A tool for adopting a different perspective on classroom observation and feedback on science lessons

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ABSTRACT This article outlines the development of a tool designed to take forward the practice of science teachers through subject-specific guidance and discourse that promotes dialogue and deep critical reflection on practice.

Identifying the 'problem'

Lesson observation should be an unbiased experience for every teacher, whether in training or experienced, to take their practice forward via a conduit of guidance towards constructively critical reflection on practice. It would appear, from the literature and from working with trainee in-service science teachers (hereafter referred to as trainee teachers) and their school-based mentors in many schools, that the 'What Went Well (WWW) and Even Better If (EBI)' approach has become the conventionally adopted approach to post-lesson-observation evaluation and the feedback session. Unfortunately, some observation feedback is anecdotally reported as being devoid of any positive feedback or encouragement.

As a result of an Ofsted (Office for Standards in Education in England) inspection of a higher education institution, the lead inspector brought to the science teacher educator team's attention that, while we were reliably able to identify and guide outstanding trainee teachers, we were not taking the trainee teachers through their paces to become outstanding teachers of science.

Research and development question

Was the essential change needed perhaps to adopt a different point of departure for, and thus perspective on, the whole process of lesson observation and feedback, to develop and promote critical reflection?

The research question thus became: What tools and evidence already in the literature could be adapted and developed to promote and support andragogical critical reflection (the stage for these 'adult learners') on pedagogical action in the science classroom en route to exemplary teaching of science?

Methodological framework

In this section the development of the classroom observation tool is outlined, based on the outcomes of an action research model (Figure 1) adapted from that of Jordan, Perry and Bevins (2011).

The development of the observation and feedback tool has been an iterative process based on its efficacy as determined by the trainee teachers, the science educator team and school-based mentors over several years.

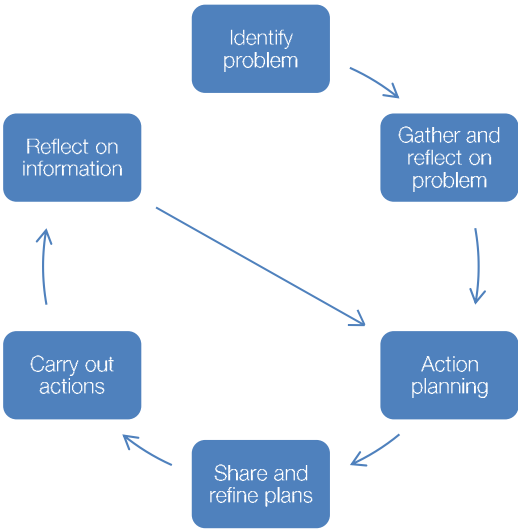

Figure 1 A teacher's action research cycle; adapted from Jordan *et al*. (2011)

Gathering and reflecting on information

'Information' in this action research project constituted what the literature reported on factors leading to and effecting exemplary teaching, and on critical reflection.

Pedagogy is important to impart to trainee teachers, whereas an andragogical approach (learning strategies focused on adults) might be a more effective conduit to achieve this end. Brookfield's (1995) framework for becoming a critically reflective teacher in the higher education sector was truly andragogical in its approach, enabling teachers to evolve their practice.

A report by Lock, Salt and Soares (2011) underpins issues surrounding subject knowledge and teaching skills. They delineate between 'pure' subject knowledge (SK) and topic-specific subject pedagogy (TSP). In the tool that was developed, the terms subject matter knowledge (SMK) and pedagogical content knowledge (PCK) (Berry, 2012) are used on the grounds that in a lesson SK and TSP will be manifested through SMK and PCK, respectively.

Essentially, there are five major areas about exemplary science lessons purported by Wilson and Mant (2011a; 2011b) based on research exploring the teachers' perspective. Yet, even using their headings, it was difficult to set apart science-specific capabilities and competencies from generically exemplary teaching. Of note is that Wilson and Mant's viewpoints represent those of pupils and teachers, further adding value to the views of the young people for whom we train our teachers to be exemplary facilitators of knowledge in school science. Their categories and sub-categories were compiled from the day-long forum-responses of specially selected teachers of science who had been identified as exemplary by pupils involved in the research, as reported in their 2011b paper. Their work was further underpinned by the views of Berliner (2004) and of Alsop, Bencze and Pedretti (2005).

'Teacher attitude and beliefs' is one of Wilson and Mant's (2011b) five categories considered to underpin exemplary teaching, and incorporates care about their students, enthusiasm for science and use of humour in their engagement with their learners. Strong relationships between the teacher and learners are a central tenet of laudable teaching, as is the pupils being active learners. The role of planning is seen as critical to commendable teaching, alongside the types of activities and strategies that are deployed to enhance the efficacy of the teaching and thus learning. Their work was used in a mentor workshop run by the science teacher educator team, the outcome of which is presented in Table 1.

Influential views about the January to July 2012 inspection criteria for science were presented by Ofsted inspectors at the Association for Science Education (ASE) Annual Conference in Liverpool in January 2012: importantly, they introduced the idea that risk-taking *is* exigent (Cartwright, 2012; Sherman and Reece, 2012). For example, it was suggested that the criterion 'Much of the teaching in all key stages is outstanding and never less than consistently good' could be met through the taking of pedagogical risks, strong and contextualised explanations, and meaningful practical work by the teacher. The latter can be evidenced through utilising the Getting Practical 'hands-on, minds-on' approach (Millar and Abrahams, 2009).

At the same ASE conference, the Ofsted lecturers further informed delegates that science would be seen to take the lead on SMSC (spiritual, moral, social and cultural) aspects of the teaching and learning in the school, while there was a greater push from central government to use teaching assistants (TAs) and learning support assistants (LSAs) more effectively. These lesson-attributes have been incorporated into the observers' and the (autobiographical) trainee teacher's 'lenses' of the tool.

While the discussion statements in the tool arose from observing other teachers and discussion, other core ideas emanated from the literature, the most influential of which are Harlen (2010) (pedagogy behind the big ideas and principles behind science), Kibble (2010) (exemplary teaching of science), Crossland (2012) (AfL embedded in science teaching and learning (T&L)), Darlington (2012) (what inspires pupils) and Jackson (2012) (creativity and catering for special educational needs). Their work provided features that underpinned observers' perspectives as found in the literature, further developing the range and breadth of ideas to promote objective observation and generate feedback discourse that engendered deep and critical reflection on practice.

In research conducted by the science teacher educator team, the science trainees proclaimed that their most valuable learning opportunities had been through observing others, and being observed

Table 1 Cross-mapping Wilson and Mant's (2011b) five categories with the views of science mentors; '+' and '^' represent the two different mentor-groups' ideas

Category	Wilson and Mant (2011b)	Mentors' views
1 Teacher attitude and beliefs	• Care about students • Enthusiasm for science • Use of humour	+ Enthusiastic for science + Awe and wonder! ^ *Skills are important* ^ *Passion for science* ^ *Belief in potential impact*
2 Relationships – teacher to pupil	• Communicate an interest in their learners • Firm, fair with clear boundaries • Value praise highly	+ Excellent communication with young people ^ *Teacher should hold something 'magical' in pupils' eyes* ^ *Trusting the pupils and lead them to make choices*
3 Pupils as active learners	• Assessment for Learning (AfL) strategies • Able to digress from plan • Pupil choice encouraged (autonomy)	N/A
4 Planning	• Contextualisation of the science and its relevance to everyday life • Lessons chunked and varied • The more able are challenged	+ Teacher has travelled so has life experiences on which to ground the teaching + Promote science in a natural way + Think outside the box ^ *Questions are important* ^ *Make no assumptions about the trainees' K&U* ^ *Move beyond the curriculum* ^ *Open-ended lessons*
5 Types of activities and strategies	• Discussions encouraged • Practical work • Focused recording and reduced writing	N/A

(Hardman and Carroll, 2011). Their findings were consistent with Brookfield's (1995) earlier work on the use of the views of an observer of the teaching episode. The observer role can include a colleague, friend, technician, mentor or university tutor, or even an inspector.

Action planning

A series of metaphors has been utilised to construct the framework for the tool used in lesson observation and feedback, reflection and evaluation; for example, reflection requires 'looking strategically, but with a focal point' and hindsight. The analogy can be continued through the use of lenses to fulfil the angle of perspective. Stephen Brookfield's (1995) book *Becoming a Critically Reflective Teacher* highlights his successful use of looking at situations and reflecting thereon through four lenses. Three of the lenses incorporate the views of the situation – the observed lesson from the learners' perspective, colleagues' understandings and the teacher's interpretation – while the fourth lens reflects what can be found in the wide body of literature about developing and improving teaching and learning.

Using Brookfield's four lenses strategy to review a teaching episode, a framework was developed as an observation and feedback tool to promote and support andragogical critical reflection on pedagogical action in the science classroom.

Teaching and Learning (T&L) are already 'over-driven' by Ofsted inspection criteria and gradings; thus it was vital to move beyond the term 'outstanding' to guide teachers of science towards 'brilliant' (Duckworth, 2014) or exemplary teaching. 'Exemplary' is used by Tobin and Fraser (1990), Alsop *et al.* (2005) and Wilson and Mant (2011a; 2011b), among others. The observation and feedback tool that was created was thus called 'Four Lenses Exemplary Science Teaching' (FLEST).

Some statements were deliberately selected to overlap with the observers' when initiating

discussion with the learners. This approach presented an opportunity for triangulation of perspectives from the lesson when deciding which statements to address to the trainee in the feedback session. The practice led to the development of a colour-coded system of cross-

BOX 1 FLEST with its colour-coding to promote triangulation of feedback discussion

FLEST – adapted from Brookfield's four lenses andragogical approach to *Becoming a Critically Reflective Teacher*

This document is NOT a report or pro forma for an observed lesson; it is meant to provide potential critically reflective dialogue during the feedback session

Canterbury Christ Church University (October 2013) *Name/Year/Date*

AS JUDGED BY THE LEARNERS

EXEMPLARY LESSON

- I felt stretched and engaged
- I was given opportunities to form & voice my own opinions
- The teacher makes the subject engaging
- Lessons are fun and help me to want to engage
- Creative approaches are encouraged
- Keywords are made clear
- Learning Outcomes are clear to me
- I've learnt …
- The examples of literacy & numeracy that we covered in today's lesson are …
- The TA helped me to …

EXEMPLARY SCIENCE LESSON

- Thorough explanations are provided that help me to better understand the scientific concepts in the literature/text book
- Enjoyment gained from doing experiments myself or in groups
- Science lessons make me think (higher order thinking skills used?)
- Teacher uses a range of T&L strategies suitable specifically for science
- The role of ICT in the lessons to support T&L of science
- The science learned is relevant to my life/life in general
- H&S/RA embedded in all aspects of the science lesson

AS JUDGED BY THE TRAINEE/TEACHER

EXEMPLARY LESSON

- Confident about my pedagogic content knowledge [PCK]
- Oracy/articulacy, literacy and numeracy embedded in the lesson
- Keywords used effectively
- Creative T&L approaches deployed
- Planned for and managed BfL
- Appropriate AfL
- I can surmise that learning has taken place
- Deep learning has taken place (SOLO)
- I know that the majority of the learners made progress because …
- I stretched some/most/all learners in that lesson
- Suitability of the ratio of teacher-talk to learner-talk
- I portrayed a sense of liking & respecting my learners
- My confidence in front of the class
- I utilized the TAs' strengths to support the learners
- Did I take an academic/pedagogic risk?

EXEMPLARY SCIENCE LESSON

- Confidence about my Subject Matter Knowledge [SMK]
- My confidence about my pedagogic approach for the scientific topic
- Using this approach I made the topic relevant to the lives of the learners
- Role and value of ICT in the T&L of the science?
- Felt that I explained well
- I explained with scientific accuracy
- I planned for and managed H&S
- Scientifically appropriate approaches to AfL
- My use of scientific modelling and its value for the T&L
- I shared my passion and enthusiasm for science with class

BOX 1 (*continued*) FLEST with its colour-coding to promote triangulation of feedback discussion

AS JUDGED BY OBSERVERS/FELLOW PROFESSIONALS/EXEMPLARY TEACHERS

EXEMPLARY LESSON

- Keywords used effectively
- Safe learning environment
- Learners had opportunities to form own opinions
- Managed and facilitated learner engagement
- Majority of learners stretched – some evidence of cognitive conflict
- Planned for flexibility in all aspects of lesson
- Frequently monitored and assessed understanding and progress/AfL
- Learning took place
- Encouraged learners to participate in learning activities
- Maintained a favourable learning environment/climate for learning
- Was the lesson well-paced?
- TAs/LSAs used proactively
- Was the T&L a coherent sequence?

EXEMPLARY SCIENCE LESSON

- The lesson provided increased learner-understanding of the science
- Demonstrated an understanding of the pedagogy behind the big principles and ideas of/in science in the lesson
- Scientific oracy/articulacy, literacy and numeracy embedded in the T&L
- Use of creativity in T&L of science
- Safe learning environment suited to science activity
- Learners are developing scientific capabilities
- Pedagogical approach of the topic made it as relevant to life as is feasible

SCIENCE-SPECIFIC STRATEGIES (from the literature)

EXEMPLARY LESSON

- Relevant numeracy & literacy embedded in the lesson
- SMSC engaged with in the lesson
- Lesson was active, fun and engaging
- Developing into successful learners and confident individuals
- AfL
- Repetition of keywords 7±2 (recent research)
- TAs/LSAs used effectively/proactively
- There must be evidence that all learners have made progress
- All learners were stretched and challenged; given some degree of cognitive conflict

EXEMPLARY SCIENCE LESSON

- Relevant contextualisation of the learning … to develop scientific attitudes
- Accuracy of scientific explanations provided
- Scientific misconceptions detected & addressed
- Relevance of activities to HSW and T&L
- Planned for and embedded BFL health & safety wrt practical work and the science teaching room
- TAs/LSAs inducted for the support expected of them e.g. Practical work/SK to enable monitoring & assessing progress
- To develop scientific capabilities – gathering and using data
- Relevance of the science T&L approach to life
- Learners' developing into scientifically literate & responsible citizens
- Displayed a love of science and communicated its values
- Language of science embedded in teacher's talk
- Language of science embedded in learners' talk – oracy/articulacy
- Language of science embedded in written work – literacy
- ICT used to support & enhance the T&L of science
- Role of modelling used effectively to enhance the T&L of science
- Is the teacher teaching scientifically?

referencing statements for greater ease when selecting the statements used to guide the trainee's reflective discourse. Box 1 is the most recent and colour-coded version of FLEST in which SOLO stands for 'Structure of the Observed Learning Outcome' and is an andragogic tool developed for use in universities in Australia and New Zealand in the 1980s by Biggs and Collis (1982).

Brookfield's 'Autobiographical Lens' enables the teacher (experienced, in-service trainee or pre-service) to take a deep and critically reflective, but constructive, look at each lesson. The evaluative reflection can then be used to plan to overcome the shortfalls in the next lesson. The overall goal for all teachers is to develop their classroom practice so that it is consistently good, while aiming to be an exemplary teacher. This lens is denoted 'As judged by the trainee/teacher' in the tool.

The view of the learners, Brookfield's 'Students' Lens', is of equal value and importance in the reflection process as the other three perspectives. Considering that the planned teaching for learning in every lesson is *for* the learners, their view *is* critical but too frequently overlooked. Of note is that, since work on developing FLEST began, the voice of the pupil has moved further and further towards the centre of all Ofsted and SLT (senior leadership team) observations and inspections. In FLEST, this lens is the section entitled 'As judged by the learners'.

The areas of overlap between what learners and teachers consider to be necessarily evident in exemplary lessons are (Wilson and Mant, 2011b):

- discussion;
- contextualisation;
- practical work;
- thinking.

These attributes are therefore reflected mainly in the learners' lens and the trainee teacher's lens in FLEST.

A third lens, that of the observer, has already been referred to several times. The 'observer' could be a university teacher educator, the school-based mentor, any colleague in the science department or school, or a science technician. The role of the observer is pivotal to FLEST being used effectively: they need to select aspects of the observed lesson quite strategically to suit the developmental needs of the teacher and the nature of the lesson. Sometimes it might not be pertinent to explore the lesson through the learners' lens, for example if a trainee teacher is only beginning to overcome 'climate for learning' strategies and the observer deems that the learners could become unsettled through engaging with a visitor. The observer then needs to ensure that triangulation can be achieved when choosing the discussion statements for the feedback discourse. In FLEST, the lens that corresponds to Brookfield's 'Observers' Lens' is listed as '*As judged by observers/fellow professionals/exemplary teachers*'. When joint observations have been undertaken, recording the views of both observers has been of great benefit as different people pick up on different aspects of a lesson; the impact of this has been voiced by the trainee teachers.

The fourth area in FLEST, headed 'Science-specific strategies', represents the lens encompassing a range of attributes prevalent in the literature, thus corresponding to Brookfield's fourth lens, 'Theoretical Frameworks'. Discussion arising out of comments recorded against statements in the FLEST lenses enabled the feedback discussion to move seamlessly towards the level required for master's-level dialogue. The discourse permitted the introduction of recent research and/or conflicting ideologies. These skills are necessary for trainees to acquire as part of the Postgraduate Certificate in Education (PGCE). The daily demands of a trainee teacher leave little time for them to read to the necessary depth and breadth in preparation for assignment writing. The added value of the discourse following on from the use of FLEST in the post-observation feedback sessions became evident. The fourth lens thus comprises ideas emanating from the body of literature that can stimulate, guide and inform critical reflection to enhance practice.

In summary, then, FLEST has provided a useful tool to take a science lesson observation and the feedback session beyond the restrictions that that can be felt by relying solely on the previous Qualified Teacher Status (QTS) Q-standards and the current *Teachers' Standards* (Department for Education, 2011) and on 'WWW and EBI'. An example of the influence of the *Teachers' Standards* on the latest incarnation of FLEST is the inclusion of the term 'articulacy' in conjunction with 'oracy'.

Share and refine plans

Figure 2 represents FLEST after several incarnations, including input from trainee teachers who were keen to be involved in the pilot phase

of the development of the tool. Note that the characteristics for exemplary lessons are separated from those for exemplary science lessons, though this was one of the strategies involved in the development of FLEST into its current form.

The university's Education Faculty's goal is to 'promote conformity without uniformity' in making lesson observations more valuable in guiding our trainee teachers towards becoming effective teachers, en route to consistently teaching exemplary lessons. Would FLEST provide the conduit to promote more effective observed lesson reflection to develop enhanced efficacy in the science classroom?

Colleagues on the science teacher educator team, and school-based science mentors, have reported that FLEST has provided a sound rationale for them as observers to engage with the learners during a lesson to elicit their perspective about the teaching and learning they encounter, and then being able to hear the trainee's interpretation of the specific lesson's success. This triangulation of ideas about the lesson, learning and progression, underpinned by what is in the literature, promotes dialogue that begins to address the needs of mentoring a student at a master's level. Personally, using FLEST has resulted in more meaningful engagement with the latest literature. Overall, the quality of discourse and interaction has been enhanced, providing the trainee science teacher with enriched pedagogy from an andragogic point of departure.

The cornerstone of a workshop organised by the science teacher educator team was based on Wilson and Mant's five categories that the science mentors then brainstormed to derive some appropriate sub-categories (given severe time constraints). Table 1 records the similarity between the school-based mentors' views and the outcomes of Wilson and Mant's research. This activity enabled the teacher educators to 'grab a flavour' of the views of the mentors who were supporting our trainees. It is significant that the ideas from the classroom practitioners closely mirror those from the research fraternity. The framework for FLEST was developed from Brookfield's four lenses and from frequently reiterated views expressed by science educators such as Tobin and Fraser (1990) and Wilson and Mant (2011a; 2011b), and incorporated the views of school-based science mentors of the trainee teachers involved in this work (cross-mapped in Table 1).

Carry out actions

It is critical to know that FLEST was not designed to be a tick-box or to replace the institution's standard observation report form but to be used to effectively complement the views of the observer, the trainee teacher and the learners, and thus add value to the (trainee) teacher's lesson observation.

In order to report on the observed facets of the lesson, a copy of FLEST was annotated during the observed lessons using tracked changes in *Microsoft Word* to record the comments from the learners', observers' and science-specific strategies lenses. In the post-observation feedback session, the value of the recorded observations and comments was that they were used to generate dialogue: dialogue between the observer and the trainee teacher (the autobiographical lens).

As both the observer and science teacher educator, it was my role to respond to the observers' lens statements with examples seen in the lesson. These responses were influenced by the literature (fourth lens). The ensuing feedback sessions liberated the observer and trainee teacher from 'WWW and EBI'; the trainee teachers commented on the difference compared with previous observation and feedback that this tool made to the process and its impact on their professional development. For example, using FLEST in the feedback sessions was reported as being '*a nice way of directing the discussion*', while another trainee said that she found it a useful way to think and talk about the lesson from a different perspective.

Two trainees used revised models of FLEST for their own action research assignments: one used some of the tracked changes comments as qualitative evidence to underpin an aspect of her action research. The other trainee adapted FLEST to create pupil-, observer- and teacher-/(self-) evaluation question sheets to triangulate the efficacy of his approach to providing additional support to two EAL (English as an additional language) learners in his year 10 (age 15) science bottom set science class (Hawkins, 2012). The nature of his evaluation sheets was to promote self-reflection on ideas from learning theories that he introduced as the support mechanism for the two learners. He considered that FLEST '*enabled qualitative evidence in this enquiry to be drawn*

together, improving the reliability and validity of information used'. The learner-responses reported in his assignment are summarised as follows:

In lessons 1 and 2, pupils A and B both disagreed with the statement that they are challenged in lessons in their evaluation questions. This suggested that higher-level work was either not accessible or not provided for these EAL pupils. Importantly, this is something that was also recognised in my own evaluations and in the next lesson I utilised extensions as part of a strategy to extend the reading and writing of these pupils. (Hawkins, 2012: 14)

Few trainee science teachers would address this critical area of teaching and learning (the idea that EAL learners also need to be academically stretched and challenged), particularly during only their second term of trainee in-service teaching.

The feedback of an observed lesson is a strategic teaching tool for the tutor and/or mentor, while also being a learning opportunity for the trainee teacher. Hattie and Timperley (2007) concur by reiterating the power of the learning context, describing feedback as '*a consequence of performance*', the value of which might be appreciated if it is seen as a '*continuum of instruction and feedback*'. They report on Winne's and Butler's (1994) view that '*feedback is information with which a learner can confirm, add to, overwrite, tune, restructure information in memory, whether that information is information knowledge, beliefs about domain knowledge, meta-cognitive knowledge, beliefs about self and tasks, cognitive tactics and strategies*'. It is hoped that FLEST does facilitate feedback and reflection in these ways.

Since introducing the use of FLEST to lesson observation and feedback, the discourse associated with the feedback session has enabled the trainees to articulate their critical reflection and be prompted by the science teacher educator and/or mentor to see that self-criticism in a different light, based on the observers' or learners' lens-reports. Many trainees tend to be hyper-critical without providing much constructive self-criticism. FLEST has helped to surmount this particular barrier, as the tracked change comments are qualitative evidence as opposed to a circumspect commentary of a formative assessment process. Box 2 provides evidence as to the value of triangulating information from the lesson from three perspectives that can produce useful qualitative data on which to focus critical reflection to take one's practice forward after the observed lesson feedback session. [Note: 'vivos' are a system of points that can be collected and traded as prizes.]

Box 3 records the responses from a trainee teacher (JH) to selected statements that were nominated to drive the reflection on his lesson. His verbal responses, along with his body language, provided particular evidence as to the effect that FLEST can have as a tool to promote quality discourse during an observed lesson feedback.

Admittedly, only two examples of trainees' responses to the few selected excerpts from FLEST gathered during the feedback have been presented here as evidence. Nevertheless, based on the unpublished recorded comments from other trainees, FLEST promoted dialogue. It is possible that, had the traditional 'WWW and EBI' tools been used to drive the feedback, JH would not have articulated his reflection-on-practice to the extent that he did. What cannot be captured in a written discourse is JH's body posture and the furrow on his brow, indicative of deeply reflective thought. Afterwards, he expressed just

BOX 2 Excerpts from a trainee teacher's FLEST in March 2013 to provide an example of how triangulation can be used effectively

AS JUDGED BY THE LEARNERS

- **Creative approaches are encouraged.** *Most of the time the lessons are interactive.*
- **Teacher uses a range of T&L strategies suitable specifically for science.** *Yes; we do the teaching and this is good as we find out what we know so that we have a deeper understanding/we saw the Daniel Radcliffe BBC video about the periodic table. Miss has challenged us to learn the PTE and she'll give us vivos.*

AS JUDGED BY THE TRAINEE TEACHER [SD]

- **Creative T&L approaches deployed.** *Don't know … crossword, pupil-led learning, then practical and then a plenary to create a sentence.*

AS JUDGED BY THE OBSERVER

- **Use of creativity in T&L of science.** *Yes – the Starter certainly was.*

how valuable that short critical consideration of how he was addressing his learners' needs had been. It was empowering to observe that he had 'taken himself to that precipice and looked back' on what he had achieved and what had worked and what he could try to do to take the process forward to improve his practice. That feedback session, less than 35 minutes long, was extremely valuable, providing qualitative evidence as to the potential efficacy of the FLEST tool. JH reported in an email that evening that he went on to his next lesson, immediately after the feedback, empowered and motivated. Of note is that the sought-after ideal – a distraction-free environment for feedback – was not necessary for JH's feedback. We were in the middle of the staffroom yet he became so engaged in the process of critical reflection that he was oblivious to movement of colleagues around the room and the ringing of phones around us. This was substantiation of the engagement potential of FLEST in a feedback session.

Box 4 is a short report (by email) about the views of others as to the potential of FLEST as a tool to promote lesson observation and feedback dialogue helping the (trainee) teacher to build their classroom practice to becoming an exemplary teacher of science.

BOX 3 Excerpts from a trainee teacher's feedback session as recorded on FLEST in September 2012

AS JUDGED BY THE TRAINEE TEACHER [JH]

EXEMPLARY LESSON

- **Keywords used effectively.** *I do not present them with keyword lists though there is a glossary on the back page of the WIKID booklet.*
- **Did I take an academic/pedagogic risk?** *I guess that by letting them loose on practical work and the possibility that they would not just play and not take in what they were doing was a risk. Are they thinking what they're doing… I was asking them to discover for themselves, and this approach must be a demonstration of me trusting them, and even respecting them through this trust.*

EXEMPLARY SCIENCE LESSON

- **My confidence about my pedagogic approach for the scientific topic.** *Pretty confident as I can use the practicals to break down 'stuff' enabling them to grasp certain aspects and understand the bits slowly as I build up access to the concepts; I don't flood them with all knowledge at the start. I think that this is a sound approach for this group and the nature of the WIKID programme.*
- **Felt that I explained well.** *The parts that were well planned were well explained because I had gone through it on paper and in my mind before; the end of the lesson less so because of timing; maybe I could have put in simpler terms.*
- **My use of scientific modeling and its value for the T&L; and its value.** *This especially I guess it comes down to giving the nuggets of information… most successful one was the sand and the rocks. Looks at different aspect of hardest aspects to relate how these relate to building the dam and it then bursting. Physically I presented the models so that they could comprehend the process. It's hands-on and the pupils can get a better feel for the concept.*

BOX 4 Anecdotal evidence from the team's lead science teacher educator about using FLEST

You replied on 05/12/2013 19:09.

Lyn,

I just wanted to update you, I did a joint observation with a SM today and I used your flest model and the four questions.

The model went down really well with the participant and the mentor, who will take the idea on. Interestingly, as we were working in a busy staff room, a current TF and a TF NQT, politely (TF after all) interrupted and asked if they could have a copy of the model and the questions. Unreliable and anecdotal evidence, but evidence never the less…

I know Sue (CC'd in) has had a similar experience.

From reviewing SD's and JH's responses, plus feedback from the lead science teacher educator, it would seem that FLEST can be a valuable and user-friendly working tool to take practitioners to a point where they can reflect on their own development, and *not* a tick-box to appease assessors!

Conclusion

The problem with evolving working education tools is that this model has moved from its initial state of true simplicity, thus deviating from the original intention of the tool. One might consider

it to be bordering on being cumbersome now. The underlying intention was to develop a tool to support science trainee teacher development; it was never intended to create yet another tick-box system. But, with the inclusion of the numerous additional concepts, FLEST was fast becoming such an overloaded tick-box. Weston's comment that the '*worst sort of observation is a tick-box approach*' (2012: 7) was a salient reminder that FLEST must be used as an observational *prompt* matched to the lesson and the agreed observation focus, and, most importantly, focus on pupil learning. The feedback discussion needs to be driven by observed facets of the lesson on which the trainee can cogitate, and in the process drive their practice towards exemplary teaching of science.

There is no reason why FLEST could not be used as an observation and feedback discourse tool for any teacher of science. In fact, with subject-/phase-specific 'tinkering', FLEST could be relatively easily adapted to be used across all subjects and phases to enhance the teaching and learning potential of all observations. Observations should be an integral part of professional development and not another Ofsted-type internal inspection with its concomitant consequences.

Whatever framework, or combination thereof, an observer chooses to use to initiate post-observation feedback discourse, FLEST is able to bring to the fore characteristics of exemplary practice separate from attributes of exemplary science teaching and learning.

Throughout the development and implementation of FLEST, the design has been *not* to create yet another tick-box tool but to attempt to ensure that it can aid the observer as outlined by Weston (2012):

Make lesson observations focus on pupil learning and not on whether a teacher is talking the talk. The worst kind of observation is a tick-box approach that forces compliance with a mandatory list of practices, while the best results in meaningful discussions about the way pupils learn.

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