How Can Colour-coded Teaching Materials and Feedback Help Students to Increase Their Understanding of Critical Thinking Skills in a Reflective Practice Module?

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How can colour-coded teaching materials and feedback help students to increase their understanding of Critical Thinking Skills in a Reflective Practice Module?

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Abstract
Dublin City University (DCU) offers a year-long 5 ECTS (European Credit Transfer System) accredited module to students involved in extra-curricular activities. The ‘Uaneen’ module has reflective practice at its core and a key element is to teach students to critically reflect on leadership skills gained through this participation. Many students struggle to develop critical thinking skills. This study examined how to rectify this by changing course content of a module within a Virtual Learning Environment (VLE) and introducing a new approach of providing extensive feedback on non-graded submissions.

An Action Research was the preferred methodology throughout the research process, as student involvement was to the fore of this study; student ideas were integral to designing new learning materials. The study was conducted over two cycles with five 4th year students who provided data through a questionnaire and two focus groups. Students were given access to a VLE that contained interactive videos, Powerpoint slides and reading material to develop critical thinking skills.

The findings suggested students improved critical thinking skills between cycles 1 and 2. The findings add to theory indicating that colour-coded teaching materials are more engaging and can stimulate positive learning opportunities. The key recommendations arising from this study are that reflective practice instructors can aid students’ to better understand critical
thinking skills by creating colour-coded module specific materials and providing corresponding colour-coded feedback.

**Keywords:** critical thinking; feedback; reflective portfolios; reflective writing; virtual learning environment

**Introduction**

Dublin City University (DCU) is an Irish university that offers a year-long 5 ECTS credits module to students involved in non-academic extra-curricular (sports, art, volunteering, etc.) activities since 2004. The module already has an established assessment criterion and rubric and there were no adjustments to these in this study. The module was named after a late alumnus and coincides with DCU’s aim of improving students’ employability skills by creating effective communicators and active leaders through personal attributes and transferable skills. Reflective practice is the core of the module and one of the key learning objectives is for students to reflect on and critically analyse competencies gained from extra-curricular activities. Students submit a reflective portfolio that is graded at the end of the year. Grades are attributed as follows: 5% for a Log of Activities (record of involvement), 10% for Level of Involvement, 35% for Competencies Gained, 35% for Self-Reflection, Values and Ethos and 15% for Presentation and Structure.

The numbers of students are decreasing each year; in the academic year 2019, 49 students opted to take the module, with 39 taking the module in 2020. Reflective practice has proven challenging for some students who take this module. Some difficulties identified with the module include the lack of face-to-face teaching opportunities throughout the year. The module has no lecturer or timetabled classes. This study is the beginning of a major overhaul
of the module with long term-goals of increasing teaching opportunities through face-to-face contact or recorded lectures.

The current module structure requires attendance at one workshop each semester. Students are assigned to a mentor in Semester 2 who assists them in preparing their portfolio. The Uaneen module’s VLE offered few resources and was a repository for suggested readings and slides from past workshops. This material was negligible in teaching students the crux of deep critical reflection. For assessment purposes, students are required to submit one non-graded short reflective essay in semester 1 and the portfolio in semester 2. Module tutors acknowledged there was a gap for some students to understand how to undertake deeper reflection involving a more critical appraisal of their experiences and decisions.

This project aimed to address some of the issues by examining ways to improve teaching critically reflective writing. A new valuable and engaging VLE was created with more interactive content using interactive Powerpoint slides, videos, quizzes and aural material. In addition, it implemented a new approach by building in extensive feedback as a key element to develop students’ understanding of deep critical reflection. Gibbs Reflective Cycle is used in the module as it is considered the most thorough framework for reflection. The model has six elements (description, feelings, evaluation, analysis, action plan, conclusion). The new material applied a colour to represent each element of the cycle, and the feedback given to students corresponded to this new colour-coded system.
Figure 1 Reflective Practice [Gibbs Reflective Model Online Image, University of Sheffield (2020)]
https://www.sheffield.ac.uk/ssid/301/study-skills/university-study/reflective-practice

The study sought to investigate students’ perception of the value of this approach. It was imperative that students were actively involved from the beginning of the project. Action Research was deemed the most appropriate methodology as the aim of the research was to reflect on current teaching practices, evaluate them and make changes to improve how students are taught reflective writing (Costello, 2011). Participants initially answered a short questionnaire to gauge their understanding of the module and reflective writing before committing to two cycles of learning and research. The research comprised gathering data through two focus groups to appraise the usefulness of the initiative to develop Uaneen students’ reflective writing and enhance their understanding of critical thinking skills.

The research questions used to structure the study were:
1. How can students develop their understanding of critical thinking skills and recognise its importance in reflective writing?
2. Can materials created specifically for the Uaneen module help students?

3. What impact will introducing the new element of feedback have on students?

This paper examines the effectiveness of new teaching material in the Uaneen module VLE that increased students’ awareness in understanding critically reflective writing skills. It argues that the interactive tools that provided modelling of good reflective writing helped build students’ criticality skills. It also argues that feedback plays a crucial role in building students’ confidence when teaching reflective writing.

**The value of reflective practice in higher education**

Kolb (2015) stated experiential learning is increasingly recognised as educators understand the value of learning from competencies. Reflective practice aids students in developing personal attributes through critical thinking skills (Hancock, Dyk & Jones, 2012). It is seen as a worthwhile practice beyond nursing and teaching students (Clegg, 2000). Bruno & Dell’Aversana (2017) stated that by creating an environment where critical thinking and analysis is encouraged, students actively involved in their own learning were deemed better prepared for the world of work (see p.4). By allowing students to be actively involved in their own learning, they can apply meaningful construction of knowledge to areas that reflect their own interests, thus developing critical thinking skills (Brown, 2008; Bolton & Delderfield, 2017).

Wharton (2017) stated that journals are useful as a starting point for learning reflection. Hume (2009, p.250) stated a reflective journal allows a student “to monitor their personal knowledge and skill growth and comment on this growth in their reflective writing”.

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According to Boud (2001), structured journal writing encourages the student to continuously process and re-form their learning, thus recognising and building on their competencies; quality and depth of reflection occurs over time. The submission of reflective journals is the preferred way of students demonstrating their reflective knowledge (McGarr & Moody, 2010).

**Issues when teaching reflective writing**

Bharuthram (2018, p.808) gives significant insight into difficulties students experience with reflective writing stating that students “are often expected to reflect, without any introduction to what reflection means or how to go about it”. The task of writing reflectively cohesively for students more familiar with an academic approach can cause anxiety when they are ill-prepared to do so, and students continue to give descriptive accounts of their experiences, with little critical analysis or deep thinking involved (see p.5) (Bharuthram, 2018; Campbell & Norton, 2007; Dryud & Worley, 2013).

Reflective writing is taught at a superficial level in Irish institutions as enough time is not given to develop the skill (Ryan, 2011; Bharuthram, 2018). Ryan (2011) stated teaching reflection is not approached in a systematic way and providing reading samples of reflective writing will not teach students what it is unless they have opportunity to evaluate and practice it (see p.5).

**How can best practice be applied to a reflective module?**

Best practice is achieved by allowing students to explore and analyse their own experiences within a theoretical framework (Ryan, 2011). Reflective journals alone cannot teach reflective writing and other structures must be in place (Hume, 2009). Writing reflective journals must
be combined with another method of teaching, such as feedback, to ensure students are fully supported to engage in a deeper level of writing (see p.15) (Hume, 2009; Campbell & Norton, 2007).

According to Hatzapostolou & Paraskakis (2010, p.111) “feedback is an essential component in all learning contexts” and can increase student motivation, confidence and desire to learn. Cauley & McMillan (2010, p.1) stated formative assessment and feedback can increase student engagement by providing “instructional adjustments that can help improve student learning”. This should be an ongoing practice that encourages student mastery of the subject.

Showing students examples of reflective writing is not enough (see p.5) but modelling good reflective practice can allow progressive development as it provides solid examples of expectations. Students responded well to previous examples of good and bad models of reflective writing (see p.15). Modelling moved students away from being told what to do and developed independent thinking, a crucial aspect in developing critical thinking (Hume, 2009; Loughran, 1996; Ahmed, 2019).

Colour-coding can be a useful teaching tool in educational settings (see p.16). Colourful materials can stimulate positive behaviours, stimulation, attention span and learning attitudes (Duyan & Unver, 2016). By presenting materials in colour, students are more inclined to pay attention to the information being presented, according to Chang, Xu & Watt (2018). Learners can process colour faster and, as a result, this can enhance knowledge acquisition. Mack (2013) argues that incorporating colour into student feedback can be a useful teaching aid by applying different colours to sections of text e.g. green for excellent work, pink for areas of improvement. Students responded to colour-coding and found it an effective strategy
as they could identify what they were doing well and where they needed to improve (see p.27).

**Adapting Gibbs Reflective Model to create colour-coded teaching materials and feedback for the Uaneen module**

The literature review was instrumental in providing an understanding of the importance of reflective practice to students in Higher Level Education. There are currently very few articles that concentrate on reflective writing directly in relation to extra-curricular activities for academic accreditation, particularly in an Irish setting. This makes the Uaneen module truly unique and it is therefore imperative that we strive to ensure students are successful in completing the module.

Research suggests that modelling best practice of reflective writing is a useful teaching tool to develop students’ critical thinking skills. This, combined with colour-coded feedback, can allow students to progressively develop a better understanding of criticality over time. Innovative material can engage students’ motivation to develop critical thinking to a deep level before attempting a critically reflective portfolio.

Gibbs Reflective Model is used in the Uaneen module to teach reflective writing as it is considered a thorough model to develop critical thinking. The Gibbs Reflective Model was adapted to create a colour-code that corresponded to each of the six elements of the model. When developing new teaching materials, colours were assigned to each element of the model for demonstration purposes, i.e. red for description, blue for feelings, green for evaluation, purple for analysis, orange for action plan and black for conclusion. Exemplar
paragraphs were created applying this colour-code to each sentence and incorporated into all teaching materials e.g. Powerpoint slides, videos, images, pdf files, etc. (see p.21).

This colour-code was carried over into the new feedback element. Once students submitted a non-graded piece of work, the colour-code was applied to one of their own paragraphs. Then, this paragraph was re-edited to model an exemplar paragraph with the colour-coding applied. Students found this the most effective teaching tool to help them better understanding reflective writing (see p.27).

Methods

An Action Research was applied to this project to examine how 5 students are taught reflective writing in the Uaneen module. There were two cycles of learning activities, and research instruments comprised a questionnaire and two focus groups. An important element of this research was to change how students are taught critical analytical skills over the two cycles. As expected, there was an improvement in critical thinking skills between cycles 1 and 2.

It was imperative that students were actively involved in reviewing how the module was taught to them, identifying areas that could be changed, and creating material they felt best helped them to learn. Mills Dialectic Acton Research Spiral (2003) was the chosen framework and was adapted for an iterative process of two cycles.
The research sample was small in size (3 females, 2 males).

**Timeline**

**Table 1** Timeline for participants who took part in the research project

**Cycle 1:**

| November 2019 | - Recruit participants  
|              | - Initial Questionnaire  
|              | - Create VLE materials  
|              | - Participants access VLE materials  
|              | - Participants submit work  
|              | - Participants receive feedback  
|              | - Participants attend focus group |

**Design Phase:**

| January 2020 | - Create material for Cycle 2 based on focus group discussion  
|              | - Participants access VLE materials |
Cycle 2:

| February 2020 | - Participants submit part portfolio  
- Participants receive feedback  
- Participants attend focus group |

The research instrument was a questionnaire of three questions. The first two questions considered students opinion of the module and any concerns they had about it. The third question was to gauge students understanding of reflective writing.

1. Why did you take the Uaneen module?
2. What benefits do you think taking the Uaneen module will give you?
3. What is your current understanding of reflective writing?

Data from the third question showed students had a limited understanding of reflective writing and critical thinking skills, and the results were used to inform the creation of interactive materials in Cycle 1. The area of focus in Cycle 1 was to provide students with a basic understanding of reflective writing. Participants watched a short video giving a basic introduction to reflective writing. Students completed a quiz created in the VLE of 5 questions including a mixture of true/false questions, blanks to compete a sentence, and selecting reflective models. After viewing Powerpoint slides giving instructions to write a 400-word reflective submission, students submitted work. The reflective aspect of Cycle 1 began following submission feedback.

Data was collected through a recorded focus group that lasted approximately one hour. Students answered questions about how useful they found the materials, why materials were / were not effective and what changes they wanted to the materials. They answered questions
about how valuable they found feedback. The students responded well to videos and the quiz as they reiterated what was taught at workshops. Powerpoint was the least popular material because it wasn’t compatible to all devices used. Students were very keen on the feedback and found this to be an effective tool that helped increase their understanding of reflection. Students were an integral part of generating ideas for materials in Cycle 2 and were vocal about what they thought would benefit them.

Analysis and interpretation of the data from the focus group at the end of Cycle 1 revealed students wanted materials that focused on specific problem areas they were encountering when writing their portfolio, i.e. critical thinking skills. They wanted examples of exemplary critically analytical reflective writing to be created that clearly demonstrated how the maximum marking criterion was applied to the samples.

The area of focus in Cycle 2 was improving critical thinking skills. At the students’ behest, multi-formatted (audio, visual, reading) materials were created with a particular emphasis on developing criticality skills. The students wanted material that was creative and engaging but reiterated concepts they were already familiar with to help develop their skill. This was achieved by innovatively adapting Gibbs Reflective Cycle (Husebo, O’Regan & Nestel, 2015) as students were familiar with it. A new colour-coded modelling tool was created to write exemplar paragraphs where descriptive text was written in red, feelings in blue, evaluation in green and analysis in purple.

Participants submitted part of their portfolio (1,200 words) at beginning of Cycle 2, receiving extensive colour-coded feedback that corresponded to the colour scheme created for the Gibbs Reflective Model, to test if this method would be an effective teaching tool. A
paragraph from each student’s submission was colour-coding to highlight how much of their writing was descriptive, evaluative, analytical, etc. Under this, a reworked exemplary paragraph was provided using the colour-coding to model how to lessen red text and increase green and purple text.

The reflective aspect of Cycle 2 began following submission feedback. Data was collected through a recorded focus group that lasted approximately one hour. Students answered questions about how useful they found the materials, why materials were / were not effective and what changes could be made to the materials. They were also asked about colour-coded feedback that corresponded to the adoption of Gibbs model.

Students responded well to the multi-formatted materials as they were downloadable to any mobile device. They were very positive about the materials that focused on critical analysis as they found them easy to follow and to engage with. They were particularly enthusiastic about the colour-coded materials and feedback in this cycle.

**Role of Feedback**

Students found the level of feedback provided in Cycle 1 to be helpful in aiding them to identify where they could have developed critical analysis in their writing but they still had some uncertainties of how to incorporate the depth of reflection needed when re-editing their work themselves. Although they were provided with exemplar paragraphs, they found it difficult to identify and differentiate the style of writing they should be aiming for. Colour-coded feedback was used in Cycle 2; students were presented with a better visual structure to their feedback. By applying colour-coding to the student’s paragraph and then re-writing that paragraph using colour-coding to include deeply critical reflective writing as a
good model paragraph, students could identify sentence structures and vocabulary
differences more clearly. Students also found the inclusion of comments and questions
throughout the remainder of the submission encouraging and helped them identify areas
where they needed to draw out their personal learning from their experiences.

During the second focus group discussion, participants were very enthusiastic about the
feedback mechanism. They were particularly keen on the colour-coded method that provided
an example paragraph as they felt it provided a template for shaping the remainder of their
portfolio.

**Results and Discussion**

*All names have been changed and each participant has been given a pseudonym.*

**Analysis**

Codes were created by analysing the data with basic and organising themes identified
(Attride-Stirling, 2001). The global theme identified is ‘Improving Reflective Writing’.
Many themes emerged from data analysis but those considered most pertinent to this research
will be discussed herein.

**Table 2 Main themes following data analysis**

<table>
<thead>
<tr>
<th>Theme 1</th>
<th>Modelling good practice and colour-coded interventions improved understanding of critical analysis in reflective writing</th>
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<td>Theme 2</td>
<td>Students found tailored resources for the Uaneen module helpful when easily accessible within a dedicated VLE</td>
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<td>Theme 3</td>
<td>Feedback created a safe space to practice with personalised dialogue to help reflective writing</td>
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Modelling good practice and colour-coded interventions improved understanding of critical analysis in reflective writing

Ahmed (2019) stated modelling can be a good teaching tool as it provides clear examples to students of expectations, while allowing development of their independent thinking. All participants desired a greater understanding of reflective writing before attempting their portfolio. The students were aware at the beginning of the research they had limited skills in reflection and the first submitted piece at the end of cycle 1 was predominantly descriptive for all participants. During the first focus group, they acknowledged they did not have mastery of writing critically. They were also beginning to recognise themselves the areas of their submissions they could improve on. All participants were aware their critical analysis was not deep enough, but understood continuous practice could rectify that as Ailbhe said:

**Ailbhe**: Yeah, it's having to be more critical but that's just going to come with more, like, so having to just go deeper each time. But the further you go, the better I think (Cycle 2).

Following feedback and during the first focus group, they were aware they had made mistakes and were keen on vastly improving critical analysis. Although information provided at workshops explains critical analysis, students did not think it was presented in a way that allowed them to fully grasp the meaning of it. They wanted a solution that helped them better understand this information. Students felt that by re-writing a paragraph within the feedback - to demonstrate an approach to vocabulary that replaced descriptive words - with a more critical approach was the best way to highlight how they could better structure their own paragraphs. This also reiterated information presented to them at workshops. Participants found this type of feedback very helpful and felt it gave them a template to work from.
Critical reflection was the main area all students were concerned with and they wanted materials created that specifically addressed this issue. Joanne was the participant who most struggled with the critical analysis aspect; much of her feedback was heavy with direction to show her how to restructure her paragraphs in a more critically analytical fashion. Students were unsure how to change the language they used from descriptive to analytical.

**Joanne:** There were several different resources in several different formats I could explore to learn about reflective writing. The biggest challenge I found was expressing on paper my thoughts in a critical reflective way. I find the critical analysis the most difficult part to grasp. I feel I struggle with this area more than identifying the feelings I felt or made others feel (Cycle 1).

Following generation of ideas in Focus Group 1, specific material for the Uaneen module was created for Cycle 2 that incorporated Gibbs Reflective Cycle to improve knowledge of deep reflective critical analysis. Gibbs Reflective Model was adapted in an innovative fashion to create colour-coded material that corresponded to each element of that model. Four exemplary sample paragraphs were created to highlight different types of vocabulary, e.g. red for description, blue for feelings, green for evaluation and purple for analysis. The paragraphs modelled to students that their writing should have a higher percentage of green (evaluation) and purple (analysis) than red and blue. In this way, it was hoped to model to students how best to use their words i.e. less description and more analysis. Participants found this a highly valuable technique and liked the visual element of explicitly demonstrating to them the level of critically reflective writing expected. Creating colour-coded materials applicable to a reflective model they were already familiar with was beneficial as it was a positive way to reinforce the model in a meaningful way.
**Michael:** ... now it’s in my brain and now when I go back to reflect, I’ll be like, ok, my framework is the Gibbs model and then I go back to that (Cycle 1).

**Joanne:** I think when you kind of give the examples, do you know when you had the different colour schemes in the different sections, you could kind of see for yourself that it is a kind of template in itself because you can kind of see, you can kind of look at your own and you can do a comparison and see if you’re kind of ticking the boxes (Cycle 2).

Students implemented the colour-coding into their draft work before submissions at the beginning of Cycle 2 that helped them identify how best to improve critically analytical vocabulary. It gave participants an opportunity to identify their own areas of improvement, rectify their vocabulary and improve their understanding of this vital skill as per Ryan (2011) and Bharuthram (2018). The level of critical analysis in the second attempt was a vast improvement from Cycle 1. At the second focus group, participants were confident they understood critical analysis and could identify areas themselves that required deeper critical reflection. They felt they now had the skill to write their material in a more critically analytical fashion. Their perception of critical reflection had evolved to a deep level of understanding:

**Michael:** I had to be more critical and then I had already looked at the thing [resources] on being critical so I went, ok, now I’ve already looked at that resource and now I need to look at that resource even more because now I know where I’m going wrong where as I had thought I was being critical (Cycle 2).
At the end of the research project they felt they had enough knowledge to respond to mentor feedback pointing out areas that needed improvement to generate further critical analysis in their writing.

**Students found tailored resources for the Uaneen module helpful when easily accessible within a dedicated VLE**

Brown (2008) stated students should be actively involved in their own learning to make it meaningful. Students should have access to quality materials that enhance their learning in an engaging fashion. Uaneen students are currently given links to external websites from international universities that have created their own materials to explain reflective writing. Data revealed students were not keen on this process, and had a preference for materials created specifically for this module. Participants felt materials should be created specifically for the core elements of creating sections of the portfolio, and to make the material more meaningful and more relatable to their DCU experience. Ailbhe stated being asked to view other university websites did not help her understand what the expectations of this particular module were:

*Ailbhe: Coming from the people who want to make this module the best that it can be, that it's not 'here's a random American website, here's an English one saying a different thing, here's a video ... ’ (Cycle 1).*

With this in mind, materials within the VLE were created specific to the Uaneen module, including visual aids - a video was created to give a basic introduction to reflective writing as well as a video that explained how to change descriptive pieces of writing to reflective pieces. They were also given a Powerpoint presentation to explain their first submission. None of the participants were keen on Powerpoint for various reasons - some devices would not allow for
correct downloading and formatting, others did not know how to use presentation mode so missed out on much of the material, as mentioned by Stephen:

Stephen: Yeah, I found it quite easy to engage with most of the material except, just, presentation mode on the Powerpoint. If I knew that, it would have been a lot better, but I found all the material to be really good (Cycle 1).

All participants agreed the materials in Cycle 1 helped give them a better idea of portfolio structure and provided them with templates and guidelines of how to approach their writing. However, the participants disliked the generic content; they felt it did not explain well enough the expectations of the portfolio. They wanted material created for Cycle 2 that was specific to the exact requirements of the module. The students wanted an assignment brief to be created that clearly outlined the assessment and grading requirements. Ellen particularly wanted specific material that explained key points succinctly rather than being directed to various resources about the same topic:

Ellen: I think it’s just, like – but I’m just the type of person that would look into everything that’s up to just try and get the best, obviously idea of what kind of way I should go (Cycle 2).

Multi-formatted materials were developed for Cycle 2 to expressly explain to students the expected elements required for their portfolio e.g. Log of Activities, Table of Contents, Introduction, Main text, Conclusion, References along with suggested word count for each part of the portfolio. Students found the resources specifically created for the module requirements helpful as a starting point to provide guidance.
The key element of this research was to increase participants’ confidence in understanding critical analysis in reflective writing. By giving control to participants, they created materials they felt best helped them increase their understanding of reflective writing and critical thinking skills through reinforcement of what they learned in tutorials, as per Farrell (2012). The participants were very vocal in generating ideas for material and later evaluating if the material was beneficial to them.

The material was designed to convey information in an engaging manner (Raftery & Risquez, 2018; Holmes, 2018). Video, in particular, was a powerful teaching aid for students as it reinforced workshop learning, it reiterated a reflective model they were familiar with and it engaged them to a level where they were motivated to learn (Tiernan & Farren, 2017; Scagnoli, Choo & Tian, 2019). The findings indicated students used the videos and other educational materials in the VLE as an initial resource to begin writing or as a reference point on receiving feedback.

In this instance, the participants found all the materials to be useful aids to generate and build on their knowledge of reflective writing. The participants did not think the materials were useful as a learning tool in isolation and felt they were better used as a guide to begin writing or to refer to for additional support. They felt the colour-coded examples created specifically for this module that highlighted differences between descriptive and reflective writing should be used more consistently throughout future eLearning materials.
Feedback created a safe space to practice with personalised dialogue to help reflective writing

Hatziapostolou & Paraskakis (2010) stated feedback is a vital component in motivating students to learn. Holmes (2018) stated introducing non-graded work that receives only feedback engages students in a more positive fashion. The participants felt, by submitting non-graded work, they were being given an opportunity to practice the new skill of critically reflective writing without any punitive measures when they made mistakes. The participants were aware they did not have a good grasp of reflection on their first attempt but were glad the environment was supportive when their attempts were unsuccessful and, more importantly, not graded. All participants felt submitting non-graded work gave them the opportunity to freely make mistakes they could learn from, as Ailbhe mentioned:

*Ailbhe:* *So I think, yeah, having that opportunity to write and to potentially write very badly which I did* [laughs] *em, and now I know what not to do whereas I thought I was absolutely flying in writing reflectively* ... (Cycle 1).

Feedback in Cycle 1 gave an exemplar paragraph and the remainder of the feedback incorporated comments and questions on the sections written by participants to encourage them to be more critical. Participants felt the extensive feedback given allowed them to identify specific areas that needed improving. Students liked that feedback was specific to them as individuals and helped build on their knowledge to better understand the expectations on them.

*Stephen:* *Yeah, it was deadly. It was the best help from any sort of feedback I’ve ever gotten because it was very detailed ...* *Eh, I thought I was on the right track and I didn’t realise how far off it I was the first time but, I suppose, like after the feedback you sort of know where you are* (Cycle 2).
**Michael:** The questions you worded were very, very useful. Just exactly to ask that question why didn’t you or why did you or whatever. Just going, like you said, just that little bit further. It was a bit like where you had said you stopped here and if you had added one more sentence you would have been on the right track and I was like, ah, yeah, but I thought I could stop there. I thought the rest was implied (Cycle 2).

The colour-coded feedback provided in Cycle 2 proved very effective and the students were very keen on this method:

**Michael:** I think the best part about that ... you broke it up into whether it was descriptive, whether it was emotive, whether it was feelings or whatever and I think the red one was descriptive and I looked at it and I went ‘how is all of that red, how could it possibly be?’ And then I read it back and I was like, .. ‘ok, I need to make it much more explicit’, here and instead of going ‘these were my feelings’ and realizing this has to be about feelings and about something else (Cycle 2).

Participants felt colour-coded modelling and feedback on their non-graded pieces was the most crucially beneficial aspect of this research. The findings indicate that formative feedback can give a better understanding of reflective writing, but only if it is specific to each individual. Extensive feedback of how to successfully structure writing also appeared to be helpful to students:

**Ellen:** You actually gave an example of what I could have wrote [sic] instead of just the feedback. You actually gave an example of the reflective writing as well which I found really helpful. It’s more clear to see, you kind of put your own feedback into action (Cycle 1).
Participants thought submitting regular chunks of the portfolio over the academic year would be beneficial to them if coupled with extensive feedback (Heyler, 2015).

*Michael: After the [regular submissions], if the mentors give the same quality of feedback that you give then that would solve that problem* (Cycle 2).

The findings indicate that reflective writing is a skill that needs to be learned over time and that much trial and error is involved in the learning process for students. Colour-coded feedback that included modelling of good critically reflective writing was found to be most beneficial to students and they readily embraced this method which helped them develop their understanding of critical thinking skills in a more cohesive fashion. Calculation of the mean score of Uaneen portfolios for the years 2013 to 2018 was 66%. The participants in this study achieved 79%, 74%, 71%, 70% and 68% for their end of year portfolio submissions.

**Conclusion**

This research aimed to investigate how to help Uaneen students develop their understanding of critical thinking skills in a reflective module by changing the teaching materials available in a module VLE. It also investigated if adding the new element of feedback would be beneficial. The data from this research indicates that materials created specifically for this module can raise awareness around the development of critical thinking skills. Colour-coded modelled paragraphs giving good examples of reflective writing were most beneficial, as was colour-coded feedback that corresponded to the materials created.

A surprising outcome suggested that VLE content is a small part of helping students to learn critically reflective writing. The materials in isolation were not enough to help students
develop a deep understanding of critically analytical reflective writing – this was only achieved when combined with extensive feedback. The materials provided students with a starting point to better understand feedback received. Modelling can help students better understand reflective writing. In this way, they can build their own knowledge to produce a reflective portfolio of their experiences. It is important to note this level of personal feedback is possible while numbers taking this module remain low and would not be feasible with a large cohort. A plausible solution, should numbers increase, is to create an exemplar colour-coded paragraph for most common competencies, e.g. leadership, communication, team work, time management and incorporate this into individual feedback.

Another interesting outcome not originally considered in this research project was the creation of materials specific to the Uaneen module. Materials that had been considered to be excellent examples to help students better understand reflective writing had been sourced and adapted from other websites. Participants were unhappy with this and felt the materials needed to be more specific and relatable to aspects of this module. Colour-coded materials adapted from a reflective model already familiar to students, combined with colour-coded feedback ultimately increased students understanding of criticality. The results of the analysis in this research showed it is important in future to develop teaching tools for the Uaneen module with more emphasis on interpreting the chosen reflective model (Gibbs) with colour-coded materials.
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