the feedback for that section as shown in Figure A3. The user is then able to customise the text to personalise the feedback. Finally, all of the comments for the sections are compiled together and saved as a pdf.

Finally, the tool is able to capture data on the most frequently used feedback phrases, the time spent marking, and the average number of words provided to each report as shown in Figure A4.

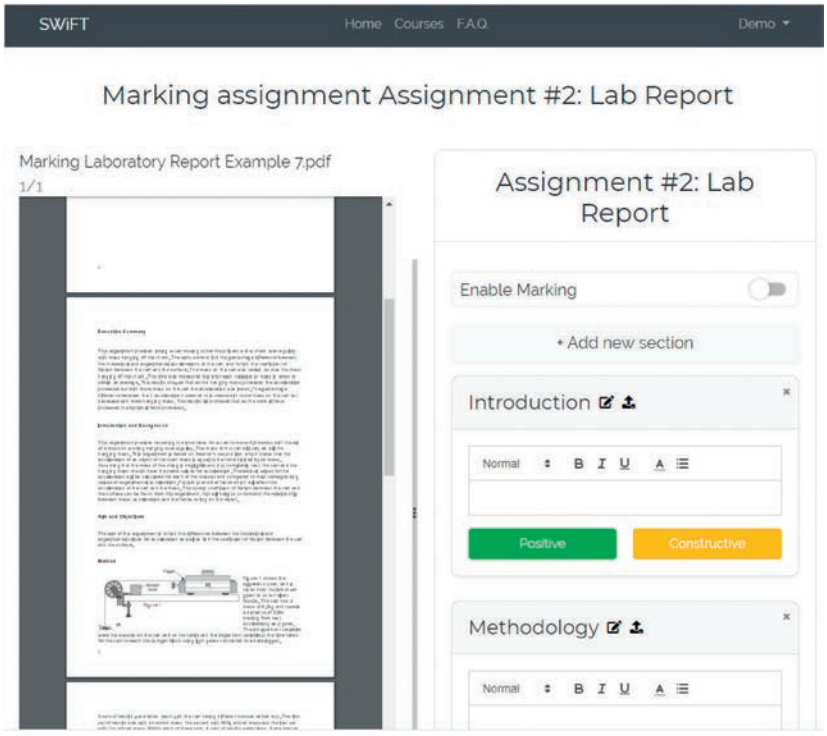

Figure A2. SWiFT screen to read report and provide feedback.

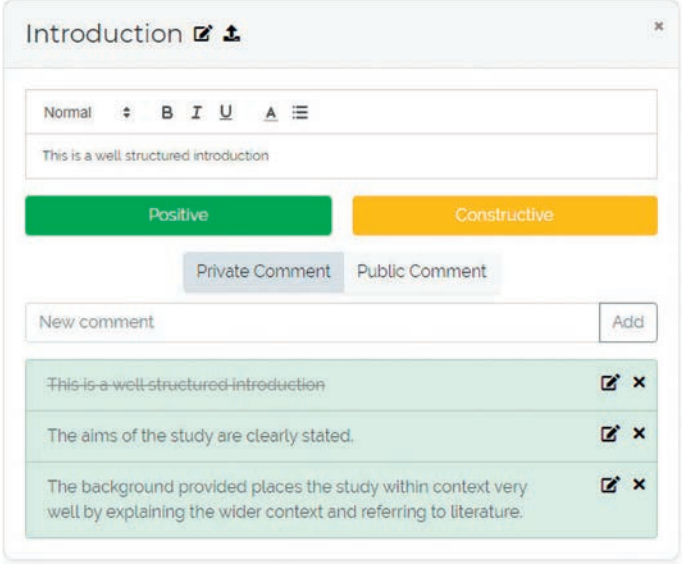

Figure A3. ***Using SWiFT's pre-populated feedback.***

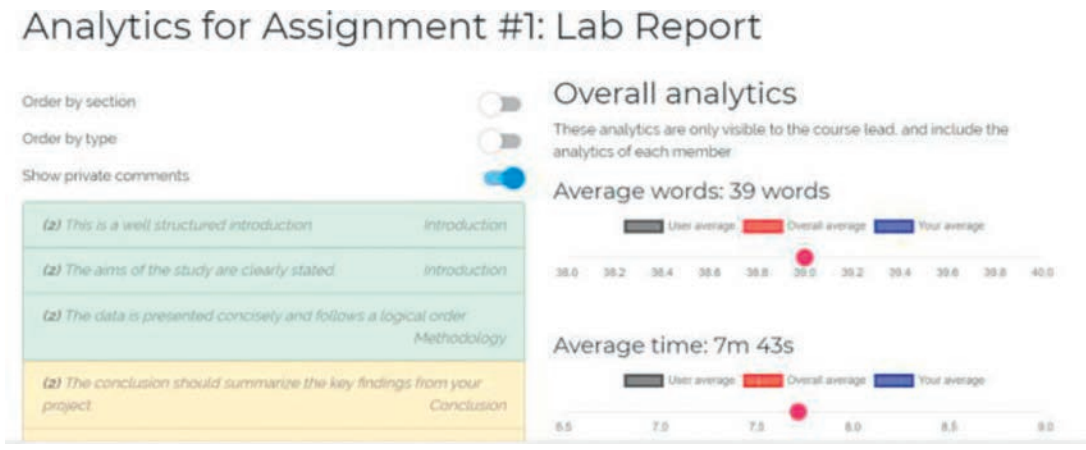

Figure A4. SWiFT analytics dashboard.