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Metadata Record: https://dspace.lboro.ac.uk/2134/2795

Publisher: © DATA

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Designing Styles – A new way of looking at design and technology learning and teaching

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Abstract
This is the record of a preliminary study into the use of Designing Styles (Lawler, 1999) within design and technology teaching. The theoretical notions of Designing Styles have been developed into a test instrument in a school context and then used to regroup students into similar ‘style groups’. These restructured groups were taught, covering similar materials in ways ‘tailored’ to their Designing Styles. What has emerged from this procedure has been an increased awareness by pupils of ‘how’ they learn and, interestingly, an increase in teachers’ motivation towards their teaching.

This paper is positioned between the validation of research findings, action research and curriculum development. It represents an attempt to further validate concepts of Designing Styles through their application within the secondary (11 to 18 years of age) design and technology curriculum. Because it is both developmental and experimental, it is difficult to claim definitive correlations between Designing Styles and pupil and teacher performance. The hypothesis behind this work was ‘learning and teaching in design and technology could be enhanced by the application of the concepts of Designing Styles.’ These are, therefore, the preliminary findings of a pilot study into using the concept of Designing Styles in secondary level design and technology teaching.

Keywords
designing styles, learning styles, design methods

Introduction
This work came as a result of collaboration between a Design and Technology Department in an 11 to 18 Comprehensive School and a University Design Department. Over several years, Goldsmiths has been part of studies into ‘capability in design and technology’, for example, Kimbell et al (1991). Their concern has been to approach the activity of the assessment of design and technology ‘through’ practical and contextualised ‘activities’. Notably, this has involved a technique of using scripted and choreographed designing activities with the subjects’ designing recorded in special workbooks. (These workbooks are structured to both fast-forward the subjects through a design and technological activity and provide a ‘snap-shot’ of their capability – the theory surrounding this approach was summarised by Stables and Kimbell (2000) ‘The Unpickled Portfolio’.) The work of Lawler for MPhil (2003) has been around the area of ‘describing designing’. As a part of this work, the notions of Designing Styles have been explored (Lawler, 1999).

The background to the descriptors of Designing Styles
The descriptors of Designing Styles were evolved by working between theoretical academic studies which sought to describe learning styles and interviews and research projects involving designers and design students (Lawler, 2001). The two seminal works which precipitated these concepts were Atkinson (1995) and Kimbell et al (1991). Those studies focused around cognitive style (a psychological construct around the areas of learning style, personality and intelligence) and design and technological capability (based around interpreting both the outcomes of designing and students’ intentions whilst engaged in the process of designing).

Designing Styles
The concepts of Designing Styles used in this study differ from the associated ideas of cognitive styles (Riding and Cheema, 1991) in the following ways:

• they represent ways of expressing ideas and proposals in ‘designing’
• they do not set out to identify ‘fundamental’ information processing styles (as do cognitive
style) but recognise that successful designing involves a combining of styles of designing
• the ability to recognise and use a ‘dominant’ Designing Style to support or compensate for a less dominant, but necessary activity is important for developing capability in designing
• excellence in designing is in part due to successfully combining Designing Styles to produce successful outcomes.

The concepts of Designing Styles used in this study were said to operate at two levels:

1. The means by which the designing was represented.

In the case of this work this was whether the work was represented in words or in pictures, though recognised that those who worked in words could do this by writing or speaking out loud and those who worked pictorially could do this as three-dimensional modelling or two-dimensional drawing and sketching.

2. The pupils’ ways of working and their styles of designing.

The ways that the designing was progressed were assessed in terms of Big Pictures designing* and Small Steps designing*. Big Pictures designing is typified by students whose work shows a clear understanding of the ‘whole’ of their solution, whereas Small Steps designing is typified by evidence which shows sequential and analytic explorations which move in detail ‘towards’ final ideas.

The process referred to by Kimbell et al. (1991) as ‘to-ing and fro-ing and referred to as ‘metacognitive designing’ by Lawler (2003) is postulated as one of the indicators of excellence in designing. This process can be represented diagrammatically when designing, using the notions of Big Pictures and Small Steps designing as shown in Figure 1.

Figure 1: Diagrammatic representations of a typical project using Big Pictures and Small Steps Designing Styles showing how a piece of project work can be described as a combination of Big Pictures and Small Steps designing activities.

Figure 2: An example of a pupil’s work showing Big Pictures designing, expressed in words.

Figure 3: An example of a pupil’s work showing Small Steps designing expressed in words.

*These concepts in terms of describing designing are taken from Lawler (1996).
The context of this study

The school in which the trial took place is a mixed Comprehensive School for 11-18 year-olds with 1500 pupils. Within the school two particular learning and teaching initiatives are currently in use in different curriculum areas. These are Cognitive Acceleration with Keele University and the concepts of Whole Brain Learning (L. Verlee Williams, 1986). Both of these approaches are in use in the school with the intention of increasing pupil capability. The increased understandings that these initiatives gave about the pupils are now being used to identify and enhance student capability in other areas of the curriculum.

The problem identified by the Head of the Design and Technology Department was that whilst these studies could give a better 'picture' of students’ general abilities, they were not particularly relevant to student achievement in the context of design and technology. What was needed, he surmised, was a means of identifying ways that pupils could be assisted to improve in design and technology.

Following an initial exploration of techniques undertaken at Goldsmiths and the initiatives within the school, the department constructed their own series of tests for diagnosing the Designing Styles of their pupils which they called IPSAT (Increase Performance in the Standards for Attainment in Technology)

The tests were devised using Stables’ and Kimbell’s work on ‘The Unpickled Portfolio’ (2000) and were developed to be capable of being completed by groups of pupils within their normal one-hour design and technology lesson. These tests were trialled with the Year 7 groups at the end of their first year in secondary school as a way of moderating the assessment rubric prior to the testing of the new Year 7 at the beginning of the next academic year. The classifications for Designing Styles that they identified by the school were:

- wordists or picturists
- *wholists, 'Big Pictures' or partists, 'Small Steps'
- an holistic measure of the overall quality 'goodness' of the pupils' work as recorded by the test.

The IPSAT classifications evolved guidelines as how to identify the dominant Designing Styles of the pupils, along with the kinds of teaching and learning styles that would be most suitable for that group. For example, the wordist pupil (the way that they expressed their designing) could be identified by their ideas being expressed in words rather than pictures in all sections of the test. They could expect to respond better to teaching that involved talking, writing, discussion and dramatic readings. Whereas the picturist pupil would, in the same sections of the same test, have used drawings and sketches or charts and would respond to teaching that was visually-oriented involving displays, pictures plus keywords, memory mapping and story-boards. Similarly, the Designing Styles of Big Pictures and Small Steps were identified and the teaching styles which would be most suitable for those pupils expanded.

For the purposes of grouping, from the test results, each child was identified as being 'predominantly' one of each of the categories (wordist or picturist and Big Pictures or Small Steps). The assessment of pupil Designing Styles was undertaken by the staff in the department following a trial marking session, where examples of previous work was discussed and assessed (a process used in previous work to validate assessment procedures and levels).

The school then used this data in two ways:

1. to restructure the Year 7 and year 8 pupils into groups with similar Designing Styles
2. to restructure the way that the learning and teaching was organised by the individual teachers to suit the dominant Designing Styles of the pupils.

Fundamental within the IPSAT programme was the teachers' recognition that all pupils had to be able to use 'all' aspects of the Designing Styles, but that individuals might naturally be better at certain aspects of design and technology than others. Existing schemes of work have therefore been modified, in terms of their delivery, for the strengths of the particular groups, the teachers modifying their lessons in ways predicted to suit the strengths of the particular group and move towards areas that the pupils tended to find more difficult. For example, the food teacher remarked:

‘The Big Pictures, picturist group are really bad at time planning, they just want to see the finished dish. With them I have to get them to see the stages as pictures so that they can work out how long each stage will take.’

*Wholist and analytic are titles used by Ridings and Cheema (1991) to synthesise several other descriptors of cognitive styles by other authors. Previous authors have used different continua to ‘place’ cognitive styles (holist to serialist; field dependence to field independence; impulsive to reflective; levelers to sharpeners; divergers to convergers).
The outcomes of this study were collected in two ways:

1. interviews with and observations of teachers participating in the programme
2. interviews with and observations of pupils who had participated in the IPSAT programme.

**Interviews with, and observations of teachers within the department**

After the pupils had been regrouped and the Designing Style Initiative had been running for six months, a range of the teachers engaged in the programme were observed teaching their Year 7 and 8 groups (12 and 13 years of age) and members of the teaching staff in the department were interviewed. In observing the teachers, it was immediately evident how much their teaching had been modified in order to suit the Designing Styles of the groups. Teachers used both the criteria that they had developed as discriminators and their modified versions of their schemes of work as aids to the planning of their teaching. In terms of the structure and delivery of lessons, different Designing Style groups were taught differently. The same learning objectives were achieved by different means.

For example, a food based lesson for Year 7 with the aim of exploring nutrients and the concept of balanced diet for a Big Pictures/picturist group started with a series of pictures of whole dishes where the nutrients in each of the dishes were on the reverse side of the card. The pupils were required to discuss the dish before them and then identify what ingredients and nutrients it had in it (proteins, carbohydrates, fibre, fat, sugars etc.). They then brainstormed the nutrients and ingredients on the board with the teacher and finally wrote down a list of nutrients and ingredients.

This can be compared to the same lesson taught by the same teacher to a wordist/Small Steps group. The group discussed the ideas of ingredients and nutrients in small groups from a series of cards with the nutrients and ingredients on them. They were required to classify the words into the appropriate category for nutrients. Once they had a classification, they wrote down the lists. Finally, they were given the pictures of the dishes and required to analyse the nutrients contained in each dish. Both groups were then required to look at their food intake over the previous two days and to comment on whether it was a ‘balanced’ diet.

These examples were typical of the versatility of approach that the staff in the department adopted. Effectively the teacher was teaching the same lesson, often using the same materials, but modifying the mode and method of covering the learning objectives to the dominant designing style of the learning objectives in the particular group.

**Interviews with staff**

The interviews were conducted informally with the following questions about the IPSAT programme and Designing Styles:

1. Did the particular staff show a developed understanding of the ideas of Designing Styles or were they merely following instructions?
2. Had the exercise led to any change in their views of students and the pupils’ capability in design and technology?
3. Had the exercise led to any attitudinal changes to themselves and their teaching?

**1. Developed understandings**

All of the staff in the department showed developed understandings of what they and pupils were doing in design and technology lessons. All but one of the seven staff interviewed had incorporated their IPSAT criteria into the learning and teaching experience of Years 7 and 8. The staff were, without exception, enthusiastic in a way that had not been predicted and felt that what they were now doing was ‘better’ than before.

**2. Perceptions of pupils**

As a result of the exercise the teachers were able to comment about their pupils and their capabilities in new ways:

‘Having a group that I know are mainly, say wordists, allows me to present things to them in what I think is the best way and then see if it works better than before. This also lets me see more clearly which pupils are not what we think the group are.’

The new way of describing the groups of pupils had meant that their ‘centre ground’ on which a lot of their preparation was based had changed to one that they felt an affinity with. The teachers felt that they had a solid understanding of the reasons for the grouping because they could easily relate the groupings to pupils’ performance in design and technology. Previously, pupils’ cognitive ability tests (CAT) scores had been used as descriptors, but these were felt to have little correlation with design and technology capability. With the Designing Styles descriptors, the teacher said they felt they had a tacit agreement. This understanding was acted on by a subtlety in judging and thus teaching individual pupils. There was a recognition, by the staff, that the
initial grouping, although imperfect, had given them the ability to tailor their teaching to individual pupil’s Designing Styles. This is exemplified by a quote from the IT teacher:

“The wordist groups do just as you tell them, in the order that you tell them. The picturist groups are all over the place, constantly clicking on different things and trying things out. They have to be given the chance to explore the computer’s possibilities before they can make progress. In a mixed group, those people get frustrated and left behind. Whereas now I can present the materials differently, more pictorially and they are more successful.”

3. Attitude changes
Rather surprisingly, the major success of the Initiative, in the teacher’s words, was in their enthusiasm for their teaching. The teachers said that they had modified what had been habitual approaches to their teaching of Year 7 and 8. They said the IPSAT programme had encouraged them to look afresh at the nature of their learning and teaching and had given and demonstrated a new repertoire of ways of dealing with pupils’ learning needs.

Interviews with pupils
When interviewed, all of the pupils were aware of their dominant Designing Styles as diagnosed. They were able to discuss the judgements that had been made of them and were able to recognise whether they felt them to be correct or not. What was most striking in all of the pupils involved was that they could relate to particular instances where particular styles of designing had been appropriate. So that, rather than a bland view of their Designing Styles, it could be recognised that all of the pupils were becoming aware of the metacognitive aspects of designing and learning, as highlighted in the following quotes from pupils:

“This is a wordist group, and I’m in it and I’m dyslexic. But I like what we are doing better this way than I did last year.’

“This is a wordist group, but I like drawing and writing. You can’t tell what my pictures are so I put labels on them.”

Summary
As a preliminary attempt to explore this area as a whole department, many of the pointers to emerge from this study give more questions than they do answers:

• the use of Designing Styles as ways of grouping and teaching pupils, whilst inconclusive, did seem to have some effects as reported by the pupils and staff in this instance
• from the interviews with the pupils there was evidence of a developing ability to reflect on their modes of learning, moving the notions of metacognition into a possibly more manageable form
• the teachers’ comments which showed an increased enthusiasm for their teaching was possibly because of the extra time that they had taken to reflect on it, but could have had something to do with ways of assessing pupils with which they found tacit resonance – they associated this directly with the concepts of Designing Styles and the IPSAT project
• the possibilities in the use of Designing Styles in curriculum development that this study illuminates could lead to further research and development in the design and technology area.

For the future, this pilot study has prompted interest from several other schools and a more developed trial is planned for this summer for application and review in the next academic year. The authors would welcome enquiries from interested academics and teachers.

References


Lawler, T. (1996) ‘If the only tool you have is a hammer, then all your problems look like nails’ in J. Smith (Ed), IDATER 96, Loughborough University: 212


