Teachers' beliefs about the value of making

Richard Tufnell, John Cave and John Neale
Middlesex University

Abstract

This paper draws on the findings of an on-going research project, funded by the Crafts Council 'Learning through Making' project and the Technology Enhancement Programme, into the competencies and capabilities which young people develop by being involved in making activities. The first phase of this research has established a general model of teachers' beliefs about the value of making. This model has been established by undertaking case study research in a number of schools, selected because of the importance which they place on making. These schools cover all key stages and the participating teachers are drawn from across the curriculum, inclusion being determined by their use of making in the teaching context.

Methodologies employed are described. Teachers' beliefs were sought in three different response modes which provided a measure of triangulation and validation. Key quantitative data is provided which highlights the hierarchical manner in which teachers view competencies and capabilities when they are categorised in to three discrete classes: practical competencies, cognitive abilities and personal attributes.

Finally the paper proposes conclusions about the value of making in the school curriculum and provides possible reasons for the way in which teachers prioritise and focus their teaching on certain competencies and capabilities.

Background

One of the key objectives of this research is to investigate whether 'learning through making' can be regarded as an enjoyable peripheral cushion to the mainstream of intellectual development or an essential aspect of education that is vital to every child's development. Publications of the 60's and 70's stressed the central importance of learning through making in art, craft and practical subjects. Concerned with the balance between intellectual development and emotional and spiritual growth, a Schools Council report entitled *Children's growth through creative experience...art and craft education 8-13* produced at Goldsmiths' College, said in relation to the overemphasis on intellectual growth:-

> 'The current emphasis on intellectual and cognitive development, today so seldom questioned, implies an under-evaluation of the intuitive, emotional and spiritual aspects of human nature. It tends to aggravate the deficiencies already present in our culture, so adding to the difficulties and emotional problems of young people growing up in it.'[1]

Since the 70's making has been given a higher priority, but the question still arises of whether there is sufficient understanding of learning through making. The Goldsmiths' team advocated a more wholesome balance which would involve a central role for learning through making; they expressed their findings as 'their beliefs':

> ... that children's work in art and craft comes about not through exercise of any one side of their abilities in isolation but through a fusion of intellectual, emotional and physical energies; that for many children verbal thinking by itself is inadequate and frustrating since their creative and sensitive energies need to be expressed in concrete form, through visual, tactile and spatial images; and that through such expression of their feelings and ideas, children grow inwardly, in personal awareness and sensitivity, and outwardly in confidence and in their capacity to communicate to others.[2]

Ryle (1971) commented on this imbalance, when he commented of the trend on philosophers and laypeople to:

> ...treat intellectual operations as the core of mental conduct; that is to say, they tend to define all other mental-conduct concepts in terms of concepts of cognition. They suppose that the primary exercise of minds consists in finding the answers to questions and that their other occupations are merely applications of considered truths or even regrettable distractions from their considerations.[3]

This was confirmed by Adams (1996)[4] who observed that for many of the disenchanted young people he deals with in Jobskills Foundation Training, there is, among other things, a widespread lack of lifeskills, lack of basic educational skills, lack of organisational and presentation skills and that they have no drive or motivation, no appetite for fun or curiosity. Walsh (1993) [5] commented that the traditional status of technology was low in comparison with that of the academic subjects of the liberal tradition and that upgrading was overdue and necessary for its inclusion as a foundation subject in the National Curriculum. This was the cumulation of a process that began in the 60's with the introduction of technical subjects in comprehensive schools. He gives five values, previously associated with academic subjects, which he believes will be unexpectedly found in making activities:

- personal fulfilment and development of a sense of power over the environment;
- quasi-ethical values like workmanship and effectiveness;
- serious contemplative potential;
- instrumentality to basic individual and social needs;
- aesthetic and integrative power.

Walsh notes that certain values are shared by thinking and making and points to making as a necessary integral life experience for healthy learning and development not only in the acquisition of practical skills and competencies but also in aspects of cognitive learning and the emotional, moral and spiritual life of children. Walsh along with other writers believes that efficiently organised and integrated making activities at all levels of education foster imaginative and expressive skills, acquaint learners with tools equipment and materials, give a sense of purpose and achievement, build confidence, as well as making a significant contribution to cognitive development through opportunity for analysis and reflection. For some, creativity and inventiveness are unleashed at an early stage resulting in highly motivating benefits for themselves and others. However, for many teachers there are problems about the value of making beyond the difficulties of shortage of resources and the organisation required. The National Survey[6] for the practice and provision for craft in Art and Design & Technology at Key Stages 3 and 4, concludes that for many teachers there is a 'lack of practical and theoretical guidance as to how to develop pupils' knowledge and understanding of the historical, technological and cultural contexts of craft'. Some teachers think there is a lack of an integrative idea that would give more value to making activities. The survey also casts doubts on the value of the end product in a sophisticated high-tech, mass -produced, consumer society.

The value of making has been acknowledged by the inclusion of the Attainment Targets 'Investigation and Making' in Art and 'Making' in Design & Technology. The extension of General National Vocational Qualification (GNVQ) to up to twenty percent of the timetable for 14+ pupils is also significant. It seems timely to investigate if these decisions have affected teachers' beliefs concerning the value of making and whether the beliefs held by writers and commentators are substantiated by those teaching the subject or whether they are merely assumptions.

Methodology

A case study approach was adopted, focusing on schools in which making was given a high priority. The key research instrument was a questionnaire designed to capture both the teachers own views concerning the competencies and capabilities acquired or learnt by pupils engaged in making activities as well as responses to those identified by the research team. The question most central to the research, provided respondents with 30 different, although in some cases subtly related, statements which detailed competencies, capabilities and attitudes which might be developed during lessons involved

in making (see end of paper). These statements can also be sub-divided in to three categories, each containing 10 statements:

- *practical competencies*
- *personal qualities and attitudes;*
- *cognitive abilities.*

For the purposes of the questionnaire they were randomly mixed. Researchers also discussed issues with respondents alongside a number of observation sessions (the results of which are not presented in this paper). Diagnostic trials of the questionnaire were undertaken prior to conducting the research presented in this paper. The case studies took place in seven schools, three in the primary sector (KS1 and KS2 - 33 respondents) and four in the secondary (KS3 and KS4 - 22 respondents) and six other schools provided questionnaire respondents (KS3 and KS4 - 23 respondents). Responses to the questionnaire were analysed using SPSS (Statistical Packages for Social Sciences).

Profile of Respondents

The subject speciality or area of responsibility of the respondents was as follows in Table 1:

Subject	No. of teachers	valid %
Design and Technology	32	43.2
Art and Design	10	13.5
English	6	7.7
Special Needs	4	5.1
Science	3	4.1
Humanities	3	4.1
Maths	2	2.7
Others (14 other titles)	14	19.6

Table 1

Information given by respondents about their lessons which involved making of any kind are given in Table 2

% of lessons	frequency	valid %
10	16	22.9
20	8	11.4
30	7	10.0
40	3	4.3
50	4	5.7
60	5	7.1
70	7	10.0
80	8	11.4
90	5	7.1
100	7	10.0

Table 2

If the teachers whose subject specialism is normally associated with making activities, Art and Design and Design and Technology, are analysed then the reported percentage of lessons which involve making increases significantly at KS3 and KS4. 84% reporting that more than 50% of these lessons involve making whilst at KS1 and KS2 the reported level of making by these teachers was 56%. The conclusion appears to support a well held assumption that making occurs more broadly across the curriculum in KS 1 and 2 but is focused in specialised environments in KS 3 and 4.

Teachers' Beliefs

In attempting to produce a generalised model of teachers beliefs' they were firstly invited to state their views in a non-structured format; then they were asked to comment on the extent to which 30 competencies and capabilities might be experienced via making activities. In order to compare the results from these questions the unstructured responses were coded in relation to the 30 statements. This also enabled analysis in relation to the three sub-categories. The statements identified most frequently in the non-structured mode are listed in Table 3 over leaf:

Statements	Weighted response
Application of knowledge in the solution of practical problem	135
Skills in handling tools and equipment	65
Ability to communicate when involved in making things	48
Ability to reflect and think independently	47
Ability to cooperate	36
Problem solving	30
Ability to analyse synthesise and plan	26
Awareness of historic, technological and cultural heritage	17
Ability to organise things and people	16
Ability to think creatively and formulate new hypotheses and ideas	15

Table 3

Categories	total weighting	as % of total	KS1& 2%	KS3& 4 %
Practical Competencies	342	59.6	55.5	63.6
Cognitive Abilities	147	25.6	24.8	25.4
Personal Qualities and Attitudes	85	14.8	19.7	11

Table 4

If the weighted responses for each of the three categories are summed, the results are as in Table 4.

This ranking is not surprising. One would anticipate that teachers involved and committed to making would see the acquisition of practical competence as being the prime objective. Analysis by Key Stage reveals that KS 1 and KS2 teachers place more emphasis on personal qualities and attitudes whilst KS 3 and KS4 teachers place additional emphasis on practical capabilities. Again not surprising as the majority of the KS 3 and KS4 teachers are subject specialists in the making spectrum. The statements which teachers either did not mention or rated rather lowly are given in Table 5 below:

Statements Weighted response	
Conscientiousness, honesty, reliability	0
Skills that will be useful at home and later in the workplace	0
Open-mindedness	1
Intellectual curiosity, the ability to question established values	1
Develop a personal set of moral principles, capability to make moral decisions	1
Ability to undertake self-directed learning	1
Acceptance of responsibility	2
Motivation in the accomplishment of tasks	3
The capacity to view problems from different angles	4
Willingness to experiment	5

Table 5

Statements	score	mean	% of 'often'
Skills in handling tools and equipment	299	3.83	84
Ability to cooperate	293	3.75	76
Ability to communicate when involved in making things	291	3.73	74
Motivation in the accomplishment of tasks	289	3.7	70
Problem solving	287	3.67	69
Initiative, energy, persistence and self-discipline in tasks	276	3.68	68
Application of knowledge in the solution of practical problems	283	3.62	63
Ability to think logically	278	3.61	61
Perseverance, application	280	3.59	59
Ability to reflect and think independently	279	3.58	59
Ability to comprehend through listening, reading and doing	275	3.58	65
Skills that will be useful at home and later in the workplace	273	3.57	59

NB Missing data accounts for the anomalies in relation to total score.
Table 6

The second part of this research gave teachers the opportunity to rate the extent to which they considered making activities in their lessons improved the 30 competencies and capabilities provided. It was apparent that once these statements were brought to the attention of the respondents, they recognised that making activities do have some bearing on pupils experience in relation to these aspects. For example, on a four point rating scale (never, rarely, sometimes, often; given values of 1 to 4 respectively for purposes of evaluation) the lowest mean recorded was 2.44 - develop a personal set of moral principles, capacity to make moral judgements (midway between rarely and sometimes). In terms of frequency 36 respondents placed this statement in the sometimes/often categories and 42 in the never/rarely categories.

Only two other statements received a mean rating of less than 3: awareness of historic, technological and cultural heritage; and sense of social responsibility. All other statements were therefore, on average, positioned between 'sometimes' and 'often'. The statements which recorded the highest mean score/highest frequency of ‘often’ ratings are listed in Table 6 above. The table lists the 12 highest, these also obtained 75% or more ratings in the ‘often’ and 'sometimes' category.

Six of the statements relate to practical competencies, four to cognitive abilities and two to personal qualities and attitudes. If the responses are subdivided into the three categories and then converted into a numerical value, the mean responses are given in Table 7 as follows:

Categories	All	KS1&2	KS3&4
Personal Qualities and Attitudes	3.25	3.19	3.31
Cognitive Abilities	3.32	3.19	3.43
Practical Competencies	3.58	3.49	3.65

Table 7

Teachers identified aspects relating to practical competencies as being the most important. An analysis by Key Stage shows that the specialist teachers in KS 3 and KS 4 value all aspects of making more highly than KS 1 and KS2 teachers who may have a more holistic view of the curriculum. Respondents emphasised the ‘utilitarian’ aspects of making in their initial responses, e.g. “development of motor skills”, “hand-eye co-ordination” and confirm these by giving high scores to similar attributes embedded within the survey. Variations in the scores between some specific questions are interesting, as the correlation is not as close as might be expected. For,

Statements	frequency	%
Skills in handling tools and equipment	39	50
Problem solving	26	33
Application of knowledge in the solution of practical problems	22	28
Ability to think creatively and formulate new hypotheses and ideas	20	26
Initiative, energy, persistence and self-discipline in tasks	18	23
Ability to analyse synthesise and plan	17	22
Ability to communicate when involved in making things	17	22
Ability to think logically	17	22
Ability to reflect and think independently	16	20

Table 8

example, a majority of teachers indicated that making promoted a capacity for "problem solving" by giving this attribute one of the highest ratings in the survey , mean 3.7. On the other hand, some closely aligned attributes such as "formulating new ideas" - mean 3.2 or "open-mindedness", mean 3.3, were given significantly lower scores. A possible explanation is that while teachers firmly believe they are promoting a specific capacity in the context of design and technology, they are less confident that this is generalisable or familiar with the attributes associated with a particular competency.

Correlating the responses between the structured and unstructured responses was carried out using Spearman's rank order correlation. If the rankings are compared, the correlation is 0.5178 and the significance is 0.003. This indicates a weak correlation which is the result of six anomalous statements. If these are removed the correlation is 0.8284 with a significance value of 0.000, highly significant. A further response determined teachers' key priorities and in addition was used to validate the consistency of responses. The Spearman correlation coefficient of this ordering with the previous response rating was 0.7835, a significance level of 0.000. This confirmed that teachers' views were soundly held and that they responded consistently to the three different approaches adopted by the questionnaire. The competencies and capabilities which polled more than 20% in response to this task are given in Table 8 as above.

If the teachers' responses are summed in relation to the three categories the following emerges as shown in Table 9

This would indicate that when the scope for choice is restricted or when teachers responses are unstructured and possibly more immediate, the importance of practical competencies in relation to the other two

Conclusions

The outcomes of the work to date have substantiated the view that learning through making is important. Teachers committed to employing making activities in their teaching, whether specialists or general teachers, have

Categories	underlining	unstructured	structured
Cognitive Abilities	33%	25.6%	32.2%
Personal Qualities and Attitudes	19%	14.8%	31.6%
Practical Competencies	48%	59.6%	37.2%

Table 9

expressed their beliefs about the value of making in a consistent manner. Teachers have expressed the view that pupils involved in making activities will develop far more than just practical capabilities, although these are seen to be of greatest importance. This was supported, albeit in a limited way, by the observation of making activities across a range of contexts.

The unstructured responses graphically illustrated the difficulty which teachers have in articulating the value of making. Teachers' first concerns relate to the focus of their teaching - the practical skills required if pupils are to be successful makers. However, once the comprehensive attributes of making were presented, teachers recognised many which initially did not occur to them. There is evidence that the full range of competencies and capabilities occur or arise quite "naturally" even though they are rarely the focus of teaching and learning objectives. If this is indeed the case, the conclusion can be drawn that pupils do not experience these capabilities in an artificial context but one which is realistic, meaningful and purposeful. Teachers do not have to invent appropriate tasks or situations, capability in a practical making environment automatically demands them.

The research also reveals that the reasons for making activities do differ according to the age of the pupils. Teachers involved with younger pupils more consciously used making as a central strategy in a programme of work because it enables them to stress the development of personal qualities and attitudes and cognitive abilities. At secondary level making is implicit to the subject and teachers' first concern is subject competence.

Has a general model of teachers' beliefs about the value of making emerged? There is sound evidence that teachers' hierarchy of beliefs, subject priorities, skills and knowledge, clearly take precedent over the capacity to internalise, reflect and apply knowledge and the development of personal qualities and attitudes. These cross-curricular, employability skills, which are increasingly seen as being of growing importance, are not the immediate concern of teachers involved in making. The subsequent phases of this research are attempting to discover if other sectors of society share these priorities.

References

1 Schools Council, *Children's Growth through Creative Experience: Art and Craft Education 8 - 13*. London, Van Nostrand Reinhold Company, 1974

2 Schools Council, *Children's Growth through Creative Experience: Art and Craft Education 8 - 13*. London, Van Nostrand Reinhold Company, 1974

3 Ryle G. Knowing how and knowing that , *The concept of mind*, Hutchinson. Quoted in Intelligence and ability, ed. Wiseman S. Harmondsworth, Penguin Books, 1971, p49

4. Adams, A. *Even basic needs of young are not met.*Times Educational Supplement: March 22nd 1996,

5 Walsh P. Upgrading Technology: A value clarification, *Education and Meaning*, London, Cassell Educational, 1993

6 Mason R. *National Survey of Craft in Art and Design & Technology at Key Stage 3 and 4*. Crafts Council, Roehampton Institute, Crafts Magazine, 1994

Appendix

Competency and capability statements

- The capacity to view problems from different angles and perspectives.
- Initiative, energy, persistence and self-discipline in tasks.
- Ability to handle factual information.
- Intellectual curiosity, the ability to question established values.
- Problem solving.
- Open-mindedness.
- Awareness of historic, technological, and cultural heritage.
- Adaptability in changing circumstances.
- Ability to analyse synthesise and plan.
- Develop a personal set of moral principles and the capacity to make moral decisions.
- Application of knowledge in the solution of practical problems.
- Self-confidence and spontaneity.
- Skills that will be useful at home and after in the workplace.
- Perseverence, application.
- Ability to undertake self-directed learning.
- Ability to organize things and people.
- Ability to think logically.
- Sense of social responsibility.
- Motivation in the accomplishment of tasks.
- Appreciation of artistic style and the development of taste.
- Self-knowledge of talents and weaknesses.
- Ability to communicate when involved in making things.
- Ability to reflect and think independently.
- Acceptance of responsibility.
- Ability to think creatively and formulate new hypotheses and ideas.
- Ability to co-operate.
- Skills in handling tools and equipment.
- Ability to comprehend through listening, reading and doing.
- Willingness to experiment.
- Conscientiousness, honesty, reliability.