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The Importance of Classroom Climate in Fostering Student Creativity in Design & Technology Lessons

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Abstract

D&T educators have pointed to a 'crisis' in creativity within the subject. Research has indicated that organisational climate, defined as 'the recurring patterns of behaviour, attitudes and feelings that characterise life in the organisation', can help or hinder creativity. Hence 'climate' is a potential explanatory factor for the lack of creativity documented in student outcomes. This paper, therefore, explores whether the classroom climate experienced by secondary students (aged 11-16 years) in D&T lessons is conducive for creativity. Data are drawn from a number of sources including student (N=126) and teacher (N=14) interviews and student (N=4996) and teacher (N=69) questionnaires gathered across a total of 15 schools, as part of an ongoing Gatsby-funded research and intervention project. Coded data and survey questions relating to the nine climate dimensions outlined in Ekvall and Isaksen's climate model were identified. The paper focuses on two of these dimensions; challenge and freedom. The analysis revealed that students felt much of the work they do lacks challenge and freedom, hence they do not perceive the climate in their classrooms as conducive for creativity. Teachers' perceptions differed somewhat and this is discussed with reference to the performativity culture in which they are located. Whilst acknowledging the difficulties this poses it is argued that, as the literature indicates climate is 'in the hands of the manager', teachers can change their practice to enable creativity to flourish. Tentative suggestions for ways forward are suggested.

Key words

creativity, classroom climate, motivation, challenge, autonomy, 11-16 years

1. Introduction

Creativity is acknowledged to be important in education (Craft, 2005; Robinson, 1999) both for economic growth (Creative Economy Programme, 2006) and as an everyday life-skill (Sternberg, Lubart, Kaufman, & Pretz, 2005). However, creativity remains a problematic area within Design and

Technology (D&T) education (Nicholl, 2002, 2004; Nicholl & McLellan, 2007c; Office for Standards in Education, 2001/2) leading some commentators in the field to suggest that creativity is in 'crisis' within the subject (Barlex, 2003; Kimbell, 2000a, 2000b).

A number of suggestions have started to be put forward to explain this situation. Before examining these, 'creativity' should be defined. In western cultures there appears to be a general consensus that creativity is an 'imaginative activity fashioned so as to produce outcomes that are both original and of value' (Robinson, 1999:29). However, rather than assuming that creativity is a characteristic of an individual, it can be conceptualised in terms of a socio-cultural system (Csikszentmihalyi, 1999): creativity occurs when an individual (student) interacts with a socio-cultural setting within the domain (D&T) and the outcomes created are judged by members of the field (at classroom level, arguably the teacher). To understand the lack of creativity in student outcomes, research has analysed the 'individual'. For instance researchers have started to examine the influence of normative cognitive processes on the generation of design ideas (Howard-Jones, 2002; Middleton, 2005; Nicholl & McLellan, 2007c) within the domain of D&T. How particular aspects of teacher practice (the field) impact on these processes is also beginning to be explored (Nicholl & McLellan, 2007a). Other work has focused specifically on the field, for instance examining how teacher belief systems within the current context of performativity (Nicholl & McLellan, 2008, forthcoming) might be a barrier to creativity. This paper aims to add to existing knowledge of the impact of teacher practice on the individual by focusing on the dimension of classroom climate. The latter, it will be argued, is under the control of the teacher and can therefore be regarded as a facet of teacher practice.

In particular, this paper addresses the question of whether the classroom climate experienced by secondary students (aged 11-16 years) in D&T lessons is conducive for creativity. To address this question the following section will explore the

concept of classroom climate. This is followed by details of the research programme from which the data discussed in this paper are drawn. The classroom climate experienced by students in D&T lessons will then be presented. The paper concludes by discussing implications for practitioners and making tentative suggestions for ways forward.

2. Classroom climate

The significance of the concept of 'climate' for understanding organisations has been recognised by organisational psychologists since the 1960s (see for instance Litwin & Stringer, 1968) and has been applied to school settings since the 1970s (for instance Siegel & Kaemmerer, 1978). Considerable work has been done in recent years distinguishing climates that support or facilitate creativity from those that do not (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Ekvall, 1996; Hunter, Bedell, & Mumford, 2007; Isaksen, Lauer, Ekvall, & Britz, 2001; West, 2002). Hence classroom climate is a potential explanatory factor for the lack of creativity in student outcomes noted above.

Climate has been defined as 'the recurring patterns of behaviour, attitudes and feelings that characterise life in the organisation' (Isaksen et al., 2001:172) and refers to the perceptions individual members of an organisation share. Work in schools, however, has suggested that different classrooms within the same school can have different learning environments or climates (Anderman & Young, 1994; Maehr & Midgley, 1996; Midgley, 2002; Turner, Midgley, Meyer, & Patrick, 2003). The paper therefore explores the perceptions students and teachers have of the climate in individual D&T classrooms.

Several models have been developed that identify a number of factors or features that are characteristic of creative organisations (Amabile et al., 1996; Ekvall, 1996; Ford, 1996; Isaksen et al., 2001; Oldham & Cummings, 1996; West, 2002; Woodman, Sawyer, & Griffin, 1993). Whilst they share similar features, the framework this paper utilises is the model developed initially by Ekvall and later by Isaksen and colleagues in the States (see Isaksen et al., 2001, for details) because this usefully deconstructs 'climate' into nine dimensions which are applicable to educational settings; 'challenge', 'freedom', 'trust / openness', 'idea time', 'playfulness / humour', 'risk-taking', 'idea support', 'debate', and 'conflict'.

These dimensions have been validated in a number of quantitative studies (Ekvall, 1996; Ekvall & Ryhammar, 1999; Isaksen & Lauer, 2001; Isaksen et al., 2001). Due to constraints of space, this paper only focuses on two of these dimensions: challenge and freedom. How these might manifest in a D&T classroom with a creative climate is outlined in Table 1.

| Dimension | Description |
|-----------|---|
| Challenge | Students are engaged by meaningful and demanding work (but are taught the necessary skills and knowledge to meet this challenge). |
| Freedom | Students are given the autonomy and resources to make decisions in their own learning. |

Table 1: Ekvall & Isaksen's creative climate dimensions 'challenge' and 'freedom', adapted for D&T classrooms

3. The study

Data presented in this paper was collected as part of an ongoing research and intervention project 'Subject Leadership in Creativity in Design & Technology' funded by the Gatsby foundation¹.

A number of different data sources are drawn on from the preliminary² and intervention³ phases of research. These are summarised in Table 2.

| Data Source | Sample | Phase |
|------------------------------|---------------------------------|--------------|
| Interviews with D&T teachers | 14 teachers across 6 schools | Preliminary |
| Interviews with students | 126 students across 6 schools | Preliminary |
| Teacher survey | 69 teachers across 11 schools | Intervention |
| Student survey | 4996 students across 11 schools | Intervention |

Table 2: Overview of data sources

Space prohibits further details of these data sources being discussed, however examples of the questions posed in the questionnaires and during interviews are given in the appendix. The interested reader can refer to other project publications (Nicholl & McLellan, 2007c, 2008, forthcoming; Nicholl, McLellan, & Kotob, 2008) for further details.

¹ For further details refer to the project website at www.educ.cam.ac.uk/sldt

² Conducted from January to December 2005. The aim of this phase was to understand how current practice in secondary D&T teaching (11-16 age range) influences student creativity.

³ Conducted from February 2006 to April 2008. This phase aims to develop student creativity. Data included in this paper was collected at the start of this phase.

Interview transcripts were coded with an initial set of descriptive codes (Miles & Huberman, 1994) relating to the questions asked which was later refined with the assistance of the QSR NVivo programme (Fraser, 2000). Check-coding between the two authors was undertaken to ensure consistency (Miles & Huberman, 1994). Coded segments pertaining to the nine dimensions encompassed in Ekvall and Isaksen's creative climate model were subsequently identified. Questionnaire responses were entered into an SPSS data file and cleaned. Descriptive statistics were calculated for each item and questions that map onto the creative climate model highlighted.

4.0 Findings

Although the data illuminated all nine of the creative climate dimensions and presented a coherent story, due to space constraints only two dimensions are reported here; challenge, and freedom.

4.1 Challenge

The vast majority of students enjoyed their D&T lessons (85% of those surveyed) and many in interview ranked D&T in their top three subjects. However, it was apparent that the work they were set was not always demanding, as these interview excerpts demonstrate:

'You can't be very inventive with a rectangular box really.' (Y11G)⁴

'The only difference was how [the colour] you painted it.' (Y10B)

'I think if you look at everyone's folios and all the research is the same, you've got a specification and you've got an analysis and you've probably got a mood board. Everyone's done that you know and it doesn't take any talent to do that at all.' (Y11G)

In fact one in six students (17%) disagreed that their teachers 'encourage me to think for myself', which is necessary to experience challenge.

In many cases students commented on the pointless nature of the work they were doing:

'In metalwork we just drilled holes and then just put stuff on it. There wasn't much point.' (Y7 B)

'Last lesson we copied joints out of a textbook. Then guess what we did next lesson? We made the joints! What's the point of that?' (Y9B)

Indeed, over a third of students surveyed (35%) agreed that 'lots of things we do in D&T seem a waste of time'. Not surprisingly, the outcome of this was the uncreative work reported previously (Nicholl & McLellan, 2007b, 2007c). It also had an impact on motivation, which this student sums up:

'I'm not a slack student but when you have to do all this... product analysis, mood boards, and research that didn't help me in the end. It puts me off D&T and I think that's where people think it is boring.' (Y11G)

Teachers made few comments about the level of challenge posed by the work they set, in interview. Nevertheless, one in five of the teachers surveyed (19%) disagreed that they 'let students try their own ways of solving problems as they emerge in a D&T project', which would be necessary to allow students to feel challenged and one in six (17%) disagreed that 'it is helpful for creativity if design briefs are related to real-life contexts', which is necessary to make tasks meaningful. This suggests they do not necessarily recognise challenge as a potential difficulty. However, one practitioner, whom students identified in interview as a good teacher, did acknowledge that this was an issue:

'I think a lot of work that we do and including what we do here is repetitive, it's irrelevant, and it's boring. It doesn't fire the kids up!' (Teacher)

It was certainly clear that students want to be challenged, as three quarters of those surveyed (76%) liked 'to play with ideas in D&T and see how far they go' and around two thirds of students (66%) agreed that 'I like problems where I can try my own way of solving them'. Students in interview also expressed the view they would like to do more meaningful and demanding work, and when they got the opportunity to do so, this was relished:

'I think it [food tech] would be quite nice to do something a bit more adventurous because usually the things we do are a bit basic.' (Y9B)

'This [pointing to her portfolio] isn't text book stuff where you just copy and paste it off the internet. When you're

⁴ Indicates year group and gender. Y7 is the first year of secondary schooling (students aged 11-12 years), Y8 the second year etc. Girls are represented with a 'G' and boys with a 'B'.

into your own project and you're actually doing it and making it and thinking for yourself, it's then that you can do the research that was relevant to it because you want to do it. (Y11G)

4.2 Freedom

Again, although students were generally positive about their work when asked specifically about the amount of freedom they had in terms of making choices and decisions they were somewhat less enthusiastic. Only 57% thought they really had a choice about the work they do. And whilst 77% agreed that their teachers 'let me make my own decisions about my work', when asked more specifically about the types of decisions they made within projects, the percentage of pupils indicating they could make choices dropped. Around half indicated that their teachers allowed them to decide which materials to use (53%) or research to undertake (48%). The interview data tell a similar story. Students talked about being told what to do:

'In most of them [D&T lessons] you're told what to do.' (Y8B)

'Yeah they give you a design and you've gotta do that exact design.' (Y10B)

They also talked about doing the same things as others:

'Cos you just have to make a box out of wood and follow instructions, all the same.' (Y9B)

'Because you are all doing the same thing [in electronics]:' (Y11B)

As with challenge, lack of freedom had a negative impact on students' engagement, as this excerpt demonstrates:

'Those projects were a bit tedious because there were a number of things that we weren't allowed to do.' (Y10B)

In contrast to the view expressed by students, most teachers felt they were offering students at least some degree of freedom. 93% of teachers agreed it was important to offer students choices about ways of working, whilst 71% agreed they give students a choice of materials / ingredients and 86% a variety of techniques / processes they can use within each project.

Furthermore the majority of teachers indicated that it was important for students to have ownership of their ideas. Several D&T teachers noted in interview that it was important

for students to come up with their own ideas and in the survey only 10% disagreed with 'it is important students generate their own design ideas'.

The discrepancy between teacher and student views about the amount of freedom students have in D&T lessons may, at least partly, be explained by differing perceptions about freedom in relation to responsibility for learning. For many students, some degree of freedom was necessary to be able to assume responsibility for their learning and they felt they would enjoy the subject more if this was forthcoming. For instance, the vast majority (89%) of students surveyed agreed that they felt 'happiest about tasks when I can make my own decisions'. In interviews, the comment made by this Y11 girl was typical:

'I like when we get to design our own stuff. I enjoyed developing it [project] like this. Because you are thinking about it and this is me and this is my work not Mr X's.' (Y11G)

When asked what they would most like to change about D&T lessons, the view most commonly expressed by students was increasing the amount of autonomy they had:

'I would like to change the amount of freedom you get in tech lessons. In like electronics you get certain things to do and you make like little circuits and each one is basically the same apart from one or two components.' (Y7G)

Teachers, however, clearly felt it was their responsibility to ensure their students progressed and controlled the learning environment to ensure this happened, as this teacher explains:

'We try and give them some freedom but within that, you know lead them, we've got what we expect.' (Teacher)

Ensuring students reached a particular point appeared to conflict with students' desire for freedom to make their own choices. This is also apparent in the fact that one in four teachers (26%) agreed 'it is a waste of time letting students work on design in D&T that ultimately might not work'. As has been reported elsewhere (Nicholl & McLellan, 2008, forthcoming) the current performativity culture that permeates education creates a real tension for teachers who recognise the importance of giving freedom, as noted in teachers' survey responses, whilst at the same time are being held accountable for performance outcomes. In order to reduce the dissonance induced (Festinger, 1957) teachers may well believe they are giving students more freedom than they actually are.

5.0 Discussion and Conclusions

The findings indicate that there is a number of tensions created by differing perceptions of teachers and students about the climate for creativity in D&T classrooms.

Although overall students were positive about D&T as a subject, a substantial number felt they weren't being sufficiently challenged, were being asked to do meaningless work, did not have enough freedom to make choices and decisions about their work and were often told what to do and had to do the same as other people. From the students' perspective, therefore, a number of features that are required for creativity to flourish, are absent in D&T classrooms.

Challenge and autonomy have been identified as two of three core needs that need to be met for healthy human functioning and are at the root of all motivated behaviour (Deci & Ryan, 1985, 2002). It is clear, therefore, that the unchallenging work and lack of freedom students experienced undermines intrinsic motivation. Indeed several excerpts indicate this directly. However, whilst intrinsic motivation is undoubtedly a prerequisite for creativity (Amabile, 1996; Sternberg & Lubart, 1999), arguably the lack of motivation reported in this paper has wider implications for educational experience and outcomes (Anderman & Maehr, 1994; Fredricks, Blumenfeld, & Paris, 2004). It is therefore essential for the D&T community to address this issue.

However the data presented indicate that teacher and student perceptions are not consistent. Nearly every teacher interviewed recognised that much student work was uncreative and agreed that design ideas were often stereotypical, as discussed in the literature (Nicholl, 2004; Nicholl & McLellan, 2007b, 2007c). However few teachers explicitly acknowledged that the work they set was unchallenging and a sizeable minority didn't see the necessity in setting real-life and meaningful work and allowing students to work problems out for themselves. Furthermore few recognised the contradiction in thinking they granted students freedom to make choices and decisions about their work, and then controlling learning outcomes lesson by lesson. So, although not unequivocal, it would appear that many teachers would not recognise that the climate in their classrooms could be less than conducive for creativity.

Given that student outcomes are the focus here, student perceptions of the climate are key; as it is their perceptions, rather than those of teachers, that determine whether they will feel able to be creative. An important message of this work, therefore, is for practitioners to be empowered by the model offered here to challenge their perceptions of the climate that

is experienced by learners in their classrooms. One way this might be achieved is to consult students about the various dimensions identified in the model to gain an understanding of the climate for creativity in their classroom.

Furthermore, climate researchers indicate that 'the climate to a fairly large extent is in the hands of the manager' (Ekvall, 1996:122) hence the position adopted in this paper is that D&T teachers can change the climates that operate in their classrooms to enable students to be creative. If teachers understand student perceptions and audit their practice using the dimensions identified in the climate model utilised here, they may be empowered to change their practice to meet the needs of students by setting challenging and meaningful work, giving students more freedom to generate and realise creative designs. However, classrooms are not isolated communities and teacher beliefs and values are strongly influenced by the educational culture they are part of. Indeed climate researchers acknowledge that culture impinges on climate (Isaksen et al., 2001). The current educational culture of performativity and tensions this sets up between a desire for creativity and accountability on student outcomes (Nicholl & McLellan, 2008, forthcoming) would appear to provide the basis of some of the contradictory views expressed by teachers here. Hence, it is acknowledged that whilst teachers can change the classroom climate to encourage creativity, in practice this will be difficult to effect.

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Appendix

The appendix provides further information about the instruments used to gather data. Tables A1 & A2 show extracts from the interview guides used when interviewing students and teachers. Tables A3 & A4 gives examples from the student and teacher interviews.

Research

Typical research (if struggling ask in context of specific project):

- When done (HW / in class etc.)
- Sources (books / internet / look at actual artefacts etc.)
- What types of information is being researched (e.g. features of existing products)
- Who decides this (teacher / student)
- How used (in terms of generating ideas – get them to give examples)

Table A1: Extract from the student interview guide

Design Ideas

- Is it important students have own ideas
- Teaching strategies to help students generate ideas – differ by year/group – which ones really wor
- Classroom organisation (groupwork)
- Talk to students – how (scaffolding / modelling / telling)
- Departmental policy relating to this

Response to specific situations (get them to give examples):

- Student that is struggling
- Cliched ideas
- Whacky ideas (follow up with whacky idea not sure will work) – ever backfired
- Ideas that need materials/processes outside parameters of project

Table A2: Extract from the teacher interview guide

| | | Strongly Agree | Agree | Disagree | Strongly Disagree |
|-----|--|--------------------------|--------------------------|--------------------------|--------------------------|
| (1) | Our D&T teachers let us discuss our work | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (2) | My teachers show me how to come up with design ideas | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (3) | My teachers let me make my own decisions about my work | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (4) | My teachers help me to understand the work | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (5) | Our teachers encourage us to free-hand sketch | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (6) | I feel able to discuss my ideas with my teachers | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (7) | My teachers let me decide which materials to use (e.g. wood or plastic, different fabrics, which food ingredients) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Table A3: Extract from the student questionnaire

| | | Strongly Disagree | | | | | Strongly Agree |
|-----|--|-------------------|---|---|---|---|----------------|
| (1) | Our D&T teachers let us discuss our work | 1 | 2 | 3 | 4 | 5 | 6 |
| (2) | My teachers show me how to come up with design ideas | | | | | | |
| (3) | My teachers let me make my own decisions about my work | | | | | | |
| (4) | My teachers help me to understand the work | | | | | | |
| (5) | Our teachers encourage us to free-hand sketch | | | | | | |
| (6) | I feel able to discuss my ideas with my teachers | | | | | | |

Table A4: Extract from the teacher questionnaire