

## 8 Students' Minds

### **Student responses**

Data from the students provided an extremely rich developmental picture of their concepts of Mind. As in previous surveys, students went out of their way to produce thoughtful and illuminating responses. Many wrote their name on the paper and added extra sheets to the response form. Many students provided illustrations to supplement their ideas. All of the responses carried the research forward in productive ways.

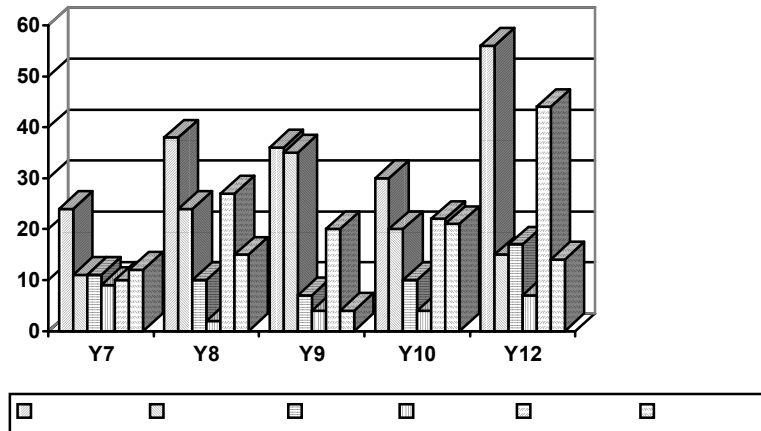
### **Analysis**

The analysis of responses in terms of age and gender revealed differences in the way in which the Mind is conceptualised. There would appear to be a disparity in the ways in which female and male students conceive the Mind and the way it works. This is particularly true when responses that can be interpreted as Constructivist are examined. These would suggest that female students have a more developed and complex concept of Mind, and that this is viewed through the perspective of affective terms: as Emotion, Ethics, Identity. Where male students have a stronger response rate is with concepts that could be described as more transactional.

**Table 8.1: The constructivist model**

	<b>Emotion</b> (% response)		<b>Ethics</b> (% response)		<b>Identity</b> (% response)	
	Female	Male	Female	Male	Female	Male
Y7	24	11	11	9	10	12
Y8	38	24	10	2	27	15
Y9	36	35	7	4	20	4
Y10	30	20	10	4	22	21
Y12	56	15	17	7	44	14

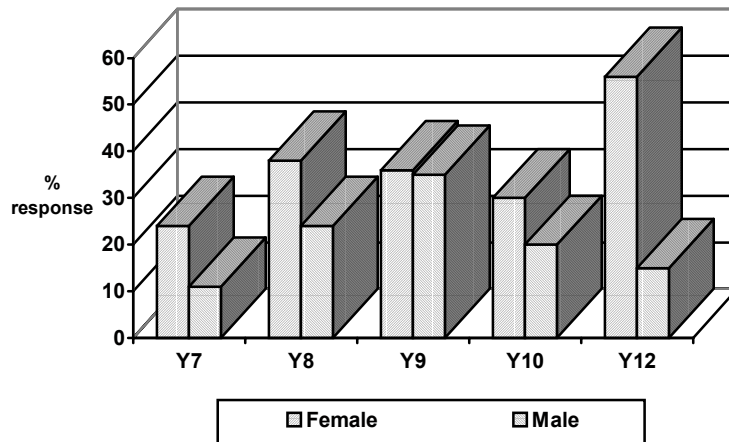
**Figure 8.1: The constructivist model of Mind**



**Table 8.2: Mind as the site of emotion**

Emotion (% response)	Female	Male
	Y7	24
Y8	38	24
Y9	36	35
Y10	30	20
Y12	56	15

**Figure 8.2: Mind as the site of emotion and feelings**

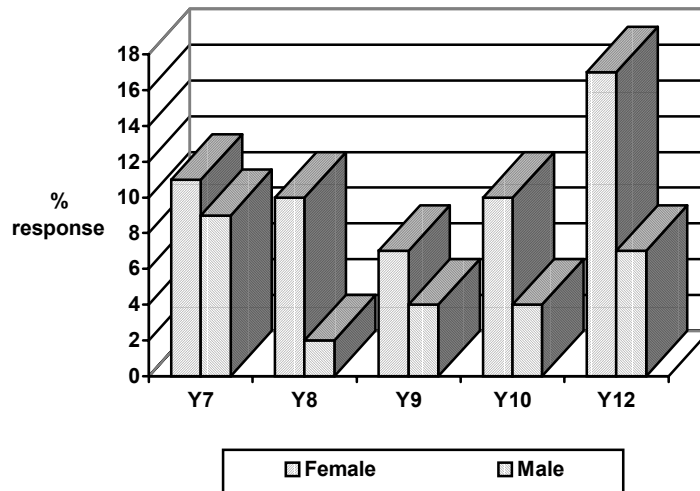


The correlation between the Mind and emotions and feelings is stronger among female than male respondents: female range 24-56%; male range 11-35%. This would contribute to evidence from other responses in this grouping. Young males would appear to have a more transactional approach to affective aspects of Mind, such as Emotion, Ethics and Individual Identity, than their female counterparts.

**Table 8.3: Mind as the source of ethics**

<b>Ethics</b> (% response)		
	Female	Male
Y7	11	9
Y8	10	2
Y9	7	4
Y10	10	4
Y12	17	7

**Figure 8.3: Mind as the source of ethics**



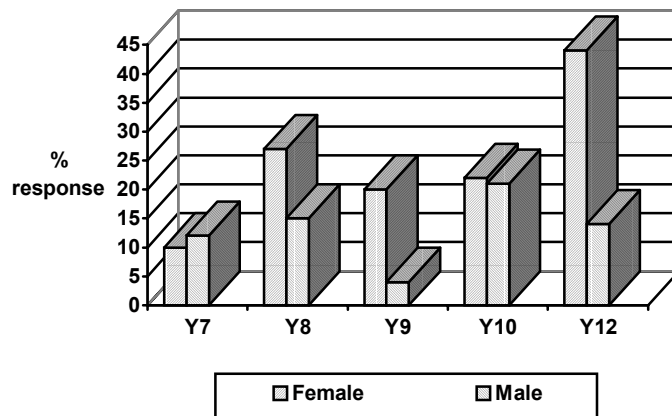
The general frequency of response would suggest that girls are more likely than boys to cite the Mind as the source of ethical standards. This is shown most strongly in Year 12, where 17% of females identify the Mind with holding ethical standards, compared with 7% of males. The female range is 7-

17%; male 2-9%. Ethical standards are predominantly viewed here as external, outside the individual and socially determined.

**Table 8.4: Mind as the focus of identity**

Identity (% response)	Female	Male
	Y7	10
Y8	27	15
Y9	20	4
Y10	22	21
Y12	44	14

**Figure 8.4: Mind as an individual's identity**



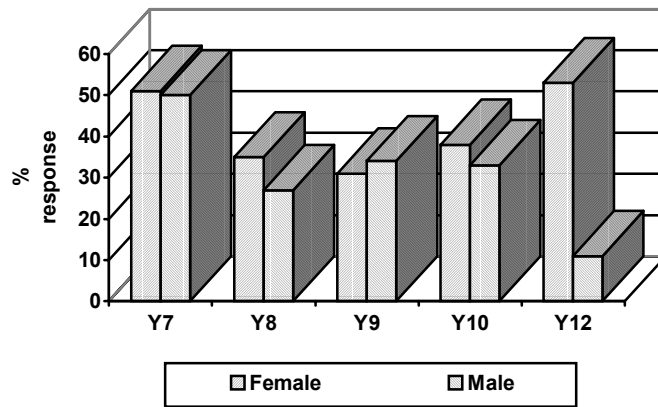
By Year 8 a significant number of girls have linked the Mind with an individual's identity. This link is particularly strong by Year 12 (44%). The male Year 10 response, at 21%, represents the peak. This contrasts identity as a psychological construct for female respondents and as an external social construct for male respondents.

**Table 8.5: The Materialist Model**

**Brain**  
(% response)

	Female	Male
Y7	51	50
Y8	35	27
Y9	31	34
Y10	38	33
Y12	53	11

**Figure 8.5: Mind as synonymous with brain**



A significant number of students see the Mind and Brain as synonymous. This is particularly true of female students, whose responses fall from Year 7, at 51% to Year 9, at 31%. They then rise again from Year 10, at 38% to Year 12, at 53%. Male responses vary with a peak in Year 7, at 50%, perhaps when there is an awareness of the amount of knowledge that must be processed. Students in Year 7 are just commencing their secondary education, in which the syllabus is constructed of separated strands of knowledge which they have

to process - a culture of mystification. Students in Years 9 and 10, on the threshold of GCSE examinations, are aware of their limitations in terms of what they have to know if they are to do well.

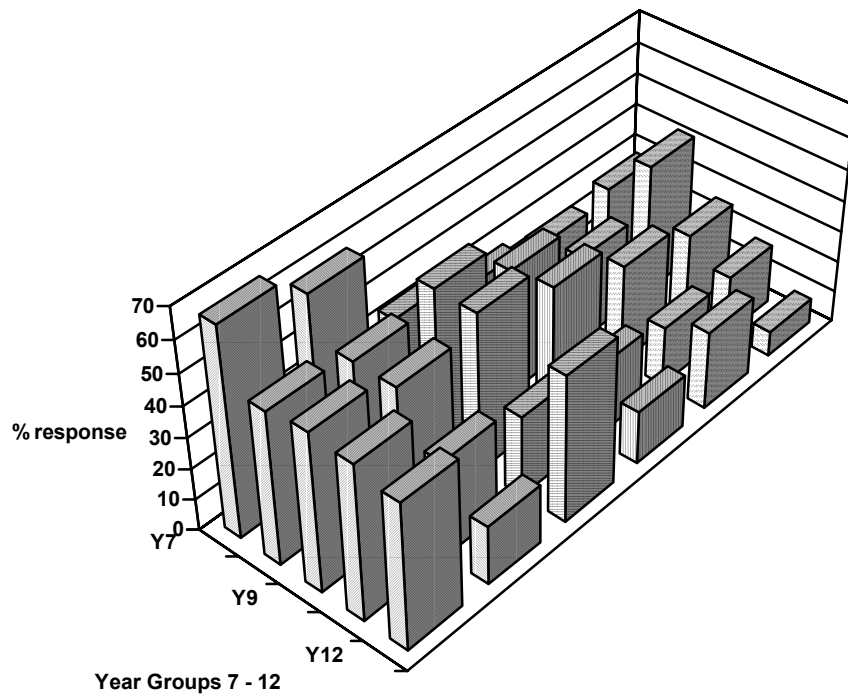
### **The Computational Model**

Student responses relating to this model fell into three separate categories. The first, and strongest, saw the Mind as synonymous with the Control of the body and its actions. Thinking explained Mind in terms of the process of thought, whilst Storage saw Mind as the repository of memory.

**Table 8.6: Computational models of Mind**

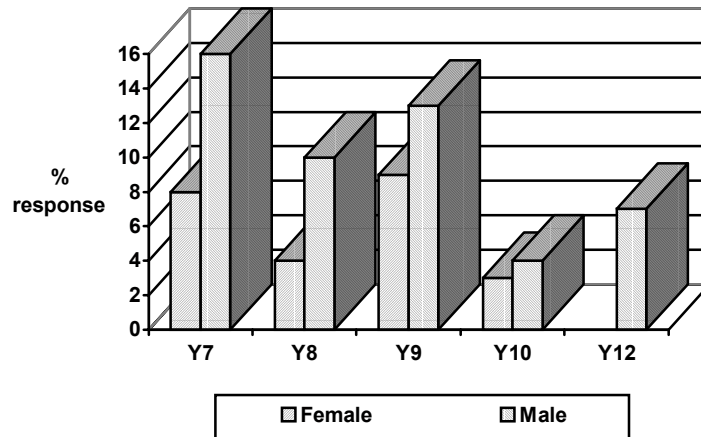
	<b>Control</b>		<b>Thinking</b>		<b>Storage</b>	
	(% response)		(% response)		(% response)	
	Female	Male	Female	Male	Female	Male
Y7	67	59	34	28	25	28
Y8	49	46	51	40	28	42
Y9	51	46	51	42	32	26
Y10	50	31	26	23	19	19
Y12	47	19	47	17	25	8

Figure 8.6: Computational models of Mind: responses by year



□ Control F □ Control M □ Thinking F □ Thinking M □ Storage F □ Storage M



**Figure 8.7: Mind as a computer**

### **Mind as computer, or a computational Mind?**

Whilst the peak response for the concept of the Mind as a computer is Year 7, with 16%, there is a consistent identification of the concept on the part of boys. The strongest response by girls is in Year 9, with only 9%, compared with 13% for Year 9 males. This concept of information processing links with that of the Mind for storage and memory, and that of thinking. No female respondents in Year 12 mentioned the concept. However, the peak response for identification of the Mind with a computer was 16%.

What is of most significance is the response that the Mind is not a computer. A computer was seen as something passive, responding to instructions from a user. Students did not view their Minds as inert, without a program or operating system. On the contrary: they viewed the Mind as active, creative and proactive, rather than merely reactive.

Despite this, the three themes of Control, Thinking and Storage patterned the uses to which computers were put by the students, and the ways in which they used them.

**Table 8.7: Metaphysical concepts of the Mind**

Year group ⇒	Y7		Y8		Y9		Y10		Y12	
Gender:	F	M	F	M	F	M	F	M	F	M
F= 533; M= 521	128	103	112	107	134	113	115	114	36	72
Category ↓	%	%	%	%	%	%	%	%	%	%
An Inner Voice			1	3	2	1			6	
The Soul			3	3	4	4			3	4
God/Supernatural			2	2				2		
A Myth, Dream, Abstraction					1			1		

The significance of these figures lies primarily in the low response rate: in other words, some concepts were not mentioned at all. There were no Year 7 responses for any of these themes. Where a correlation between the Mind and God is made this is on three occasions: Year 8, where both boys and girls generated a 2% response, and Year 10, where boys generated a 2% response. It is, perhaps, more illuminating to cite the number of respondents, rather than a percentage response, given that statistics have been rounded. Four students in Year 8 cited God, as did two in Year 10: six students out of more than one thousand surveyed.

The link between the Mind and the Soul generated a response rate of between 3% (Year 8, male and female; Y12 female) and 4% (Year 9, male and female; Year 12 male.) The concept of the Mind as an inner voice is at its strongest with Y12 females (6%), but occurs spasmodically across the age and gender range.

### **Summary**

Of the total number of responses - 1054 students - only 25 responded that they did not know what the Mind was. 97.6% of the total, therefore, were able to attempt a definition. What was significant was the eclectic mix of responses which nevertheless matched the three models outlined at the beginning of this section.

There would appear to be a disparity in the ways in which female and male students conceive the Mind and the way it works. Responses would suggest that female students have a more developed and complex concept of Mind, and that this is viewed primarily in affective terms. Where male students have a stronger response rate is with concepts that could be described as more transactional.

One concept of Mind is cited most frequently by all respondents. It is the Computational Model. This explanation used metaphors drawn from Information Technology: control; memory, information processing. This group views the Mind as responsible for controlling the body; for the thinking process; for the function of memory.

The majority of students do not, however, describe the Mind as a computer. Those who did constituted a small group, and were predominantly male.

Many of the students saw the Mind and brain as synonymous, and conflated the computational model with the Materialist Model of Mind. The concepts of information processing, however, provided the conceptual framework for their explanations.

The Constructivist Model of Mind used as an explanatory framework by students focused on features that could be described as affective, and the most frequently cited attributes were Emotion, Ethics and Identity. Female response rates were considerably higher than those for males.

Metaphysical explanations of Mind were consistently low across the whole school population. It would appear that most students have a range of concepts that they can draw on to attempt an explanation of the Mind and how it works without having to draw on non-rational explanations.

Amongst the 1054 students who responded to the survey the predominant view of the Mind is as an information processing device. In terms of the whole school, 47% saw the Mind as responsible for control of the body; 36% saw the Mind as responsible for thinking and 25% viewed it as memory, the storage of information. Trends in terms of age and gender have already been described.

The significance of Winograd and Flores' thesis, that a new technology changes our language, our understanding and the world which we construct, could well be reflected in the ways which this young people conceive themselves and their Minds.

What is more significant, perhaps, is the range of factors which are cited by students as constituting their Mind: the complex and rich patterning that they see as residing 'inside their head'. It is in the application of 'what is inside the head' to what things are made to happen that computers become a significant tool.

### **Concepts of Mind and multiple intelligences**

The thesis that individuals possess multiple intelligences (Gardner, 1983; 1993) is reflected in the ways that the students attempted to define Mind. Gardner's identification of Linguistic, Musical, Logico-mathematical, Spatial, Bodily-kinaesthetic and Personal intelligences can be seen in the terms that students used.

<b>Gardner</b>	<b>Student description</b>
Linguistic	Communication
Logico-mathematical	The Brain; thinking; information storage.
Bodily-kinaesthetic	A control device; A major organ; Visualisation; Mechanical.
Personal	Emotion; Ethics; identity; Consciousness; The inner voice.

No students linked musical ability with the Mind: neither was the quality of Spatial intelligence mentioned. What is significant is that the qualities that Gardner identifies as contributing to intelligence form the responses which students cited as components of the Mind and the way in which it works.

### **Conclusion**

The Computational Model of Mind may well constitute a contemporary hegemony. If this is the case then it is to be expected that references to such a model in the media, and as a metaphor of common currency, will frame young people's concepts and discourse. It may be that students simply use the tools with which they work as a source of metaphors for understanding. What is undeniable, however, is that their discourse is shaped by these processes.

If the Computational Model of Mind is the dominant interpretation accepted by young people, and if the world which they construct is shaped by this, then one would expect an information processing approach to apply to their work. What needs to be examined is whether or not, as Winograd and Flores suggest, this new discourse leads to changes in the world the students construct.

Examples of student responses to the survey are contained in Appendix 3.

### **Surprises**

My information processing expectations had been subverted. The model of Mind shared by many young people was multi-faceted and richly diverse. It did accept the information processing paradigm, but there was much more to their concepts than that.

One evening I was discussing my dilemma with a colleague. Whilst I outlined my findings and tried to organise them into some kind of taxonomy I found myself thinking of the ways in which the students, the cyborgs, had worked. All of the aspects of Mind that the students had detailed, and the eclectic working patterns they adopted appeared to form part of a pattern.

I found myself thinking of Levi Strauss' concept of bricolage. This was the model that I took forward to the next stage.

