

Gene Jury
Interim Report April 2008
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1) Project summary:

The Gene Jury project aims to engage children aged between 7 and 13 with bioethical issues surrounding the use of modern genetic technology, via interactive workshops delivered in their school classroom. The “Gene Jury” workshops exploit e-learning technology, particularly the personal response system (clickers). All workshops take the same format, which constitutes an approximately 1 hour powerpoint presentation making use of “clickers” throughout, such that pupils can vote to convey their understanding of the material and their opinions. Interactive games or activities and regular class and group discussions are also used to encourage reflection. Initially the powerpoint presentation introduces the minimum amount of science facts or concepts necessary to understand the issue in hand, and the class are then asked to vote on a bioethical question pertinent to that issue. After this, a number of salient examples or scenarios are considered by the class, before re-voting on the bioethical question. The workshops complement the curriculum, fulfil many of the values identified by the “Curriculum for Excellence”, and are supported by a project website (<http://www.biology.ed.ac.uk/projects/GeneJury/>) providing information, links, resources and a question-asking box for further clarification. There are currently 3 workshops which have been tested and evaluated in the classroom, and a 4th is scheduled for presentation in May/June 2008. These workshops have been designed to engage children with the following bioethical issues;

- Genetic testing (“Build a monster”, targeted at p4-p5)
- Pre-implantation genetic diagnosis (“Designer babies”, targeted at p6-S1)
- Genetic modification (“GM,ll fix it?” targeted at p6-S1)
- Whole genome sequencing and DNA privacy (“Whose DNA is it anyway?” targeted at p7-S1).

The project is funded in full by grants from the Wellcome trust and the Scottish government and is managed and executed by a University lecturer in genetics and two dedicated post-doctoral science communicators. The project has also involved a final year Genetics student working on his assessed honours project from January 2008 until April 2008, and three volunteer post-graduate students.

Throughout the first year of the project (April 2007 –April 2008), a total of 100 workshops have been presented in primary 4-7 or S1 classrooms (one to a troupe of Scouts) as well as 10 workshops at the Edinburgh international science festival. Supporting our workshops, the project is further disseminated via the website, and via leaflets, talks and demonstrations at the BA Science communication conference (May ‘07, London), the SSERC conference (November ‘07, Glasgow), the Edinburgh University public engagement networking “Threshold” lunch (December ‘07), Edinburgh education authority principal biology teachers meeting (January ‘08) and at the ASE conference (Perth, March ‘08). Our workshops are also presented at Our Dynamic Earth (ODE) where workshop summaries are included in the ODE educational literature. Via

ODE staff training and provision of materials, it is hoped that workshop presentation at ODE will continue with minimal input from us, although a consultation strategy has been put in place to ensure that workshops are adequately maintained.

2) *Feedback from participants and observers:*

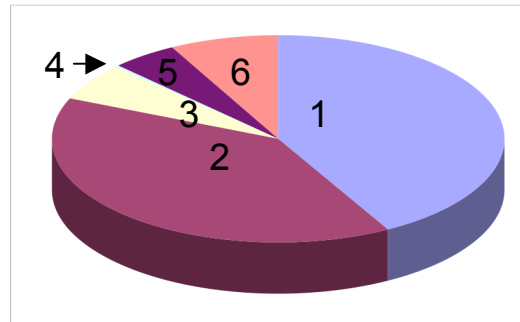
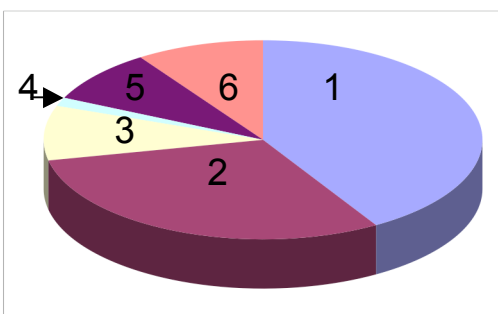
Our extensive evaluation strategy has provided an overwhelmingly positive response to the project by children, teachers and academic colleagues alike. As well as external consultation via Gene Jury steering group meetings in May '07, November '07 and April '08, we have commissioned 2 external evaluators (one educationalist and one science communicator) to attend workshops and to report on our project. The educationalist report has also been submitted to senior members of the Edinburgh education authority.

After each of our workshops, the children and teachers are asked to rate their opinion of the session, and representative figures shown for a subset of p7 and S1 children demonstrate that >80 % of children “liked the workshop” (figure 1). Teachers were asked to rate their agreement on a scale of 1-5 with a series of 8 supportive statements (figure 2). In all cases, the overall agreement was 80% or more, while agreement with 5 of the 8 statements was always greater than 90%. Written comments were also solicited from both children and teachers. A few constructive criticisms were obtained and acted upon, while the majority of comments affirmed enjoyment and usefulness of the workshops. Examples would include; *"The children were made to think and make judgements, which they enjoyed"*, *"The interactive element allowed all the children to contribute their ideas"*, *"It was good to have a thought provoking workshop that adults and children enjoyed"*

Figure 1: Childrens enjoyment of the “Designer babies” workshop

a) P7 children. n= 379.

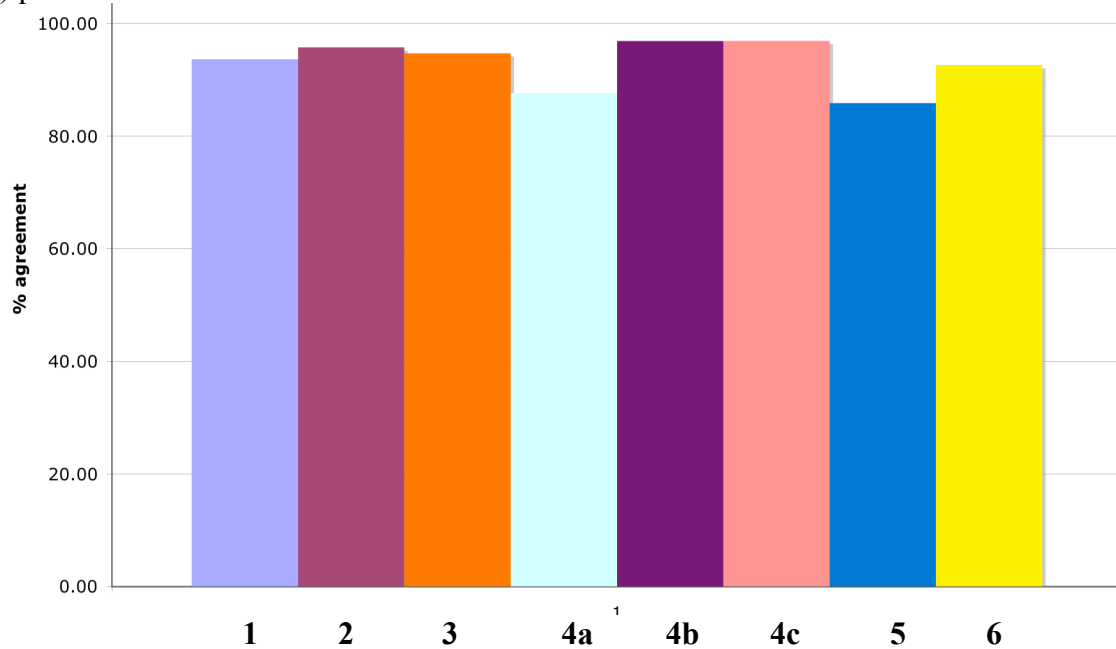
b) S1 children. n= 438



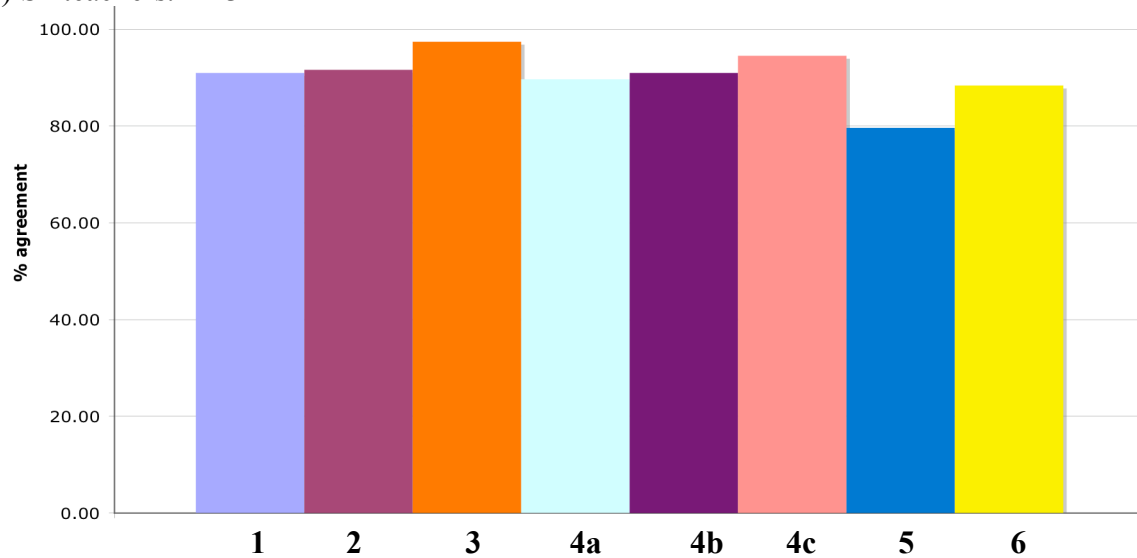
1. I liked it and it made me think. 2. I liked it. It was good fun. 3. I liked it but I did not understand it all. 4. I did not like it. It was hard. 5. I did not like it. It was boring. 6. I just did not like it.

Figure 2: Teachers evaluation questions (“Designer babies” workshop).

a) p7 teachers. n= 19



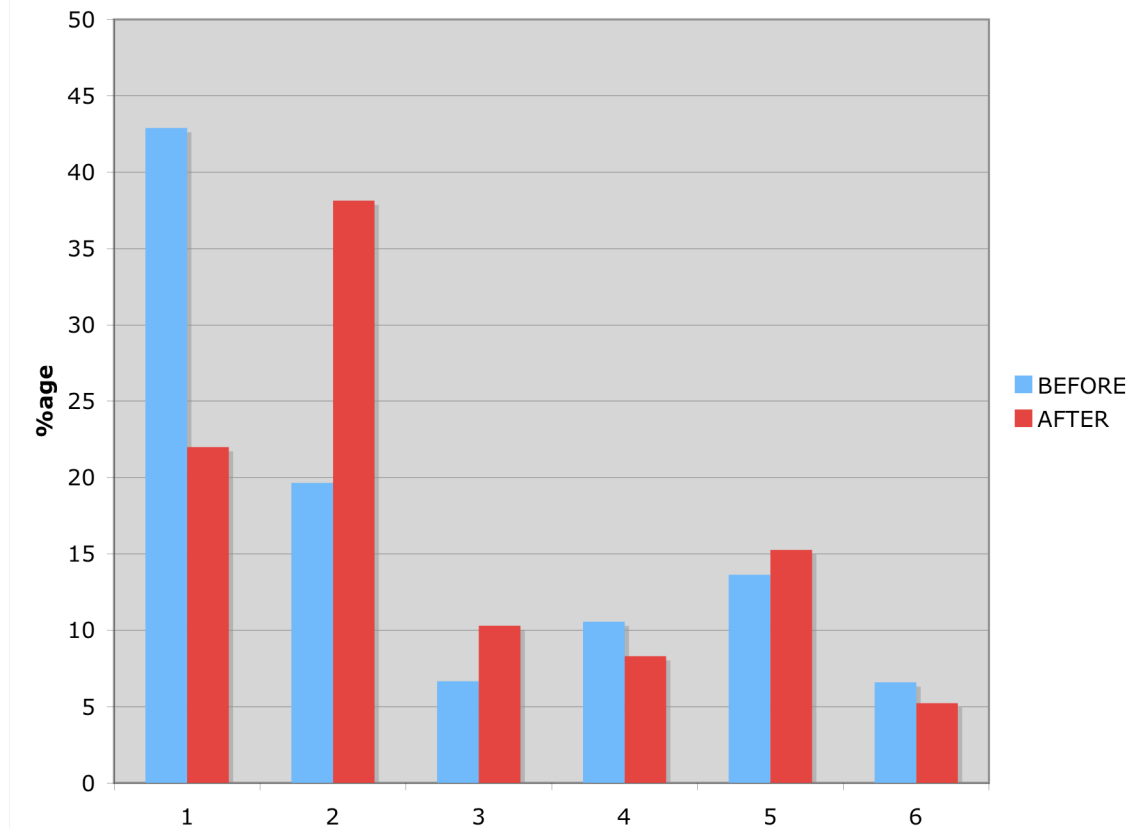
b) S1 teachers. n= 31



1. How enjoyable did you find the session?
2. How interesting did you find the session?
3. How would you feel about further visiting workshops of a similar nature in the future?
- 4a. How did you think the children coped with the teaching style of the presentation?
- 4b. How did you think the children coped with the teaching style of the clickers?
- 4c. How did you think the children coped with the teaching style of the game?
5. Did you feel that most of the children were able to grasp the scientific content?
6. Did you feel that the themes discussed in the workshops were appropriate for the age of the children?

As a measure of the level of engagement, we have also compared the childrens' responses to our bioethical question before and after reflection upon the issue (figure 3). Not only does statistical analysis confirm that the change in opinions is significant, but by examining individual responses we have established that 48% to 71% of children have changed their opinions after reflection upon the issue (depending on the workshop analysed), and that the swing of opinion is greater with older children (data not shown). Lastly, we can now start to draw some conclusions about what the children actually do think on the bioethical issues presented, the results of which can be extracted from figure 3. More extensive investigation of total project results (including p 4-6 children and all workshops) will be analysed and prepared for publication at a later date.

Figure 3a: P7 pupils' bioethical responses before and after reflection. n= 400



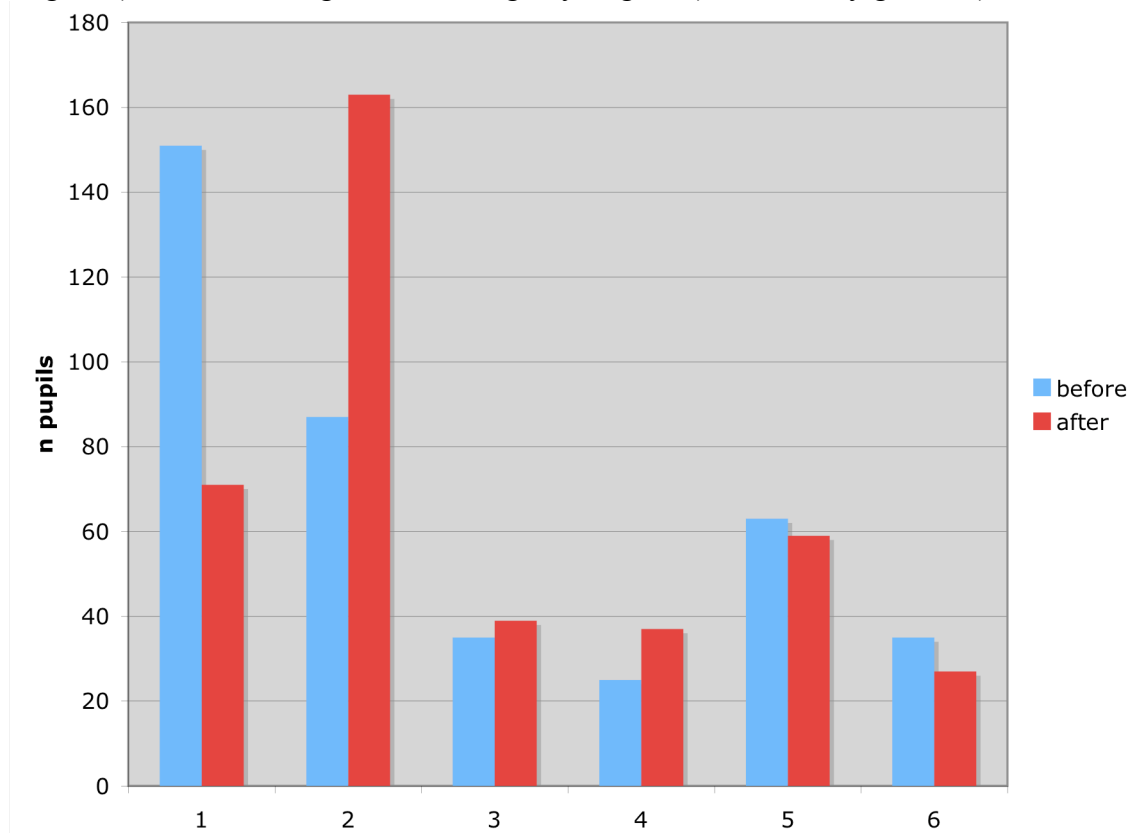
Question: "Designer babies: What do you think?"

1) Never choose genes. 2) Only choose healthy genes. 3) Choose some genes but not boy or girl. 4) Choose some genes including boy or girl. 5) Choose any genes. 6) Don't know

Figure 3b: S1 pupils' bioethical responses before and after reflection. n =396.

Question: "Designer babies: What do you think?"

1) Never choose genes. 2) Only choose healthy genes. 3) Choose some genes but not boy or girl. 4) Choose some genes including boy or girl. 5) Choose any genes. 6) Don't know



3) Audience demographic:

Up to and including April 2008 Gene Jury workshops were conducted in 33 S1 classes, 24 p7 classes, 13 p6 classes, 17 p5 classes and 12 p4 classes within the Edinburgh, Midlothian and East Lothian authorities. The list of schools is shown in table 1 and includes schools from a variety of socio-economic contexts with a range of child attainment and progression levels. The "Designer Babies" workshop constituted 57 of these visits and 32 were "Build a monster", while 10 visits presented our newest workshop "Whose DNA is it anyway?". We estimate that over 2,000 children, to date, have experienced Gene Jury workshops.

Table 1: Gene Jury workshops, June 2007-April 2008.

<u>School</u>	<u>classes visited (n)</u>	<u>workshop</u>
Kings park primary, Midlothian	p4 (3)	Build a monster
Kings park primary, Midlothian	p6 (2)	Designer Babies
Humbie primary, East Lothian	p4 (1)	Build a monster
Law primary, East Lothian	p5 (3)	Build a monster
Law primary, East Lothian	p7 (4)	Designer Babies
Davidson Mains primary, Edinburgh	p5 (2)	Build a monster
Davidson Mains primary, Edinburgh	p7 (3)	Designer Babies
South Morningside primary, Edinburgh	p5 (3)	Build a monster
Dalmeny primary, Edinburgh	p4 (1)	Build a monster
Dalmeny primary, Edinburgh	p6 (1)	Build a monster
Sciennes primary, Edinburgh	p7 (3)	Designer Babies
Prestonfield primary, Edinburgh	p4 (1)	Build a monster
Prestonfield primary, Edinburgh	p5 (1)	Build a monster
Prestonfield primary, Edinburgh	p6 (2)	Build a monster
Prestonfield primary, Edinburgh	p7 (1)	Designer Babies
Burdiehouse primary, Edinburgh	p5 (1)	Build a monster
Burdiehouse primary, Edinburgh	p6 (1)	Designer Babies
Burdiehouse primary, Edinburgh	p7 (1)	Designer Babies
Craigour Park primary, Edinburgh	p5 (2)	Build a monster
Craigour Park primary, Edinburgh	p6 (1)	Designer Babies
Craigour Park primary, Edinburgh	p7 (2)	Designer Babies
Wardie primary, Edinburgh	p4 (2)	Build a monster
Wardie primary, Edinburgh	p5 (2)	Build a monster
Wardie primary, Edinburgh	p6 (2)	Designer Babies
Wardie primary, Edinburgh	p7 (2)	Designer Babies
Granton primary, Edinburgh	p4 (1)	Build a monster
Granton primary, Edinburgh	p5 (1)	Build a monster
Granton primary, Edinburgh	p6 (2)	Designer Babies
Granton primary, Edinburgh	p7 (1)	Designer Babies
Niddrie primary, Edinburgh	p7 (1)	Designer Babies
Royston primary, Edinburgh	p4 (1)	Build a monster
Royston primary, Edinburgh	p5 (1)	Build a monster
Royston primary, Edinburgh	p6 (1)	Designer Babies
Royston primary, Edinburgh	p7 (1)	Designer Babies
Dalry primary, Edinburgh	p4 (2)	Build a monster
Dalry primary, Edinburgh	p5 (1)	Build a monster
Dalry primary, Edinburgh	p6 (1)	Designer Babies
Dalry primary, Edinburgh	p7 (1)	Designer Babies
Dalry primary, Edinburgh	p7 (1)	Whose DNA is it anyway?
South Morningside primary, Edinburgh	p7 (3)	Whose DNA is it anyway?
Tynecastle secondary, Edinburgh	S1 (6)	Designer Babies
Firrhill secondary, Edinburgh	S1 (11)	Designer Babies
Boroughmuir secondary, Edinburgh	S1 (10)	Designer Babies
Tynecastle secondary, Edinburgh	S1 (6)	Whose DNA is it anyway?
12 th Midlothian scout group	mixed (1)	Whose DNA is it anyway?
Edinburgh Science festival	mixed (10)	Build a monster