Constructing classroom learning environments that are interactive and authentic and aim for learner empowerment

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Constructing classroom learning environments that are interactive and authentic and aim for learner empowerment

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Abstract

This paper examines the concept of learning and teaching effectiveness as defined in Kimbell's (2001) assertion that the real products of design and technology classrooms are to be seen not simply in terms of '3D artefacts' learners produce but rather the 'empowerment' of young people. Assuming learner empowerment is the goal, the challenge for teachers is to provide more authentic instructional contexts that will motivate and enthuse pupils in their learning and give them a real sense of ownership and personal achievement. This paper argues that collaborative interaction and imaginative engagement in authentic design and technology contexts helps foster an approach to learning that is empowering for both teacher and learner. Toward this end, teachers need to be reflective and analytical about their own beliefs and practices, and acquire deep understanding of cognitive and motivational principles of learning and teaching. In this paper the author examines how teachers can model and promote greater learner autonomy and empowerment within supportive and creative classroom learning environments.

The research tutor worked collaboratively with teachers in two schools, primary (11 yr old pupils) and post-primary (14 yr old pupils), encouraging a greater emphasis on holistic teaching and more active and reflective forms of learner engagement. In the primary school, a story, featuring a dilemma and a challenge, provided an authentic context by virtue of its orientation towards mutual engagement and intersubjectivity. In the post primary school, a short four-minute video clip and other source material related to the G8 'Make Poverty History' concert provided the context for imaginative engagement and reflection. The aim in both schools was to provide real contexts for learning and a classroom ethos that would encourage student voice, purposeful and imaginative engagement, decision-making, action and reflection (learner empowerment).

Audio and video recordings, collections of pupils' work, teacher and pupils' questionnaires, field notes and reflective comments were used to provide the data. Semi-structured interviews with the teachers and pupils helped illuminate the contextual conditions that seemed to be significant in promoting more participatory and inclusive modes of engagement. Main findings indicated that facilitating student voice and more collaborative ways of working and thinking together helped
change the classroom culture to one that empowered pupils in their creative thinking and learning. The quality of the talk-in-interaction, the nature of the teacher-pupil relationship and a more authentic form of pupil assessment provided the engine for driving the learning process forward in creative and personally fulfilling ways.

Key words

teacher effectiveness, engagement, interaction, autonomy, authenticity, empowerment

Introduction

Learning in both case studies was seen as a process of interaction and knowledge construction. The learning context engaged pupils in imaginative and authentic activity as they set about inquiring, exploring alternatives and searching for solutions to problems they had identified. The mutuality of the process and the need for action and reflection helped the teacher become a better and more informed teacher and the pupil a more creative thinker and learner.

Related research in mathematics (Naomi et al, 1989) claims that when teachers begin to see learning as knowledge construction, they change their thinking about curricula, instruction and assessment, developing more powerful approaches to connecting thinking and mathematics and designing more mathematically significant instructional learning experiences. Costa (2003) argues that a new teacher mindset is needed to empower pupils in their learning by facilitating greater self-determination, self-direction, self-assessment, and self-evaluation. Claxton (1999) claims that what marks teachers out as good or better than good is more than their mastery of content knowledge and pedagogical skills. It is their enthusiasm and passion for teaching, for their students and for their learning. An observation of this study is that purposeful engagement in learning and teaching requires both intellectual and emotional commitment. It is the emotional component that fires pupils with enthusiasm, creates energy, self-determination, commitment and resilience (Csikszentmihalyi, 1990; Goleman, 1996).

Literature review

Research shows that classroom activities that encourage greater independence, risk-taking and intrinsic motivation, empower

pupils in their learning (Dweck, 1986; Shaughnessy, 1991; Wallace, 1996). Dewey (1929) advocated making learning problematic and pupils learning through a process of reflective inquiry. For him, understanding and making connections was the goal, and what pupils remembered from resolving problematic situations he called the 'fruit' of the activity:

> In intrinsically motivated activity the answer lies in the activity itself and its successful conclusion: thinking holistically, the pleasure of competent performance, the feeling of success, and the sorts of things Csikszentmihalyi (1990) contends promote a state of 'flow'. The context for thinking and learning therefore needs to be one that elicits the curiosities and sense-making skills of the learner, provides choices, fires the imagination and offers a real sense of ownership and feelings of control.
>
> (Watkins, 2001).

Assessment for learning and constructive feedback can empower, provided the learner retains ownership of the process and autonomy is facilitated through enhanced metacognition and metalearning (Salmon, 1998; Carnell, 2001; Watkins et al, 1996). When teachers create a 'responsive' and 'supportive' classroom environment (Curtis, 2000) students are less apprehensive about their creative expression and sharing ideas. This more 'accommodating' atmosphere allows pupils to be unsure, tentative, doubting, question, make mistakes and change their minds.

In considering *authenticity*, *autonomy* and other relational factors of *empowerment*, cognisance needs to be given to those inner qualities that characterise an 'effective' teacher; a continuing *striving* to portray meaning and purpose in learning (authenticity); a deep *commitment* to providing the best possible opportunities for each pupil (moral purpose); a natural desire to *nurture* and build the kind of teacher-pupil relationships that encourage and value creative expression (empowerment).

Emerging from the research literature are four themes which have significantly impacted on this qualitative study:

(i) Classroom communication.
(ii) Classroom activities.
(iii) Teacher-student relationships.
(iv) Assessment.

(i) Classroom communication

Dialogue and conversational engagement is crucial to the creation of a participatory process, critical thinking and learner empowerment (Mercer, 2000; Shor, 1992). Intersubjectivity means that participants are jointly focused on the activity and

its goals, and they help pull each other's attention in a common direction. Engaging in reciprocity encourages talk of a more exploratory kind (Mercer, 2000) where participants strive to make connections and build on each others' contributions through purposeful inquiry.

This kind of 'constructive' dialogue, as shown in the transcript that follows, illuminates a number of talk functions that empower learners in their thinking and acting: speculating, explaining, elaborating, questioning, challenging, hypothesising, affirming, feedback, evaluating and reflecting (Kumpulainen & Wray 2002); Corden (2001); Wegeriff & Mercer (2000); Coultas, 2007). The aim is to provide a 'comfortable and safe' environment that will enhance the sharing of ideas and thoughts leading to more creative learning outcomes. In the classroom there is need for a move from 'pedagogical dialogue' to 'dialogical pedagogy' (Skidmore, 2000), where the emphasis is on the kind of exploratory and constructive talk this study seeks to encourage.

(ii) Classroom activities

The effective teacher is a reflective practitioner who strives to provide a learning context that engages learners cognitively, emotionally and socially (Schön, 1983). The intellectual and emotional dimensions to learning and teaching need to be recognised in order for learners and teachers to invest effort in the process and remain resilient in the process. The use of story and video in the two case studies is an attempt to provide a more authentic and imaginative context for thought and action.

By encouraging learners to collaborate and in a real sense act as co-constructors of their own design narratives as they work progressively towards a design solution, narrative centred learning environments aim to promote the deep, connection-building, meaning-making activities that define constructivist learning (Bruner, 1996; Cooper & McIntyre, 1996). Starko (1995) contends that learning is a creative process that involves learners in the art of thinking, acting and reflecting, both individually and collectively. By emphasising process, learners are encouraged to view creativity as exploratory thinking, making connections, visualising solutions, investing effort, deciding, reflecting and modifying ways of doing things rather than a moment in time 'Eureka' experience or the gift of a few.

(iii) Teacher-student relationships

Effective teachers aim to provide an environment that nurtures and supports pupils in their learning. According to Morganett (1991) good teachers are not only knowledgeable about their subject but, more importantly, they care for their pupils as individuals, show respect for their ideas and value their

contribution to the interactive process. A good teacher responds in a way that empowers them to know how they learn and how to learn independently. These qualities are communicated directly through the classroom ethos the teacher creates: their sense of humour, interpersonal warmth, patience, empathy and support of their pupils' self-esteem (Hopkins and Stern,1996; Bliss et al, 1996).

A study of a range of primary schools found that for most children, friendships and companionships were critical to their enjoyment, together with work in which they could participate actively (Bendelow and Mayall, 2003). Creating a narrative centred learning environment attempts to capture the imagination and interest of the pupils in personally fulfilling ways.

(iv) Assessment

Research shows that pupils find difficulty being creative in traditional classrooms where they are 'afraid to take risks, afraid to explore new ideas, and afraid to fail' (Kawenski, 1991). Traditional educational systems tend to emphasise a 'performance orientation' in classrooms rather than a 'learning orientation' where individuality and creativity are valued (Dweck, 2000). An emphasis on performance tends to depress performance whereas an emphasis on learning can enhance both learning and creative performance. Educational systems would benefit from understanding creativity and learning as a more personally based construct than evidenced by traditional means of assessment.

Berenson and Carter (1995) promote the use of journals, open-ended problems, portfolios, interviews and performance assessments as more authentic forms of assessment that reward learning and value the individual and unique contributions of the learner. Pupils need to be encouraged to share their own 'learner stories' and reveal their own 'solution pathways' in ways that are personally meaningful and authentic.

Methodology

This study is part of a much wider European project which involves ten countries and a range of subject curricula including design and technology. The aim of the project is to create contexts for learning that use dialogue as a tool for thinking and social interaction as a tool for learning (DIAL:Connect, 2004-2007). The important emphasis is on building a dispositional view of good thinking that pays as much attention to pupils' alertness and attitudes as it does to thinking skills. Such an approach facilitates a much more metacognitive approach to learning by placing a greater emphasis on questioning and reflection: challenging, hypothesising, negotiating and achieving consensus.

Narrative centred learning environments tend to capitalise on learner motivation by placing a dilemma, challenge or question at the starting point. The 11 yr old pupils, operating in mixed groups, identified fully with the story involving Ted and his son Bill. The dilemma raised in the story caught the pupils' imaginations and actively involved them in the development of a bridge design that incorporated a clever warning system for approaching trains. The 14 yr olds (all girls) identified with significant issues relating to the Make Poverty History campaign, 2005. In groups, the pupils were encouraged to design and model their own stage sets for raising other pupil's awareness of an issue they felt passionate about. The choice of issue, the design of stage and stage set, the lighting, the music, the venue, the planning and organisation was for them to consider and take responsibility for. Each group was given total control for conceiving, planning and modelling such an event and demonstrating how it could become a reality. An independent panel of teachers and pupils would decide, from a consideration of the different group presentations and stage models, the group they felt was most compelling in terms of originality of design solution, the creative process experienced, how well the group solved the problems they encountered, what they learned from the process and how well they communicated and justified their methods and their thinking to their audience.

Both of these case studies were conducted in naturalistic settings. A number of qualitative methods were employed as data collection methods: pupil and teacher questionnaires, semi-structured interviews, focus groups, classroom observations, video and audio recording of class and group interaction, field notes. During informal interviews pupils were asked to discuss their feelings about the different tasks they engaged in, the degree of teacher direction and control, and their views on teacher expectations. The data provided information on each of the following:

(a) classroom ethos and vibrancy;
(b) talk-in-interaction;
(c) openness (freedom of choice) associated with classroom activities;
(d) assessment.

These emerged as significant factors in the cultivation of a supportive learning environment for learner empowerment.

(a) classroom ethos and vibrancy

Evidence of more open interaction between teachers and learners and good relations in a classroom are crucial determinants of the quality of classroom life and learning (Watkins, 2001). The quality of teacher-pupil relationships was a significant factor in the high levels of imaginative thinking and

creative engagement that characterised the groups in both case studies. Classroom observations showed that the teachers fulfilled a broad range of roles (supporting, facilitating, modelling, guiding, prompting, challenging, inviting, suggesting, encouraging, directing, demonstrating…) but chief amongst these was that of providing an audience for the pupils and giving constructive feedback. The pupils enjoyed the warmth of relations and in both schools they spoke of the teacher being more like a 'friend' than a teacher. He 'doesn't make me feel stupid'… 'he lets us try and work it out for ourselves and tells us we are brilliant when it works'… 'he is never too busy and will always help us take the next step if it is too hard'… 'makes you feel you have done something really good'… 'it's fun'… 'it's practical'… 'we are really proud of our work'… 'ours is the best class'.

The teachers demonstrated the importance of the social context in learning and encouraged pupils to use the group as a resource for developing ideas and considering alternative ways of doing things. To facilitate cooperation and collaborative inquiry the teachers taught the groups certain ground rules for collaborating which were posted on the wall and referred to from time to time. Thinking routines like **KWL** (what do we know, what do we need to find out, what have we learned), and **PMI** (plus points, minus points, interesting points) helped make thinking visible in the classroom. The teachers encouraged the pupils to form small communities of enquiry and in a real sense modelled 'thoughtfulness' through their use of language. They emphasised the importance of active listening and valuing diversity.

A review of the video clips showed teachers encouraging pupils to take time to think about 'what if?' or 'how else could this be done?' or 'is there a better way?' or 'talk me through this' or 'how about…'. Such an approach to thinking and learning helps facilitate a more hypothetical, metacognitive and evaluative approach to learning that pupils found 'hard' but rewarding… 'learning is not easy …but when things work out you feel really good'. The teachers in their reflections were asked to comment on questions such as: are pupils using dialogue and sketches to communicate?, are pupils offering creative ideas?, are pupils exploring different possibilities?, are pupils able to work out the method or procedure for themselves?, are pupils attentive to the problem and resilient in their thinking?, 'are pupils remaining on task or are they easily distracted?' The teachers were becoming more reflective in and on practice and more aware of the diversity and complexity of factors affecting learning and understanding.

In both case studies, individual and collective enquiries developed from problematic situations highlighted within the case stories.

The pupils could be seen using dialogue and annotated sketches to create shared understanding, calling up and searching out related information, formulating their own hypotheses, working out their own solution methods and methods of manufacture, and making changes and improvements to them in ways they considered to be appropriate. The pupils worked on genuine challenges that they had created and adopted for themselves. The learning was contextualised, first-hand, collaborative and self-assessed. In addition to solving design and technology problems the pupils were using important real-life learning skills. The teacher provided the context for inquiry and exploratory activity and shared the learning intentions and criteria for success at the beginning of each lesson. The interpretation, choice of procedures, decision making and methods of implementation belonged to the pupils. There was a good mood in the classrooms and pupils were encouraged to monitor 'what they were doing', 'how they were doing it' and 'why they were doing it'. This highlighted the importance of self-assessment and self-regulation in learning. The classroom ethos encouraged diversity, open-mindedness, resourcefulness, and reflection. It was this that impacted significantly on interest and commitment levels which remained high throughout the activities. The pupils had identified with the problems, made them their own, and engaged collaboratively to search out solutions and learn from them.

(b) talk-in-interaction

In creating a comfortable and safe environment for thinking the teachers emphasised that all ideas mattered and that there was no one right answer. Barnes (1992) points to the learning potential of open group discussions, which are reflective and hypothetical, where speech is tentative and exploratory, and where students are prepared to take risks and share their thoughts. The challenge for pupils was to agree the purpose of the tasks, proceed with a shared understanding of what they were trying to achieve, and reach consensus on which solution ideas worked better and why. The teachers were keen for pupils to make their thinking explicit (Wells and Chang-Wells, 1992; Perkins et al, 2000) and share this through dialogue, modelling, brainstorming, thumbnail sketches and annotated drawings. An open mind was encouraged and one that was tolerant and respectful of other ideas (Wegerif & Mercer, 1997, Dawes et al, 2000). This was a process that could not be hurried and teachers had to be patient to avoid removing the challenge from the problems pupils had identified.

The teachers encouraged pupils to engage with problems in an exploratory way and arrive at a shared understanding that would enable them to make an appropriate decision. Pupils were advised that this was not an easy process and teachers were encouraged to provide a wide and valid range of different audiences within the classroom: engaging in active listening, prompting, challenging,

supporting, encouraging, suggesting, speculating, facilitating, demonstrating responsive understanding… (Corden, 2001). Raising teacher awareness of this diversity of roles and encouraging reflection in/on practice were important aspects of professional development that were emphasised in the teacher-tutor partnership. What was particularly significant when reviewing the video tapes was seeing pupils engage in a creative process of using collaborative talk to reason and think through problems.

From observing and reflecting on classroom practice and talk-in-interaction it became clear that two conditions needed to be met for collaborative talk to have this empowering effect. It was seen that teachers were most effective when they intervened in ways that enabled pupils to retain ownership of both process and task and, secondly, the dynamic nature of the talk characterised contingent responsiveness. These conditions worked to empower both teacher and learner. The learner was making thinking explicit and the teacher was becoming more knowledgeable about the learner's purposes and current state

of understanding, thus allowing him to make his contributions contingently responsive to the learner's needs (Wells and Chang-Wells, 1992; Lyle, 1993).

Teachers felt that pupils' use of *exploratory* and *constructive talk* and *reasoned evaluation* was a significant feature of successful group work. The capability to make connections with prior knowledge and build on this was significant in enabling pupils to apply their knowledge and understanding in solving related problems. A part transcript (**Extract 1**) of two 11yr old pupils challenged with developing a system for warning an approaching train of danger at the bridge revealed a rich variety of talk functions. What is of particular interest is the use of *hypothetical* and more open, *powerful questions*, as pupils engaged collaboratively to reach a shared understanding of problem requirements and solution possibilities. Equally interesting is the use of 'could be' and other creative language functions such as: 'I was wondering', 'I reckon', 'but suppose'.

Extract 1: need for warning system	talk functions
L (using hands, models the opening operation of drawbridge)… bridge goes up… bulb flashes (is seen musing over the raised drawbridge)	(thinking aloud)
P *could be* a flashing bulb	(speculative,
L yeah…. what turns it on?	(affirms) (powerful question)
P something hits a switch…	(*hypothetical*)
L what like?	(powerful question)
P not sure… *I was wondering*…	(thinking aloud)
L (makes link with barrier at railway crossing)… you know… the red light on the arm thing at home flashes when the train comes… must do it automatically…	(connection making) (thinking aloud)
P yeah… it's on the barrier… stops the cars	(affirms, thinking aloud)
L *I reckon* it needs to flash as the bridge goes up… before it opens…	(*hypothetical*)
P where does the bulb go?	(powerful question)
L *could be* on the bridge…	(extends)
P whereabouts?	(powerful question)
L at the entrance… *could be*…	(speculative)
P too close… train couldn't stop… goes too fast…	(thinking aloud)
L yeah… before it gets to the bridge… down the track a bit….	(affirms) (*hypothetical*)
P ok… needs time to stop…	(affirms)
L yeah, *but suppose* we place it here (pointing to a suitable place on bridge tower)… put it here on the model AND in the drawing show it on the track… ok?	(thinking aloud)
P good idea…	(**affirms decision**)

Extract 1

Transcripts of 14 yr old pupils' talk-in-interaction also showed a constructive use of 'what if', 'why not', 'how else could we do this' range of talk functions. The quality of the dialogue and interaction was revealed through questions of exploration, connection making and group decision making. The aspiration of the teachers was to build a strong culture of thinking in the classroom that empowered pupils in their problem solving and decision making.

(c) Openness (freedom of choice) associated with classroom activities.

The case stories in this study provided the contexts for thinking and acting imaginatively. Consideration of the issues raised, generated a certain kind of *narrative reasoning*, and *narrative knowledge* that is different to other more traditional forms of knowledge (knowing how and knowing that). The kind of knowledge attributed to narrative is more akin to '*knowing what it is like*' as experienced through storytelling (Polkinghorne, 1988). Narrative reasoning helps us to empathise with other people, develop sensitivities and better understand why things are the way they are and how they may be improved. It empowers people by developing intellectual, social and emotional intelligence and a sense of personal identity.

The case stories had emotional impact. They allowed the pupils to construct a mental image or model of the situation that was durable. The construction of a shared understanding gave a real sense of purpose to the classroom activities as

seen in the high levels of attention, interest, motivation and creative engagement that followed. The teachers kept emphasising that there was no one right answer to problems that were identified and that the method of solution was as important as the end product. For each lesson the teachers provided a framework for action but within this pupils were free to consider their own ideas and perspectives. This openness contributed to creating an environment conducive to risk-taking, learning and creative expression.

In the story designed for the 11 yr olds, the emotional impact of the dilemma faced by the main character Ted upon realising a runaway train was coming through, and that his son Bill may be in danger, was gripping. The children identified fully with the situation and drew a number of parallels with other equally difficult and heart stopping moments they had either experience of, or, knew about. After that the children seemed to act as if they were on a mission, telling the teacher… 'we need a control tower for Bill'… 'we could use a lever to open the bridge'… 'the light has to flash as the bridge opens…' (See Photo 1).

When the pupils designed their bridges and demonstrated how they operated the teacher felt sufficiently pleased for him to say that maybe the project could stop at that point. When the idea was put to the pupils it was firmly rejected with calls like… 'but what about Ted… Bill is in danger… we need to stop the train… we haven't even solved the problem yet'.
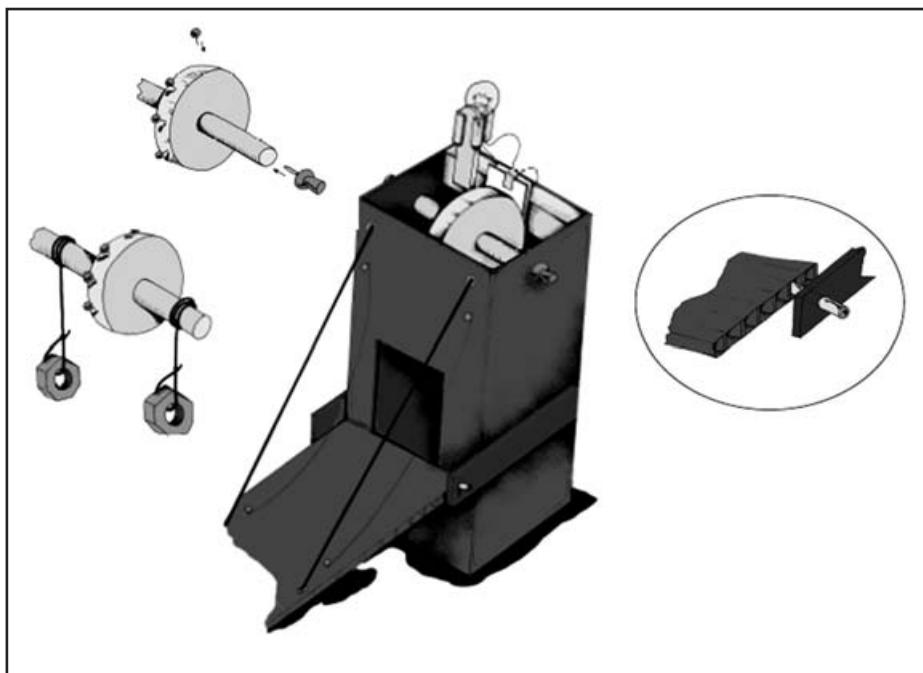

Photo 1

The pupils went on to invest real energy and commitment in designing circuits with a clever switching system that could be used to simulate how a dilemma could be avoided. This was a really powerful moment to experience.

The pupils forced the teacher to continue with the project and go well beyond what he was happy to accept. The driving force was the mental model pupils had constructed in their mind's eye at the outset of the story. In designing solutions that worked the pupils were constructing other mental models as they reasoned and developed further solutions to problems they had identified. The video clips showed the pupils engaging in a process of visualising (standing back and musing over a problem), communicating (talking with or without sketches but always with reference to the model) and acting (interacting with objects and modelling possibilities). Permitting time and space for this to happen was essential for a successful and creative outcome.

The girls were equally passionate over the 'causes' their concert stages represented (Photo 2). The video clip of the Live8 concert fired their imaginations, and design and technology became a vehicle for powerful thinking and creative engagement. The context was authentic and their identified cause had emotional impact. In addition to designing stage sets with all sorts of creative backdrops, the pupils designed an electronic fireball system of flashing LEDs, an illuminated logo for the band, admission tickets, and thematic headgear for the marshals etc. Pupils asked the teacher: 'can we make our own music and download it to our MP3 player?' In their own time, the pupils wrote their own music and used their own instruments to make their own recordings so that their presentations at the end could be judged to be authentic. They told the teacher they exchanged ideas about the project outside class using MSN messenger!

In both case studies the process became the content, and it was through 'experiencing' the process that imaginative thinking developed and impacted significantly on the project outcomes. The creative context for learning permitted choices, individual expression and personal growth resulting in enhanced knowledge and experience, or, what Dewey called the 'fruit' of the activity (Dewey, 1933). The pupils responded to the challenges with enthusiasm and conviction. They worked collaboratively, engaging in a process of integrating and imagining how the different parts fitted together to form a coherent whole.

(d) Assessment

Constructing authentic and responsive learning environments helped teachers focus more on the creative process of knowledge construction, understanding and application than on the end product and standardised methods of assessment. The environment was one that encouraged student voice, diversity of outcome, and the confidence to express and work through ideas. Paul said he was 'getting better at thinking' and was 'not
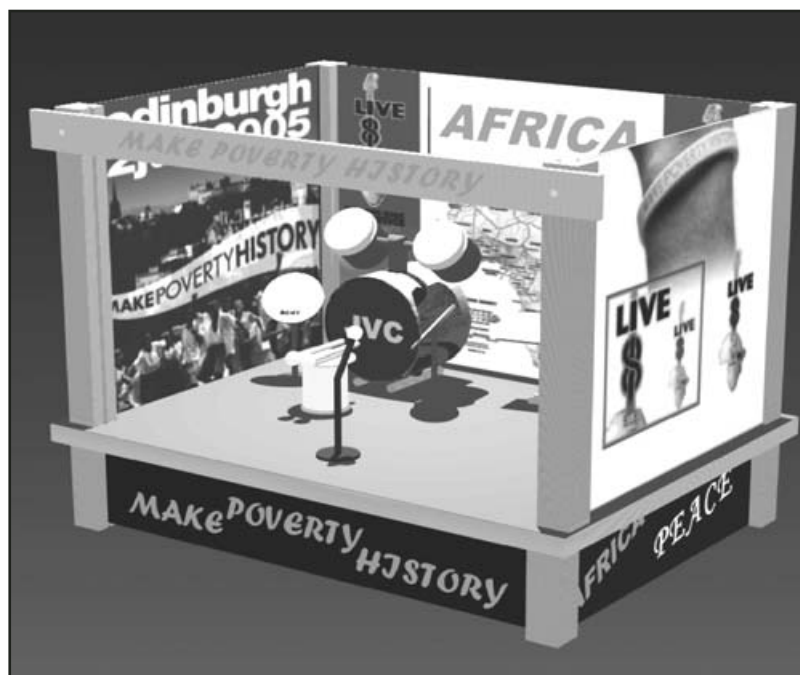

Photo 2

getting stuck' the way he normally did. Sarah said 'the teacher doesn't give me the solution but helps make a solution possible'. The approach was one that encouraged pupils to interact with problematic situations, explore alternative solutions and agree on the one that worked best. The emphasis was on personal satisfaction, intrinsic motivation and resilience in learning (Dweck, 2000).

Assessment that is authentic takes issues of context into account and rewards individual effort in arriving at creative solutions. Such an approach turns students' attention more towards learning, understanding and creative expression rather than evaluation and judgement. The students perceived the teacher's view of assessment as non-threatening and felt free to be creative and take risks. The tasks were authentic and engaged pupils in personally and culturally appropriate ways, facilitating a range of learning styles (Smith, 1996), and maximising opportunities for students to display what they actually know (Darling-Hammond & Snyder, 2000). Research argues that in this assessment for learning approach, teachers are developing a better understanding of the many variables that influence their work which in turn enriches their ability to understand the effects of their actions and interventions on student learning (Wyatt & Looper, 2004). In this sense the teacher is becoming a learner and showing a willingness to change when the change leads to greater student learning development.

During the design and realisation of the projects, the students could be seen sketching, annotating, communicating, interacting and modelling to explain and clarify their thinking. The older pupils were encouraged to use digital and video cameras as learning tools to record significant moments of 'work (learning) in progress'. A web camera was used to record feelings about progress, difficulties experienced, decisions reached and goals still to be met. These pupils had access to the video clips in their free time and were encouraged to enter into reflective dialogue on their 'work in progress' and to learn from this.

In both classroom settings the assessment was viewed as non judgemental. The criteria for assessment were agreed by the teachers and pupils at the outset. Pupils knew the emphasis would be on the quality of:

1. Solution: utility (functional) and significance (appeal);

2. Execution: imaginative use of materials and components;

3. Input: effort, persistence and resourcefulness;

4. Portfolio: weaving events of learning and reflection to present the 'big picture'.

The acronym **CORP** describes the process approach used in portfolio construction (Campbell et al, 1997). CORP stands for *collection* of data (text, annotated drawings, plans, diagrams, photos, video clip, scanned documents), *organisation* of data; *reflection* on the selected data, and *presentation* of the product. The portfolio had to comprise five items which were then supported with five reflections that justified their inclusion. Presentations were evaluated in terms of coherence, impact and depth of reflection.

Conclusions

From observations and analysis it could be seen that both teachers in this qualitative study were keen to provide learning environments that nurtured positive learning relationships within a context of trust, respect and confidence. The narrative ***contexts for learning*** were authentic; the pupils identified with them, and the freedom and openness associated with the classroom activities invited active participation and interaction within the groups. The activities were practical and relevant with opportunities for reflection, learning and change. The teachers promoted a student-centred approach and their practice showed that they were operating with rich conceptions of learning (Watkins, 2001). The pupils were *empowered* to take responsibility for identifying and solving problems, managing the dialogue and group dynamics, staying on task and being resourceful.

The case studies helped illuminate the value of ***exploratory talk*** and modelling in creating joint understanding as a precursor for creative and purposeful engagement. Transcripts of the talk-in-interaction helped reveal the nature and quality of the *reciprocity* in dialogue and the significant use of hypothetical and powerful questions in attaining understanding. This tended to reinforce the view that simply allowing pupils in groups to 'get on with it' is insufficient in promoting the kind of collaborative inquiry and discourse needed to create meaning and understanding. In their introductory activities teachers were very explicit when drawing up the *ground rules for collaboration* and agreeing the *rules of engagement* needed for constructive learning. The 'oral discourse patterns' of the classroom had to change to encourage the kind of dialogic interaction and reflective inquiry that was needed for imaginative engagement with problems (McMahon& Goatley, 1995; Westgate & Corden, 1993).

Pupil learning was enhanced as they identified problems, formulated questions for themselves, used exploratory language to think through and develop ideas, monitor their own progress, show respect for different views, and display self-determination and a desire to persevere with a task. However, the study did point to the need for a more

diversified teacher role in providing a wide and valid range of different *audiences* in the classroom (Corden, 2001). Sensitive intervention and responsive understanding on the part of the teacher was needed to tease out individual responses and help make thinking more explicit in the classroom. Teachers needed to provide time to scaffold and model the learning process with particular groups and provide a climate in which pupils felt comfortable to grow thinking and venture ideas. The authenticity of the context, however, was a significant factor in helping pupils overcome inhibitions to voicing their thinking and engaging more effectively in the process.

The pupils operated in a 'safe' environment which encouraged them to take risks and offer ideas without fear of ridicule or a sense of failure. For this project, more traditional forms of **assessment** were discarded in favour of more personally authentic forms that allowed pupils to log and share their **learning story** in the form of a portfolio that highlighted 'significant moments of learning' within the project. Pupils were encouraged to take ownership of the process and to log only those events they could justify as most representative of learning: the uniqueness of the solution, the effort involved, the decisions taken, and conclusions reached (Darling-Hammond & Snyder, 2000).

The evidence from the case studies showed how these **teachers** were **enhancing their own learning** and bringing about change to their own professional practice through dialogue and interaction. The teachers were responsive to the demands of the learning situations and were taking risks by trying new ideas in the classroom and asking pupils for their views. They were encouraging more complex learning both for themselves and their pupils by making learning an object of conversation. The teachers had the support of the research tutor throughout the case studies and afterwards when reviewing the video clips and engaging in reflective dialogue. A teacher observation at the end of the first day makes a salient point – 'this project has hit home… the pupils are switched on because it relates to the real world'.

If larger scale research shows that this more authentic form of assessment significantly enhances creativity then change in practice needs to take cognisance of these findings. To allow comparisons, further research needs to be undertaken at Key Stage1, also within all boys and mixed gender groups at Key Stage 3 (11-14 yr olds).

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