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## **Abstract**

A design and technology enrichment programme is proposed as a way to aid teacher nominations in the early identification of student giftedness. A study, initiated by the Wandsworth LEA and carried out by a Brunel University research team, is used to show the way that enrichment programmes of the sort designed by the Nuffield Design & Technology Project, which take place over a period of time, may be able to facilitate the identification of giftedness. Accordingly, the performance and behaviour of children (and their teachers) inside three primary classrooms are tracked over the span of two-day tasks, and conclusions are made concerning the possibilities of using appropriate enrichment tasks as indicators of, and a means of, nurturing giftedness.

## **Introduction**

Sternburg (2004) states that there now appears to be a consensus amongst researchers concerned with giftedness that identification should not be limited to tests of intelligence, and that a variety of techniques, procedures and instruments ought to be used to identify these students, to differentiate their educational experiences. Furthermore, he proposes that such relatively 'quick' tests are unlikely to get at the complexity of giftedness. He presents the work of early researchers such as Passow as primary examples of the approach that research should now take. His position is that examination of performance and products is necessary for identifying gifted children... and the batteries of instruments and tests that have been developed over the last twenty five years do not fully do this.

Passow and Tannenbaum (1978), argued that enrichment programmes are highly relevant to the current problems and interests of those concerned with the identification of gifted students, because they examine the issue over time, in heightened atmospheres of constructivity:

"It is the creation of pupil products which contributes to self-identification, and since product development is a continuous one, identification should be seen as a continuous experience, rather than a single event test administration. Identification of the gifted and talented therefore is related not only to systematic observation and intelligent interpretation of test and observation data, but to the creation of the right kinds of educational opportunities which facilitate self-identification – identification by performance and product which results in the manifestation of gifted or talented behaviours."  
(Passow and Tannenbaum 1978, p. 16)

Sternberg's notion of the necessity of using a specific enrichment programme to identify elements of giftedness is central to this case study. It grounds the use in this study of the observations in the primary schools in authoritative theory. It investigates the notion, proposed by a prominent researcher in the field, that tracking giftedness through the use of tasks (especially those designed to enrich elements of giftedness), performances and resulting products, should now be regarded as potentially a necessary addition to the identification process.

## **Background**

Davina Salmon, the Primary Gifted and Talented co-ordinator for Wandsworth Local Education Authority in London, England initiated this study. This local authority is rethinking its approach to primary education in response to the government publication Excellence and Enjoyment (Department For Education and Skills 2003) which highlights the following:

- Set high expectations and give every learner confidence that they can succeed
- Establish what learners already know and build on it
- Structure and pace learning experience to make it challenging and enjoyable
- Inspire learning through passion for subject
- Make individuals active partners in their learning
- Develop learning skills and personal qualities

From the Local Education Authority (LEA) perspective the challenge for practitioners is to create the context in which children can develop a learning orientation. In recent years there has been a considerable emphasis on performance with primary schools being ranked in league tables according to the performance of pupils in statutory tests. The LEA has identified clearly the limitations of a performance led culture and contrasted it with the benefits of a learning culture in terms of the learner's orientation to learning. This is summarised in Table 1

Table 1

Learner's orientation to learning	
Performance	Learning
<ul style="list-style-type: none"> <li>• Belief that ability leads to success</li> <li>• Concern to be seen as able and to perform well in the eyes of others</li> <li>• Gain satisfaction from doing better than others</li> <li>• 'Learned helplessness' when the task is too difficult or challenging</li> </ul>	<ul style="list-style-type: none"> <li>• Belief that effort leads to success</li> <li>• Belief in ability to improve and learn</li> <li>• Enjoyment of challenging tasks</li> <li>• Deriving satisfaction from success with difficult tasks, and ability to learn from mistakes</li> <li>• Ability to engage in dialogue with oneself to proceed through a task</li> </ul>

### **A learning arena for both teachers and pupils**

In response to the challenge of developing a learning culture Davina identified design & technology as a subject in which there was considerable 'learning potential' for both teachers and pupils. In her experience there were many teachers in Wandsworth for whom teaching design & technology was a challenge and she wanted some of these to experience learning from the child's perspective as a first step to providing a situation in which the teacher could organise lessons in which the children were learning, as opposed to performing, design and technology. To achieve this Davina collaborated with the Nuffield Design & Technology Project to organise two days of professional development activity in which the teachers carried out four Nuffield primary solutions units of work. The units involved the teachers in carrying out the following designing and making activities supported by a tutor.

#### Day 1

What should be stuck to your fridge?

Design a fridge magnet that is made from layers and is part of a set that will appeal to young children.

This task is suitable for Year 2

Should your creature be fierce or friendly?

Design and make a creature to welcome visitors to, or deter intruders from, the classroom.

This task is suitable for Year 6

Day 2

How will your roly poly move?

Design and make a simple push-along toy (a roly poly) that provides amusement in both its appearance and the way it moves

This task is suitable for Year 2

How will your beast open its mouth?

Design and make a model animal with a moving mouth.

This task is suitable for Year 5

Davina was convinced that the learning behaviours developed through good quality design & technology provision would have an impact on learning across the curriculum for children of all abilities but she had a particular interest in those children who might be gifted and talented. So the teachers worked with Davina, David Barlex and Tom Balchin on a third day exploring how they would identify gifted and talented pupils in their schools, which units of work they would teach and over what time span they would carry out this teaching. There was general agreement that a drip feed approach, e.g. one – two hours per afternoon across several afternoons was not particularly suitable, partly because such a large proportion of available time was spent 'getting out and putting away' and also because it was difficult for the pupils to immerse themselves in the activity. This has resonance with the findings of others working in the field (Barlex 2001(a), Perry 2003) and also the recommendation of Sternberg (2004) that extended enrichment activities are increasingly being seen as appropriate to assist in the identification of the gifted and talented. Hence it was decided to teach the chosen units of work over a two whole days but with a time gap between the days to avoid disruption.

It was not easy for the group to decide on the criteria for selecting pupils who might be considered gifted and talented. After much discussion the following list of criteria was established.

- Can show interest and enthusiasm, are predisposed to engage
- Can show aptitude in using tools and materials
- Can show initiative in following through design ideas
- Can justify choices and decisions made
- Can show willingness to acquire new skills/knowledge
- Can be capable of non-conventional and creative thinking
- Can be an efficient demonstrator of intent and direction of progress
- Show problem solving skills in a particular subject area which has the potential for application in another subject area
- Can show curiosity and intrigues towards artefacts – what they are for and how they work
- Can take ownership of activities

The teachers spent some time discussing the research questions they would try to address in their teaching and although many of the questions were intriguing it was decided that it would be best if they concentrated on teaching the unit with special emphasis on enabling pupils to make design decisions. This would enable a visiting researcher to take photographs and make field notes which could later be explored for data relevant to the research question driving the study i.e. To what extent is gifted and talented behaviour revealed in the work of primary children, identified as gifted and talented by their teachers in design & technology, during an enrichment programme consisting of a two-day immersive design & technology experience?

The teachers decided on the following units of work, selected from the Nuffield Primary Solutions Pack (Barlex D 2001(b))

Teacher A (a mix of year 3 and year 4 children)

Does this game stop you from being bored?

Design and make a toy or game that will amuse and intrigue a bed-ridden patient aged approximately 11 years and that can be played with on a bed tray.

Teacher B (a mix of year 4 and year 6 children)

How fast should your buggy be?

Design and make a controllable, battery-powered toy vehicle for an identified user

Teacher D (year 4 children)

How will your beast open its mouth?

Design and make a model animal with a moving mouth.

### **Observations**

Teacher A specialises in teaching art and engaging her pupils with the highly technical task of designing and making an electrically powered was a highly challenging endeavour. She responded by taking great pains to learn new technical knowledge but still drew heavily on her specialism. Her approach mirrored that identified by joint Nuffield Curriculum Centre – Qualifications and Curriculum Authority research as supporting creativity (Barlex 2003). She provided stimulus by beginning the task with observational drawing of toy vehicles. She put the work in a context to which the pupils could relate – they would make a buggy for themselves. She carefully structured the building of the basic chassis and electric motor drive so that they learned useful and relevant knowledge and skill. She promoted reflection by organising the children to work in pairs and discuss their work as it progressed. She added intrigue to the work by requiring the children to use an animal of their choice as the basis for the body shell. She gave choice to the pupils over the control and special features they built into their buggies. Her highly structured approach at the beginning coupled with the freedom for the children to make both technical and aesthetic decisions enabled her to manage the risks the children took in developing innovative designs. Each child produced a unique animal based decorative body shell. All the children were keen to assemble a basic working buggy and enjoyed the new experiences of stripping wire and making connections. One pupil in particular who had worked rapidly in producing a basic single motor chassis moved on to produce a chassis with two motors enabling directional control. The task of developing a hand held control unit attached to the buggy by a four wire cable proved demanding and led to the buggies being incomplete by the end of the second day. However all children were engaged and demanded more time to finish.

Teacher B responded to the challenge of providing an enrichment opportunity for her pupils by identifying 8 children from two year groups who may be gifted at design and technology. She provided a context for the two day task, asking probing questions about the need for board games during 'wet-weather breaks'. She drew up charts that the children contributed towards in order to work out criteria for the game. The level of response to such questions was, for her, an indication that she had used sound professional judgement when choosing the children for the task. Children were encouraged to look at and criticise a selection of existing games, which brought up a number of user-issues the teacher had not expected. They then designed their own board games. Each was a simple idea, not too complicated. The teacher used her communication skills to involve each student, but a constant feature of the programme was its autonomous nature. Each of the children was creative and industrious because they were clearly supported whenever they needed. There was a vast reservoir of resources, and the teacher made it clear that if the children needed anything, she would buy it. This teacher energy, confidence and control of her class showed... children were even allowed to use craft knives. Different stages of development from modelling to final product were characterised by the extreme mess that the classroom became; but the children seemed focussed on their productions. Ups and downs in mood became obvious, as difficulties with the making process emerged.

Teacher D adopted a very structured approach. On the first day he organised and led a series of short tasks that engaged the children with learning about nets, being able to construct nets, making simple mechanisms from wire, constructing legs and feet to support a body shell and ways to give a creature character, On the second day he changed his pedagogical stance

completely. He ceased being an instructor and encouraged the children to use what they had learned in developing their own ideas for creatures with moving mouths. Each child responded individually and developed an animal that met his or her own personal criteria. Some members of the group had serious behavioural problems. Several were receiving anger management treatment. The teacher showed great skill in deflating conflicts and providing a calming influence when the tension of over ambitious designing was about to result in tantrums.

## **Discussion**

There were features inside these processes that were recorded, and then further brought out by interview data, which will form the basis for a full paper. These incidences concern the responses of the children to particular events inside the enrichment programme. We found that there were features about the enrichment tasks that drew particular responses from the children. Such responses can be split into two; either 'real time' or 'multi-stage'. Both were found to be indicators of 'differentness'; answers to inputs or events that could be put towards the sum of what it means to be gifted.

In this way, we found that such events to range from unconscious responses to a teacher's or peers questions or advice, to the conscious decisions to work in particular way over a period of time. Impressions were formed by each of the researchers about the particular children, using these critical incidences. We found that many of the children, identified as gifted and talented:

- Posed unforeseen questions
- Generated complex, abstract ideas.
- Exhibited feelings and opinions from multiple perspectives
- Inferred and connected concepts
- Initiated projects and extensions of assignments
- Were intense.
- Manipulated information.
- Guessed and inferred well.
- Anticipated and related observations
- Were self-critical.

The above criteria are all strong features of the gifted learner, according to (Szabos 1989), and our observations captured these going on, in a way that single-shot gifted and talented tests probably cannot. This strengthens the argument for using enrichment programmes for identifying gifted and talented to provide support for the teacher when he/she is using professional judgement to nominate gifted and talented pupils. There is also some evidence that gifted and talented -ness is nurtured in the environment of enrichment programmes in which children can experience immersion through the use of extended time. An interesting question for senior managers in primary schools is the extent to which enrichment programmes can be integrated into mainstream schooling.

## **Conclusion**

It is our belief that reflexive or reactive incidences that occur in response to stimuli provided inside design and technology enrichment tasks (which take place over a continuous period of time) can inform us about giftedness. Not only do enrichment tasks have the power to reveal behaviour that may be regarded as gifted and talented, in order to compliment, support or check teacher nominations, but they provide an environment in which such behaviour can flourish.

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