Using Reflective Writing in Your Teaching: A workshop for STEM Disciplines

WORKSHOP NOTES

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It is not sufficient simply to have an experience in order to learn. Without reflecting upon this experience it may quickly be forgotten, or its learning potential lost. It is from the feelings and thoughts emerging from this reflection that generalisations or concepts can be generated. And it is generalisations that allow new situations to be tackled effectively. Gibbs, (1988)

Introduction

Reflective writing, or writing about one’s personal experiences of learning, is appearing more and more often as a requirement of Higher Education courses, and in the professional regulatory procedures for many scientific and technical careers. This workshop is designed to introduce the concept of reflective writing in the context of scientific and technical disciplines: the Higher Education STEM subjects. You will have an opportunity to explore the potential advantages and disadvantages of including structured reflection as a formal part of your students’ tuition, clarify some settings in which it might be appropriate, and consider the practicalities of delivery. After experimenting with it, you might want to try reflective writing as part of your own personal development.

This workshop is intended to be only an introduction; a bibliography of additional material is provided to allow you to research the subject further, if you wish. You will soon realise, however, that relatively little has been written about reflective writing specifically for scientists and technologists. Most of the existing literature relates to the pedagogy of medical programmes such as nursing, social work and sociology, and to arts and humanities disciplines where reflective writing is frequently a central feature. Even within these disciplines where there is espoused belief, there remains some academic debate about its efficacy. It remains to be seen whether scientists and technologists are actually sceptical about prescribing that their students write personally about their own experiences and learning, or merely cautious because it is unfamiliar as a genre of writing. Experimentation is, of course, a key element of science, so the workshop will offer opportunity to try out different approaches to reflective writing.

1 Note: The Higher Education Academy’s ‘STEM’ disciplines include Agriculture; Biological Sciences; Built Environment; Computing; Engineering; Geography, Earth and Environmental Sciences; Materials; Mathematics, Statistics and Operations Research; Physical Sciences; and Psychology.
What’s in a name?

There is no one definition of ‘reflective writing’. Higher Education teachers invariably say that they want their students to adopt an interrogative approach to their learning, and to think broadly and critically about what they learn in classes, in the library, or online. This would allow the students to utilise their understanding in new, broader and more complex settings. This is an approach associated with developing in students the equally abstract quality of ‘graduateness’.

Hampton (2010) notes simply, perhaps uncritically, that ‘reflective writing is evidence of reflective thinking’, and reflective learning usually involves

- Looking back at an event (such as a laboratory class, a group project, work experience or a seminar), an idea or an object, and describing it
- Analysing or interpreting it from various perspectives, perhaps in relation to a specific model or theory
- Thinking about the outcomes of it, and how you have gained from engaging with it in terms of your progress as a learner or as an aspirant professional.

Reflective writing is therefore inevitably personal, using the words ‘I’, ‘me’ and ‘we’, but can also be structured and profound. The individual and subjective features distinguish it from the writing normally found in scientific journals or reports; Moon (2004) provides a useful comparison between writing for reflection and reporting, albeit within a wider context acknowledging the limited research evidence for the links between reflection and deep learning. Beyond the obvious personal characteristics, good reflective writing is usually accepted as broadly addressing the three themes summarised above, and it will certainly be more than the inconsequential or disordered ramblings of many personal diaries or blogs. Experience suggests that providing some structure or scaffolding for students’ writing can enable them to gain more from it, and we will explore a couple of different potential structures for reflective writing later on in the workshop.

Reflective writing can theoretically be used by tutors firstly as a prompt to students to think more deeply about a subject than otherwise would be the case. Secondly, it may promote the self-awareness that leads to critical analysis, behavioural change or commitment to action – learning to think. And finally, the outputs can be seen as a written representation of the level of understanding that students have achieved: some sort of proof of their depth of learning. In the case of the last, the reflective piece of writing may be susceptible to scrutiny and assessment, and may also give the tutor some feedback on how successfully their students are learning.

Academic and professional settings
In Higher Education, you may have encountered study programmes that require students to reflect on their life and work, and their career or life aspirations, perhaps associated with some form of Personal Development or Career Planning. This is commonly found in the early stage of Degree and Diploma courses. In vocational courses such as Social Work, course accreditation may require that students record and reflect upon specific experiences, often later on when they engage with ‘clients’ or members of the public. Some courses require students to submit ‘learning logs’, ‘diaries’, or ‘journals’ to accompany major elements of work such as Final Year projects. These are all examples of reflective writing. By contrast in physics, mathematics and chemistry courses, such requirements appear to be much less common at undergraduate level. However, students who enter professional practice in scientific domains after graduation will normally begin to climb the ladder towards personal Chartership, for example as engineers, scientists, environmental scientists, or geographers. For such graduates, formal reflection on one’s career history, and demonstration of the ability to continue to learn from specific projects and all aspects of practice, will normally be a criterion for success. The ‘reflective practitioner’, a phrase believed to have been devised in 1983 by engineer Donald Schön, is a key element here. The ‘Chartered Scientist’ case study illustrates one example. Learning the skill of reflective writing is therefore an important manifestation of what Schön describes as ‘the process of discovering the limits of one’s own expertise’.

Example of reflective writing required to become a professionally-recognised Chartered Scientist

Chartered Scientist is a legally-recognised qualification similar to other titles such as Chartered Mathematician, Chartered Psychologist, or Chartered Engineer, and requires people to demonstrate Master’s level achievements, usually through an academic qualification, by writing about their high-level knowledge and by reflecting on what they have learned through their professional experience. As an illustration, to be able to use the postnominals CSci after their names, candidates need to demonstrate five key ‘competencies’, namely to be able to:

- Deal with complex scientific issues, both systematically and creatively, make sound judgements in the absence of complete data and communicate their conclusions clearly to specialist and non-specialist audiences
- Exercise self-direction and originality in solving problems, and exercise substantial personal autonomy in planning and implementing tasks at a professional level
- Continue to advance their knowledge, understanding and competence to a high level and demonstrate a commitment to Continuing Professional Development
- Demonstrate an understanding and commitment to Health and Safety and environmental issues related to employment
- Comply with the relevant Codes of Conduct

These statements are broken down further into specific attributes that all Chartered Scientists will possess, but key elements that must be demonstrated through reflective writing include:

- Knowing and managing personal strengths and weaknesses
- Identifying the limits of own personal knowledge and skills.

www.charteredscientist.org/
ACTIVITY ONE: OSSIBULLA (About thirty minutes in total)

This activity is based on output from an HEA-sponsored project that encouraged reflective writing amongst international engineering students at Southampton Solent University, and was reported by Jacqueline Tuson in 2009. Her report describes a useful way of introducing students to the concept of thinking, which we will try here.

Workshop participants play a short teaching and learning game called ‘Ossibulla’ which has been adapted from an activity used in the 1980s at Coombe Lodge, the former FEU staff development centre. The game is designed to embed ideas about active styles of learning, start engagement with Kolb’s (1984) cycle of learning if participants have not come across this before (more about that later) and signal some first principles about reflection.

The workshop attendees are divided into pairs (the workshop tutor may have to join in to balance the numbers). In each pair, one is a member of the Ossi tribe, and the other is a Bulla tribesperson. Each tribe has their own number system that has to be taught to a member of the other tribe. These are provided at the end of these notes. Since the systems are initially completely unknown to the participants, each partner has first to learn their own number system, and then teach it to their partner, but without using the printed notes. At the end of this, the partners should assess how well they have learned both numbering systems, although the outcomes of this are not shared with the group.

You will need to allow about five minutes for each person to learn their own tribe’s number system, and then about fifteen minutes for the teaching and assessment activities. Encourage the participants to talk about what they are doing. At this stage they will not write anything reflective themselves. After they finish this, you will need to organise a short discussion around the following questions:

- How did you learn the set of numbers? What role did visual or conceptual pattern play?
- How did you ‘teach’ your colleague?
- Did you prefer ‘learning’ or ‘being taught’?
- How did you react to mistakes?
- How did you feel about being assessed on your learning?
- Did anything unexpected happen?

You may want to structure the ideas generated into simple headings, around

What?........................So what?............................Now what?

perhaps using a flip chart. These headings are based on Driscoll’s (2000) ideas on reflective writing. If you wish, and dependent upon the number of people involved, you can give participants some ‘post it notes’ and ask them to write an idea about the questions on each ‘Post It’, and then come forward to stick them onto your ‘master chart’. You will then need to group and summarise their views.

Fact or fiction? Telling the truth, and ethical issues.
One challenging issue that arises when asking students to write some personal reflection is whether or not they are completely honest in what they say. Indeed, this issue may have come up in the Ossibulla activity. Consider these questions:

- If a student was asked to keep a log about how they tackled a laboratory or field experiment, what would be your response if their reflection revealed the fact that they had ignored your health and safety guidance and exposed themselves and their colleagues to danger?
- For a piece of writing relating to human subjects in psychology, what would be your view of the quality of their writing revealed deep-seated racist attitudes?
- For a group of engineering students asked to reflect individually on their experiences of working together to tackle a design problem, what would be your perspective on a piece of writing blaming other individuals for deficiencies such as lack of effort, carelessness, or stupidity?

Most tutors would probably say that these expressions were extreme and unacceptable, even abhorrent, and they would find it difficult to evaluate such a piece of writing. If they did assess the writing, they would probably want to give it a low mark. But is this fair? Hargreaves (2004) has written at some length about honesty in reflective writing, in the context of health care education, pointing out that the imperative to do well may outweigh candid reflection on their opinions, or on mistakes that they made. More generally, however, students may suspect that their reflection will only be acceptable if they write something that demonstrates compliance with the general guidelines, and the norms of their science or technological discipline, even if the reality for them was very different. They may therefore suppress their true views. We will look in more depth at this issue later.

There is also some evidence that reflective writing is more challenging for students in UK universities whose native language is not English. Cultural conventions about not challenging perceived wisdom and therefore not expressing a personal view, or loss of face in admitting mistakes, may require some specific attention from tutors promoting reflective writing with diverse student groups.

**ACTIVITY TWO: SCOTT’S DIARY (About thirty minutes in total)**

We will now take a look at a well-known piece of writing, taken from one of the best known scientific diaries of all – the last entries in Captain Robert Falcon Scott’s diary prior to his death in Antarctica in March 1912. The text is at the back of these notes. We should assume that Scott’s diary reflects his genuinely held views, expressed despite the immense physical challenges of actually writing it. He must certainly have learned a great deal about the nature of disappointment in the days preceding his notes. Scan through the text.

Before we look in more detail at it, we need to consider, in a little more depth, what might be meant by ‘reflective writing’. Graham Gibbs (1988) has described a simple, idealised model of the iterative process of reflection in which there are six main stages, through which the reflective learner progresses cyclically. We might therefore expect these stages to be apparent in reflective writing.
Spend ten to fifteen minutes with the workshop participants working in pairs, looking at the extract of Scott’s text, finding sections that might relate to Gibbs’ different stages of reflection. Ask the participants to ring and label parts of the text that may suggest that Scott was a reflective practitioner.

Then consider the following questions as a group, spending about ten to fifteen minutes on them:

- To what extent does Scott’s scientific diary, obviously written in extremis, demonstrate the various reflective elements of description, feelings, evaluation and so on?
- Was Scott therefore a ‘reflective practitioner’?

**More detail about the different elements of Gibbs’ model**

After exploring Scott’s text you can provide workshop participants with more detail about typical expectations of reflective writing, or better still draw these from the experiences of the participants. These can then be made more specific to the disciplinary context. The diagram below provides some starting positions for the discussion. Naturally, reflection is a complex, multifaceted activity and any breakdown will be somewhat arbitrary.
Reflective learning is frequently associated with pedagogies variously described as ‘active’, ‘experiential’, ‘enquiry-based’ or ‘problem-based’, and an associated move from teacher-centred to learner-centred education (Rust, 2002). In all of these philosophies, students are not seen principally as passive recipients of ‘teaching’ (through listening to lectures, for example), but as active stakeholders in a complex process of learning where they set, and repeatedly reframe, both questions and answers. The best teaching is constructed accordingly. Kolb (1984), who will be familiar to many who have attended introductory teaching courses, described effective learners as moving repeatedly through a cycle of active experimentation, concrete experience, reflective observation and abstract conceptualisation.
Current pedagogic styles in Higher Education require a strong constructive alignment between intended learning outcomes, teaching styles, and assessment characteristics. That is, what students are intended to learn in a course should be linked to the way that they are taught it, and to the way their learning is assessed. Scientific disciplines are pushed forward by curiosity, by experimentation and by testing of ideas, and occasionally by sudden paradigm shifts in understanding – ‘aha! moments’, some have called them. With this in mind we might approach teaching by setting up learning experiences in which students have opportunities to experiment, and to construct enquiries for themselves, building on or testing the research findings of others. We can hence try to secure these epiphanies, where deep learning happens. Reflective thinking, and the associated reflective writing, can sit comfortably within this active learning paradigm, with the developing mental habit of reflection kicking in at every stage.

Making sense of it

Wikipedia’s ‘Reflective Writing’ entry usefully captures the thought that reflective writing is not just a question of authors ‘hitting the replay button’ about events, scenes, interactions and so on, but that it also involves them becoming more conscious of the wider implications of their activity. Through their reflective writing, students are intended to become curious about what could come
next for them and for wider scientific endeavour in their discipline. Reflective writing theoretically allows STEM students to ‘pull back the lens’ to observe not only the direct outcomes of their scientific experimentation or technical understanding, but to explore more intangible, complex and uncertain elements. Bolton (2010) notes

‘Writing exploratively and expressively can take practitioners up to and beyond their habitual boundaries, overcoming previously perceived barriers to perception and understanding. Practitioners can begin to leave at the border professional assumptions, such as clinical detachment or the inadvisability of sharing significant doubts and disasters with colleagues. Such critical enquiry is at the heart of professional development’.

This is, of course, an ambitious aim, but certainly appropriate for those who in future will be entering professional practice.

Other authors have also considered issues around reflective writing (for example Kalman (nd)) for Physics students; Towndrow (2008) for senior school Chemistry students; Anon in the Australian Scholarship in Teaching project http://www.clt.uts.edu.au/Scholarship/Reflective.journal.htm; Chalk and Hardbattle (2007) for Science and Engineering students; Ellwein (2011) for fieldwork for geobotany teachers; King (2002) for Computing, ICT and Mathematics students; Harrison, et al (2003) for Geography, Earth and Environmental Science students).

**Stages in reflective writing**

Simply asking students to produce a ‘reflection’ on their learning, as part of a course, is unlikely to engender the best results (Hume, 2009), especially if this is the first occasion on which such a demand has been made of them. To strengthen their response, most authors suggest that a clear structure is provided, as appropriate to the students’ discipline. In the case of Degree students in STEM disciplines, this should provide a background to learning in an authentic inquiring and scientific manner, handling complex and increasingly uncertain (as the course progresses from first to final year) subjects.

Two models for reflective writing are summarised below, and either may provide appropriate scaffolding for guiding students’ (or your own) writing. There are strong parallels between the two, despite differences in terminology. The first, based on the work of Schön, has fewer discrete stages and is more often associated with reflection for professional purposes. The second, based loosely on Gibb’s (1988) work, is often simpler for undergraduates to follow.
How to do it – suitable settings

Reflective writing can be done anywhere, in the classroom or library, at home, in a coffee shop, or in the field. It can even be done on the train or bus. The text can be produced using pen and paper, a computer keyboard or a smartphone. You do not need to spend too much time on this element!

Types of reflective learning

Stories or narrative

Some reflective writing simply consists of a piece of text, produced in a single session, illuminating an event or incident and the student’s associated perspectives upon it. Like a piece of fiction, the
story will usually have a beginning, a middle, and an end, and a set of characters. Varying in length from a couple of paragraphs upwards, it can include reflection on events recently experienced, or upon something significant that took place some time before. A structure, and an approximate word length, is normally suggested by the tutor. When undertaken formatively, students can be reluctant to submit their writing for feedback, but Lea and Correy (2009) provide convincing evidence about the growth in confidence experienced by students as they repeat the exercise.

**Learning Journals or Learning ‘Logs’**

A learning journal or ‘log’ is normally a personal collection of reflective writings, often produced longhand in a notebook over a period of months at irregular intervals. It is usually based on material collected at various times and after specific experiences or events in which the author participated, such as lectures, practical exercises, projects or group activities, and explores what they learnt from it. It is intended to assist the writer to grow their understanding of particular themes, and not to be an expression of what is ‘right’ or ‘wrong’. In some cases it may contain ‘evidence’ of particular formal curriculum-based activities, but informal learning such as discussions with friends or colleagues outside a formal academic setting, television programmes, books read, or internet browsing, might also feature. It might contain reflections on problems encountered, and how these are being addressed. Whilst many entries may be made within a day or two of the activity, at longer intervals the writer may reflect on the implications of the experiences for how they might act in future. The journal or log may be relatively loosely structured, and may not be intended to be seen by others.

Some learning logs may encompass a student’s whole programme of study, but others might cover more specific activities such as how a dissertation was approached, or how a major project was initiated and is progressing. Writing about a period of work experience or a placement is another common demand.

**Learning Diaries**

Learning diaries are often more structured writings than learning logs, with frequent (usually daily, at minimum) entries made over a period such as a few days or weeks. The entries might include dates and even timings of specific activities. The issues might be quite specific, for example addressing a specific challenge such as improving laboratory technique, considering a particularly crucial chapter in a book, or mastering a specific mathematical concept. Each day’s entry might briefly address the six headings suggested by Gibbs, with a note under each heading, ending with a reflection concerning future very specific actions. Given the timescale, typical entries might address how the author is preparing for a specific lecture, or the preparations being made for a group project. Realistically, daily entries may well prove too demanding for many authors, except in the short term.

It would be possible to use a learning diary to explore the impact of an ‘intervention’, such as a new way of approaching learning, using the diary as a record of what is essentially a personal experiment. For example, a student might keep a diary recording what happened when they began to use ‘mind mapping’ to record a lecture, or whether participation in an externally--organised seminar developed their understanding of a particular theme.
Personal Development Planning and reflective writing

The Higher Education Academy defines Personal Development Planning (PDP) as ‘a structured and supported process undertaken by an individual to reflect upon their own learning, performance and/or achievement and to plan for their personal, educational and career development’. Usually undertaken as part of first year Degree or Diploma programmes, PDP embraces a range of approaches to learning that connect planning (an individual's goals and intentions for learning or achievement), doing (aligning actions to intentions), recording (thoughts, ideas, experiences, in order to understand and evidence the process and results of learning) and reflection (reviewing and evaluating experiences and the results of learning). It thus embraces the full cycle of personal growth envisaged by Gibbs, Schön and others. In some systems, the emphasis is on generic skill acquisition, rather than knowledge or understanding of a specific discipline. PDP is recognised and supported by organisations such as the Quality Assurance Agency, Universities UK, SCoP, Universities Scotland and others.

As part of the PDP process, many Higher Education Institutions require their students to produce or maintain a progress file or portfolio. Commonly, these include reflective writings, alongside ‘evidence’ such as marked assignments, or returned examination scripts, and similar. The PDP portfolios are usually assessed, sometimes by the student’s personal tutor or advisor, and often on a pass-fail basis rather than by the award of a numerical grade. It is frequently suggested that students continue to maintain these portfolios throughout their course of study, and take them away afterwards to use when applying for jobs after graduation. The HEA website includes a large number of resources describing and evaluating different PDP initiatives.

Some institutions have developed bespoke e-portfolio systems in which students can record the various elements of their PDP; the propriety product PebblePad, emanating originally from the University of Wolverhampton, is one such example (http://www.pebblepad.co.uk/pebblepad.teach.asp). Whilst these systems do enable relatively easy entry of material, there can be problems associated with their ‘portability’ and students’ access to such e-portfolio systems after their graduation.

Tweets, blogs and reflective writing on social networks

Electronic communications and Web 2.0 tools have radically altered the ways in which many people communicate, and particularly for younger students, the immediacy of feedback through using Twitter or Weblogs (‘blogging’) may be attractive. A student might, for example, tweet about their views on an idea during a lecture, or whilst they were reading an article, and receive immediate responses from others. No doubt some assignments have already been set in which students are asked to use this tool. Rinaldo et al (2011) have reviewed the use of Twitter in a marketing course in the US, but identify the principal benefit as enhancing interaction between tutors and students, and increasing student satisfaction rather than any particular benefits to reflection. They do nevertheless allege that the increased social interaction associated with ‘following’ a professor also enhanced students’ cognitive processing, although the evidence is relatively weak. There are also some contraindications, particularly concerning privacy (with publically accessible postings online) and the maximum length of tweets.
A blog is a type of Web page made up of usually short, frequently updated postings arranged in reverse chronological order. Blogs can contain many different types of content, including ideas and commentary, and are allegedly a creative outlet for people to reflect on their learning. Some blogs include graphics, videos and links to other Internet sites. Again, in theory blogging could be used for structured reflection on elements of learning in science and technology, their value and their future use, in the same way as a learning log or diary. There are nevertheless differences. For example, the ‘reach’ of some blogs is effectively global, although closed blogs can be set up including all the students on the same course. The openness may nevertheless constrain the personal nature of the postings. In relation to IT courses, Les Pang (2009) suggests that the key benefits are that tutors (‘instructors’) can reinforce key learning concepts, and that they can maintain some form of one-to-one relationship with the students. Deep reflection is not clearly identified as an outcome. If blogs are to be assessed (see below), then the guidance should cover issues of timeliness, clarity of expression (including specific guidance on the language that is appropriate), having a structure, and the need for creativity and thoughtfulness.

Some experimentation has also been undertaken with audio-visual based logs, using podcasts or YouTube as means of recording reflection, or with class blogs contained within a Wiki. 
http://cloudworks.ac.uk/cloudscape/view/2063 includes a growing list of examples of the use of blogs in reflective practice to support learning and professional development.

ACTIVITY THREE: SELECTING A THESIS TITLE

(about thirty minutes, and can be undertaken by individual participants with pen and paper, supported by tea or coffee and cookies)

Most participants will have had to write a thesis at one time or another, probably a doctoral thesis. This can be quite a traumatic event, and one which people will probably remember. Ask each participant to write a couple of paragraphs (using paper and pen, probably quite a feat for people today!) reflecting on their experience of identifying a thesis theme or title. This is something that is very significant for many academic staff, as it often predisposes them into a particular career path. If they did not actually choose a theme or title themselves (for example because they joined an existing research team and were effectively allocated one), they should reflect on why they chose this research team or institution, rather than the title. Prompt them to think about the various aspects of reflection highlighted by Gibbs. Explain that they are going to share their text with one other person in the room, chosen randomly. Tell them not to put their name onto it, or to name other individuals. Whilst the activity is going on, take care that all participants are actually engaging; there may be behavioural clues that suggest they are not, and that they may need encouragement.

Allow people about fifteen minutes for this writing. Gather the reflections in, and allocate one to each person. Ask them to read it and award marks or grades, using your normal institutional convention, in each of Gibb’s six categories. Then they need to award the reflective writing an overall mark or grade. These will only be returned to the original authors if they want to see them. This assessment should take no more than five or six minutes.
Now each participant needs to write a further paragraph reflecting on their own experience of undertaking this writing and assessing activity. Allow seven or eight minutes for this. These second elements of writing should form the basis of a discussion around the following themes:

- How important is it that students are provided with an outline structure for their writing (such as Gibbs’ or Schön’s headings)?
- How important is it that the ground rules such as confidentiality are explained in advance?
- Are any of the group feeling uncomfortable about the activity? Why?

Groups and facilitation – ground rules, growing teams, growing cooperation, team development and the world of work

It is possible to establish groups who reflect collaboratively on their experiences, usually using online systems such as Moodle or Blackboard to write and record their commentaries. Students will make postings describing particular activities, and explaining their own views, but inviting others (often peers, co-researchers or tutors) to comment and develop the ideas further. The postings grow as time progresses. The benefits of the dialogue are said to include the development of long lasting communities of learners, or communities of practice, that can support students throughout their time studying. In these instances, it is advisable to set the ground rules very carefully to ensure that everyone engages (perhaps by requiring a minimum number of postings by each individual, and by indicating that commentary must be polite, quasi-formal, and supportive of other members of the group. Once students move into the world of work, the issues surrounding confidentiality tend to militate against the use of shared postings for reflection.

Make it easier by....

- Explaining the purpose
- Giving the background
- Choosing the setting
- Setting the ground rules
- Structuring the writing
- Clarifying the expectations
- Giving formative feedback
- Assessing if appropriate

Assessing reflective writing

The Latin root of the word ‘assessment’ is ‘to sit beside’, a literal interpretation of which may strike very deeply at some people’s conceptions of the purpose of assessment. If, as Brockbank and McGill suggest (1999), the classical meaning implying collaboration and sharing of ideas is adopted, then exchanging personal reflections for formative purposes would be implied, but awarding grades for it might be a less comfortable activity. If, by contrast, assessment is seen purely as a process of checking or oversight, then its relationship with reflective practice is different. In this case the reflective process is more likely to be viewed as a technical exercise, for which grading is entirely appropriate. Individual tutors may have to decide on the purpose of the assessment for themselves, and make a judgement about whether they want reflective writing to form a formal part of the assessed work on a course, or whether it is to be used only formatively.
In either case, reflective writing is dealing in part with emotional matters, so sensitivities will inevitably be involved when it is shared with others. In situations where fellow students (perhaps formatively) or tutors (either formatively or summatively) are giving immediate responses to help authors to progress, responsible and thoughtful feedback must obviously be encouraged. Scathing, dismissive remarks have more-than-usual potential to cause damage to authors. Care should also be taken to express feedback so that it is the text, rather than the person, that is the subject of the critique.

Some researchers have gone further in posing questions about the legitimacy of summative feedback on reflective writing. Hargreaves (2004) for example, writing about its use in assessing the work of health care students, says that there are only three valid types of narrative: ‘valedictory’, ‘condemnatory’, and ‘redemptive’. Valedictory narratives tell stories of an obstacle overcome. Condemnatory narratives demonstrate a crisis followed by poor decisions and consequent guilt or anger, whereas redemptive ones allow for expression of inappropriate behaviour or beliefs, so long as these lead to improvements in subsequent practice. All other types of reflection, including expression of unacceptable beliefs or values, poor socialisation into the relevant discipline and so on) are ‘illegitimate’ and should not be rewarded. Her partial solution to questions of legitimacy is that assessment of the academic practice itself (the laboratory experiment, the design process, the field notebook, the essay) must be separated from assessment of the reflective writing. This will allow ‘good’ reflection to be recognised, but not directly at the expense of failure to demonstrate competence in the core science.

Bibliography


Kalman C. (nd) The Need to Emphasize Epistemology in the Teaching of Science: Use of Reflective Writing, Department of Physics, Concordia University
http://www.ucalgary.ca/ihpst07/proceedings/IHPST07%20papers/2116%20Kalman.pdf


The Ossi number system assigns a specific symbol to each of the numerals 1-9 and represents a zero by crossed sticks: X

You must teach this system to your partner. As a teacher, your abilities will be measured on the basis of how well your learner can remember and convert any Arabic number, from 1-50 into its Ossi equivalent.

Take five minutes to analyse the system and decide how you are going to teach it. Obviously, you cannot merely hand over this crib sheet.

1) 
2) 
3) 
4) 
5) 
6) 
7) 
8) 
9)
The Bulla number system uses horizontal and vertical lines to represent numbers.

You must teach this system to your partner. As a teacher, your abilities will be measured on the basis of how well your learner can remember and convert any Arabic number, from 1-50 into its Bulla equivalent.

Take five minutes to analyse the system and decide how you are going to teach it. Obviously, you cannot merely hand over this crib sheet.

Questions about the process:

What?
What happened?
What was your role in it?
How did others act/react?
What were the circumstances?

So what?
Why is it important?
What did you feel about it?
Has this kind of thing happened before?
How does it relate to theory?

Now what?
Are there any alternative theories?
How might you do it differently?
What could you change, next time?
Who might know something more to help you try again, differently?
Extract from Captain Robert Scott’s diary, March 1912

Captain Robert Falcon Scott RN and his companions Lt. Henry Bowers and Dr. Edward Wilson were three of a five man British team who died in the Antarctic whilst on the return leg of an epic and ultimately tragic journey to reach the South Pole. Two of the team, Lawrence Oates and Edgar Evans had perished earlier. Their intention to be the first had been unsuccessful, as Roald Amundsen’s team had already left their Norwegian flag at the Pole before Scott arrived. The three mens’ bodies were found eight months later, on November 12th, 1912, in a tent only a few miles from a food and fuel depot. Science was very important and they had carried 35 pounds of geological specimens until the end. Scott had maintained a diary throughout the journey, recording both scientific aspects of the journey, and his observations on many aspects of human endeavour. The last words of the diary ‘For God’s sake look after our people’ probably made on March 29th are well known, but the following extract from a few days earlier forms a poignant subject for an exploration of reflective writing.

The original diary is in the British Library, but sections are available to online readers at http://www.bl.uk/onlinegallery/onlineex/histtexts/scottdiary/. The Scott Polar Research Institute at Cambridge University also have sections of text online at http://www.spri.cam.ac.uk/museum/diaries/. These were recently blogged as part of the centenary of the journey.

March 22nd and 23rd

The causes of the disaster are not due to faulty organisation, but to misfortune in all risks which had to be undertaken.

1. The loss of pony transport in March 1911 obliged me to start later than I had intended, and obliged the limits of stuff transported to be narrowed.

2. The weather throughout the outward journey, and especially the long gale in 83° S., stopped us.
3. The soft snow in lower reaches of glacier again reduced pace.

We fought these untoward events with a will and conquered, but it cut into our provision reserve.

Every detail of our food supplies, clothing and depots made on the interior ice-sheet and over that stretch of 700 miles to the Pole and back, worked out to perfection. The advance party would have returned to the glacier in fine form and with surplus of food, but for the astonishing failure of the man whom we had least expected to fail. Edgar Evans was thought the strongest man of the party.

The Beardmore Glacier is not difficult in fine weather, but on our return we did not get a single completely fine day; this with a sick companion enormously increased our anxieties.

As I have said elsewhere, we got into frightfully rough ice and Edgar Evans received a concussion of the brain - he died a natural death, but left us a shaken party with the season unduly advanced.

But all the facts above enumerated were as nothing to the surprise which awaited us on the Barrier. I maintain that our arrangements for returning were quite adequate, and that no one in the world would have expected the temperatures and surfaces which we encountered at this time of the year. On the summit in lat. 85°/86° we had -20°, -30° [-28°C, -34°C]. On the Barrier in lat. 82°, 10,000 feet lower, we had -30° [-34°C] in the day, -47° [-44°C] at night pretty regularly, with continuous head wind during our day marches. It is clear that these circumstances come on very suddenly, and our wreck is certainly due to this sudden advent of severe weather, which does not seem to have any satisfactory cause. I do not think human beings ever came through such a month as we have come through, and we should have got through in spite of the weather but for the sickening of a second companion, Captain Oates, and a shortage of fuel in our depots for which I cannot account, and finally, but for the storm which has fallen on us within 11 miles of the depot at which we hoped to secure our final supplies. Surely misfortune could scarcely have exceeded this last blow. We arrived within 11 miles of our old One Ton Camp with fuel for one hot meal and food for two days. For four days we have been unable to leave the tent - the gale howling about us. We are weak, writing is difficult, but for my own sake I do not regret this journey, which has shown that Englishmen can endure hardships, help one another, and meet death with as great a fortitude as ever in the past. We took risks, we knew we took them; things have come out against us, and
therefore we have no cause for complaint, but bow to the will of Providence, determined still to do our 
best to the last. But if we have been willing to give our lives to this enterprise, which is for the honour of 
our country, I appeal to our countrymen to see that those who depend on us are properly cared for.

Had we lived, I should have had a tale to tell of the hardihood, endurance, and courage of my 
companions which would have stirred the heart of every Englishman. These rough notes and our dead 
odies must tell the tale, but surely, surely, a great rich country like ours will see that those who are 
deendent on us are properly provided for.