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**Interactive Museum Sites: The NMSI Tell System**

An Interactive Qualifying Project Report
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of the
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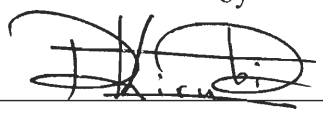
by



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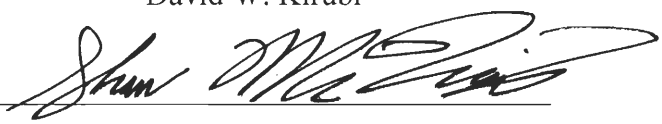

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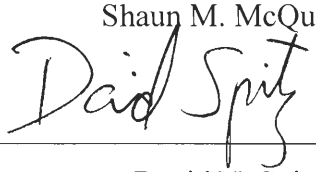

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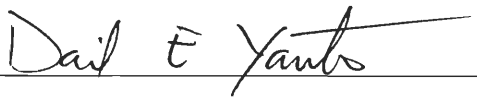

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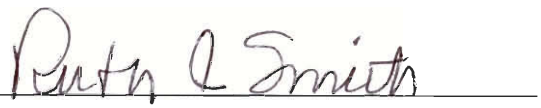

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# Abstract

Currently, museums are shifting from the classic didactic presentations of the past towards more interactive exhibition approaches. At the London Science Museum, we conducted the first analysis of the Tell system, which embodies this new approach by encouraging dialogue between visitors. We updated several Tell questions using our analysis of how question formulation affects the quality of the responses and interactions. We developed and implemented Euthanasia, Stem Cell Research and Internet Privacy as new Tell topics.

# Executive Summary

Traditionally, museums have focused on collections of objects and passive display as exhibition techniques. These exhibits, although beneficial, tend not to involve the visitors directly and spark interest in the subject matter. Recently, there has been a shift away from this approach towards a more interactive presentation that engages the visitors personally and seeks to interest visitors in the subject matter. The National Museum of Science and Industry in London has embodied this new approach through the construction of the Wellcome Wing, and more specifically, the "Tell Us What You Think", or Tell system. This system consists of a series of kiosks scattered throughout the Wellcome Wing, each presenting a controversial issue in contemporary science and technology. Visitors view a series of short introductory film clips and text, and are then invited to peruse comments left by other visitors and/or type their own. This system allows for an interaction between the museum and the visitors, and makes them feel a part of the exhibition by soliciting their opinions. However, since its introduction in June 2000, the content received by the Tell system had not been examined, and the topics themselves had not been updated to keep them current.

An analysis of the Tell system and individual kiosks was needed to gain a greater understanding of how successful Tell questions are formulated. This project contains an analysis of the comments and associated data left on the Tell system between the months of June 2000 and January 2001. The data was analysed using age distributions, total numbers of acceptable comments per topic, and finally percentages of unacceptable (as

judged by Science Museum staff) comments. Content analysis was used to determine the visitors' feelings on certain controversial topics, and also to gain knowledge of which Tell questions succeeded in producing an emotive and diverse group of visitor comments.

We found that individual kiosks attracted an audience whose age was based on the content of the question and its maturity level. The age distribution analysis shows that the Tell System is inviting to all age groups, not just the Museum's major target audience of seven to fourteen years. Based on this information, we concluded that any future material should be constructed so as to maintain an age balance in the content that reflects the ages of visitors using the system.

Our content analysis determined that the more open-ended questions enticed a wider and more in-depth response range. We identified a successful kiosk as one in which there are many acceptable comments and the content within is diverse and issues are discussed in a well-thought out manner throughout the comments. These questions allow visitors to expand their knowledge by incorporating the ideas of others. Open-ended questions that are clear and relate personally to visitors produce the highest number of focused comments and the lowest number of yes/no answers without elaboration.

In combination, our analyses of the current Tell System were instrumental in guiding us in our formulation of new Tell questions. After we conducted research to determine a short list of topics, we interviewed museum visitors to determine which of these topics would be most appealing to them and produce the most successful responses, with success being judged by the results of our analysis. We generated new questions concerning the current and controversial topics of Euthanasia, Stem Cell Research, and Internet Privacy that were approved by both the Science Museum and experts in the

questions' field. To complete this task, we followed the update procedure created by the Science Museum to ensure that their protocols were observed. The updated Tell kiosks that were formulated and uploaded onto the system will encourage the continuation of direct interaction between the museum and its visitors.

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# Chapter 1 – Introduction

## 1.1 Problem Description:

The Science Museum in London is a centre that seeks to impart both the latest in scientific development and the history of previous science achievements to its visitors. In an effort to move away from didactic presentations and encourage dialogue, the Wellcome Wing of the Science Museum has implemented the "Tell Us What You Think" system, often referred to as the "Tell" system. This system consists of a series of kiosks scattered throughout the Wellcome Wing, each presenting a scenario that asks a question relating to a contemporary scientific issue. Museum visitors are invited to type in a comment reflecting their ideas and feelings on the subject at hand. These comments are edited for content based on guidelines set by the Museum administrators. The edited comments are then uploaded onto the Tell System and act as a platform for further discussion by enabling other museum visitors to respond to the various comments left by other Tell users.

Part of the challenge faced by the Science Museum Tell Interactive Qualifying Project (IQP) group was that the content embodied in the Tell System was no longer current and needed to be updated. In addition, the Science Museum wanted to have the existing set of comments analysed to determine whether or not the computer-based Tell System was more effective than the previously used pen-and-paper based system through a careful study of the comments left by museum visitors on Tell. Also, the Science Museum's continuing efforts towards the application of more interactive exhibition methods had yet to be studied and evaluated to determine the museum visitors' responsiveness and usage of the new and more interactive exhibition environment.

### 1.2 Sponsoring Agencies:

The Science Museum Tell IQP project is sponsored by Science Museum in London. The Science Museum's origins date back to the nineteenth-century movement to "improve scientific and technical education" (Science Museum, 2001). Prince Albert was responsible for the Great Exhibition of 1851 to promote the "achievements of science and technology." This Great Exhibition led to the construction of a building in South Kensington to display examples of science and technology. At this same time, the Government set up a Science and Art Department from which the Science Museum and Victoria and Albert Museum were derived, respectively. (Science Museum, 2001).

### 1.3 Project Objectives:

The following were the objectives for the Science Museum Tell IQP Project:

- To analyse both qualitatively and quantitatively the existing users' comments from the Tell System during the period of June 2000 to January 2001.
- To determine if the new Tell System is more effective than a previous "pen and paper" system.
- Gather information and generate proposals for creating new Tell content and questions.
- Implement the newly proposed topics on kiosks of the Tell System and gather visitor feedback on them.

### 1.4 Audience for Findings:

There is currently a revolution in museum techniques in progress. The philosophy of the Wellcome Wing embraces a new form of exhibition, in which the public learns by interaction and there is an exchange of ideas between the presentations and the visitor.

This is in opposition to the older style of museum presentation, in which visitors were shown what the museum community believed to be appropriate and there was no interaction to speak of. Our project is engaged in showing how the new method of presentation is succeeding in its goals through the success of the Tell system. There are many parties who may be interested in the results of our IQP. In addition to the Science Museum in London, other museums, not just science centres, but also art or history museums, might find our work useful. If these other groups are considering implementing feedback methods similar to the Tell system, this project's work could provide a framework on which to base the update process, and the analysis part of the work could be used as an indicator of what to do and what not to do with a system similar to the Science Museum's Tell System. Any group seeking to put together a continuously updateable opinion gathering mechanism will benefit from a study of the Tell system's strengths and weaknesses.

### 1.5 Agency Use of Findings:

The Science Museum intends to use the data analysis to gain a greater knowledge base of popular opinion in certain fields of science and technology, as well as data supporting the premise that the computer-based system is more efficient than a previous pen-and-paper system, in which visitors viewed the question on a panel, wrote their comments on paper and placed them in a box to be typed up, edited, and bound into a book by Science Museum staff. The Science Museum in London will also use our group's work not only as an update for their system, but also as a process devised to update the Tell system that can be replicated by whomever should follow our group. This

process can also be used in any future expansions of the Tell system, should such an eventuality come to pass. Also, should the Science Museum look to implement any similar interactive systems at a future date, there will be a process ready to be applied for updating in that system.

### 1.6 General Project Methodologies

In order to achieve the goals and objectives set forth, we employed the following methods. Tables and graphs were created from a quantitative analysis of the different ages of visitors and the frequency with which they commented on each topic. Secondly, we wanted to gain some qualitative knowledge concerning the views expressed by the visitors who left comments on the system. We conducted a content analysis that counted both words and concepts in order to reach this objective. Next, with the objective of generating new content, we researched the latest scientific and technological controversies using sources such as the Internet, various newspapers and journals, and experts in the field. This enabled us to come up with a list of possible replacement themes, which we narrowed down by conducting on-site interviews with museum visitors with the purpose of discovering which ideas people found the most intriguing. The finalised topics were developed and implemented, thus completing our final objective.

### 1.7 Definition of an IQP:

An Interactive Qualifying Project (IQP) is an experience in which future engineers and scientists explore the relationship between modern scientific issues and the social impact that each of them has. By having an understanding of the social implications of

these fields, we are able to develop products and concepts suitable for a diverse and fast-evolving society. WPI hopes to better educate its students by linking societal effects with science, technology, and engineering. The goal of this link is to produce well-rounded graduates who are better suited to solving "real world" problems. Our project fits well into this description, as it deals with public reaction to controversial issues on the cutting edge of technology, and also explores the implications of new technology for an old field, namely museum presentation.

# Chapter 2 – Background Research

## 2.1 Museum Exhibit Presentation Techniques

Exhibition methods used in museums are as old as when the first museum was established (Karp, 1991, pp. 176-190). The method of exhibition used depends on the kind of artefact or item and the effect that it is supposed to have on the museum visitors. For example, the Gallery of Modern Art in Milan would be expected to employ a different method of presentation compared to what the Science Museum in London would use. This is mainly because the exhibits have different materials, effects and meanings and this adds to their complexity when it comes to deciding what method to use. In determining what method to use, the following factors are normally taken into consideration: lighting, climate control, security, the kind of artefact being exhibited and the effect the exhibit is supposed to have on the viewer. However, with current advances in technology, multi-media methods have become common in museums, thus negating some of these concerns.

Lighting is important as it enables the objects to be seen (Karp, 1991, pp. 176-190). What matters enormously in museum viewing is the relative brightness of the objects. Lighting can be manipulated in order to present the desired effects. Some objects might require controlled temperatures and as such, it is important that climate control equipment be available. Security plays a crucial role in the selection of an exhibition technique. Most of the objects available in a museum are typically one of a kind and of high value. Therefore, the security of the objects must be given serious consideration when deciding the method of exhibition to use as different techniques offer varying levels

of security. In order to arrive at the desired effect, all the factors are combined and manipulated to ensure that the exhibit is able to convey the correct message to all the viewers. This will also enable the viewers to effectively interact with the exhibits.

However, the concerns on presentation that are described above are indicative of older dogma on exhibition, when museums were more geared towards the display of objects of interest, rather than encouraging the interaction and engagement in the subject at hand in its visitors. The Tell system for example, consisting of a computer terminal, does not need to worry about such things as lighting. Historically, the common methods used to present exhibits include wall hangings, encasings, walls, panels, cases and supports (Brawne, 1995, pp. 170-191). Although these methods are still employed, new technologies and new techniques have enabled the creation of multi-media exhibits that offer many more features and enrich the museum experience. For purposes of our discussion, we will place emphasis on multi-media exhibition methods, as the Tell system is a prime example of this type.

Multi-media exhibitions include video and sound outputs that enable the presentation of virtual reality and/or a more realistic display (Science Museum, 2001). This is possible through combination of sound and video signals. An important aspect of multi-media presentations is that they act as interactive media that enable the museum visitor to participate actively and interact with the various exhibits. A notable example of multi-media exhibits other than the Tell System at the Science Museum in London is the Boston Museum of Science's new Current Science and Technology Centre (CS&T). (Science Museum, 2001). This style of exhibit can offer live presentations on contemporary science and technology, live imaging capabilities such as live imaging of

the sun, moon and satellites from observatories, and virtual reality experiences such as being able to virtually visit research expeditions around the world (Museum of Science, 2001).

The highly energetic atmosphere of this type of exhibit transforms the museum visitor from a passive to an active observer. He or she can interact and respond in person to whatever is taking place in the display. This has also changed the way museums are viewed by the general public since people are now more engaged in live and real time interactions (Brawne, 1995, pp. 170-191).

This trend is not limited to science museums in particular and has been employed at such museums as the Smithsonian in Washington D.C., in which people can view online versions of various exhibits available at the museum (Smithsonian, 2001). People can visit museums "virtually." This has tremendous value to the museum community and the general public since many more people, who were otherwise constrained by geographical location and/or time, can now take advantage of the various resources offered by museums worldwide. When such web-based exhibits are interactive in nature, the experience is heightened.

By taking advantage of technological advances, multi-media presentations will continue to play an important role in improving accessibility to the museum visitors and to the general public by providing a means of presentation that is able to effectively communicate the exhibits' desired effects while interacting actively with the museum user (Brawne, 1995, pp. 185-191). Exhibit presentation techniques have played a key role in the development of our understanding of how the Tell system works and why it is successful.

## 2.2 Interaction Methods between Museum Visitors and Exhibits

In order to understand more completely the ways in which science museums such as the Science Museum of London set up their exhibits and communicate their concepts to visitors, it is essential to examine the development of the Science Museum genre as a whole. Science museums in their current form are a relatively new development (Danilov, 1982, pp. 29-31). Previously, museums were defined as repositories for objects of significance; they dealt with the past, not the present and the future. However, after World War II, a new type of museum began to make its presence known. Rather than a stale collection of artefacts, the new type of museum dealt with exhibits designed to educate the visitor in the new theories and developments in science and technology. This new institution began to assume greater responsibility for this enlightenment. In order to engage the visitors, many such museums began to make their exhibits interactive; that is, they gave the visitor a more active role in the exhibition. This shift from the "hands-off" policies of the past, meant to preserve the artefacts that are worth so much because of their antiquity, towards the "hands-on" approach, characteristic of the new science museums, is very important to our project because the Tell system directly involves the visitor with the contemporary issues of science and technology (Danilov, 1982, pp. 29-31). The Wellcome Wing as a whole embodies this shift from presentation towards interactivity.

Science museums vary in their focus of various issues. Danilov (1982, p. 44) has created a set of categories that one can use to group the set of contemporary science museums: comprehensive centres, specialized centres, and limited centres. Comprehensive centres are, as Danilov says, "the larger, broader, and more fully

developed contemporary science and technology centres" (Danilov, 1982, p. 42). This is the category into which the London Science Museum falls. It is large, covers a broad base of material, and is not limited to strictly one field of science. Within this category, there is a further breakdown: industrially oriented, educationally oriented, and scientifically oriented museums. The description of the scientifically oriented centre seems to fit the London museum best: it "encompasses natural history and/or other fields in addition to the physical and life sciences." The example given for this type of museum is the Museum of Science in Boston, which originally was a natural history museum and now encompasses a variety of fields (Danilov, 1982, pp. 42-44).

There is one specific difference that separates science and technology museums from all other types of museums. This difference is in the material presented. Science and technology museums are in the business of exhibits, while other museums are designed to present important objects. While both kinds of museums do still collect objects and items for display, the real difference is in the purpose that the items have in their respective formats (Danilov, 1982, p. 181). In the original, non-science museum mindset, the object itself is of grand importance. It is the purpose of the museum; collecting and displaying objects to the public is what these museums do. However, in the typical newer science centre, the goal of the museum is not to display objects, but to educate the populace in science and technology. Therefore, any objects and items that are present in a science and technology centre assume a secondary role; they are there for the sole purpose of supporting the educating exhibits that are present throughout the museum. It is this difference that drives the different management structures that exist in each of these museums. In the traditional museum, curators and the staff support maintaining and

safeguarding the objects that the museum holds and displays (Danilov, 1982, pp. 180-183). In contrast, science centre staff are more concerned with upholding the quality of the exhibits and making sure the visitors are interested and educated by the presentations. The Tell system is a good example of this difference; rather than presenting an object, it draws the visitor into a multimedia presentation on a controversial topic and invites comment. This allows the visitor to interact with the exhibit and hopefully he or she comes away with a greater knowledge about the topic at hand. This is the embodiment of the interactivity described above.

The above material is nicely summarised by Goldsmith (1986). He includes a quote from Bernal in 1939 that sums up the transition from passive to active exhibition rather nicely: "'In the old days', a venerable Russian scientist once remarked to me, 'they used to make museums for savants; now, they make them for children'" (Goldsmith, 1986, p. 51). Goldsmith is quick to point out that the new purpose for science museums is to educate, and since the general population is rather uneducated in the sciences, it is hard to make a science museum that does not appear to be geared towards children. Goldsmith warns against designing an exhibit to be so childish and poorly communicated that it would not appeal to most adults. He also suggests that an overly unstructured set up of exhibits is ineffective and should be avoided at all costs (Goldsmith, 1986, pp. 51-58). The Tell system is designed to appeal to a broad visitor base, as the wording of the issues presented is not terribly complicated, and the situations presented are very realistic and appeal to visitors of any age.

## 2.3 Exhibit Scheduling and Update Procedures:

Now that a basic understanding of the techniques and goals of a successful science museum exhibit have been established, a methodology of scheduling and updating these exhibits must be examined. Continuous updating of museum exhibits ensures that there is a healthy mix of exhibits that teach basic laws or ideas and modern events that reflect today's society (Current Biology, August 1999, p. R581). The Tell system is designed for continuous update as science and technology advance and bring up new issues.

Museum exhibits are generally classified into two categories, the permanent displays and changing exhibits (Brawne, 1965, p. 36). The permanent displays, as noted by the name, suggest exhibits that are beneficial to the viewer and have not, or will not change with time. For example, an exhibit that shows that gravity is a constant and falling bodies will have the same acceleration in a vacuum will not change. This display will be placed on permanent display showing all viewers, young or old, about the effects of gravity. However, an exhibit on new health topics such as cloning will be placed on a changing display. The Wellcome Wing of the Science Museum, which contains the Tell system, also contains a series of exhibits dedicated to continuous update in order to keep current material in presentation. The Tell system itself is designed so as to facilitate frequent update. Our project will provide the first major update for Tell, and it can also function as a guide for further updates conducted by the museum. Any group that is planning to update Tell can replicate the procedures described in this report.

# Chapter 3 – Methodology

## 3.1 Analysis

One of the main goals of our project was to conduct an analysis of the data contained in the current Tell database. This data is made up of the comments on the questions posed by each kiosk, along with the age entered by the visitor and the date the comment was entered. We met this goal by analysing the data both quantitatively and qualitatively. By developing a number of charts and tables to display the trends in age for each Tell question, along with summaries of which Tell questions yielded the most usable comments (a description of what qualifies as usable can be found in Appendix C). The qualitative analysis yielded a breakdown of trends in the general visiting population on each of the subjects posited by the Tell system.

### 3.1.1 Quantitative Analysis

Tell comments from opening day of the Wellcome Wing in June 2000 to January 2001 made up the data set that yielded our quantitative results. It is important to note that all comments left on the system from the aforementioned time period are edited for content; all inappropriate comments have been deleted from the system.

The comments were quantitatively analysed in the following ways:

- Tables and charts were created to summarise findings on the percentage of comments contributed by a specific age group on a specific subject.
- The number of comments left on each kiosk after was compared with the others and the results compiled in table form and charted.

Once all of this data was compiled, the February/March 2001 comments were analysed. The comments from the months of February and March were not edited, and thus consist of the total number of comments generated by visitors. We compared these comments to the set of edited comments for the same time period. By comparing these two groups of comments, the group determined the percentage of comments that are unacceptable due to graffiti (visitor comments that contain foul language or gibberish), inappropriateness to the kiosk question, or extremely poor spelling, grammar or statements that are incoherent. These analyses sufficed to make the comparison of the computer system to the pen and paper system.

### 3.1.2 Qualitative Analysis

To fully reach our goal of producing a useful analysis of the Tell system, qualitative analysis of the data set had to have been completed in addition to the quantitative work described above. This method allowed us to deal directly with the comments left by visitors and to produce a series of themes running through the responses that correspond to large portions of the comments' content. With this in mind, each visitor response was reviewed and similar comments were placed together to determine if any trends between the different groups occur. For example, similar thoughts by guests on male pregnancy were examined to determine if there is a general trend among the museum's guest population, whether there is a discrete number of such trends, or whether the range of responses was too great to group effectively.

Our group evaluated the comments using the tenets of content analysis, which is broadly defined as "any technique for making inferences by systematically and objectively by identifying special characteristics of messages" (Berg, 2001, p. 240).

Objective analysis was achieved by following strict "criteria of selection." Succinctly put, these criteria consisted of a series of rules that were applied rigorously and rigidly to each item on which the analysis was performed. Without these criteria in place and fully articulated, any content analysis would have been meaningless, for the path traced to obtain any findings would be unable to be replicated. When using these criteria, it is important to maintain as much of the original wording and the original phraseology of the content being analysed (Berg, 2001, pp. 240-241), and we have endeavoured to accomplish this. One of the advantages of content analysis is the fact that it is almost completely unobtrusive (Berg, 2001, pp. 258-259), yielding results that do not constitute an opinion oriented towards social recognition but towards self-expression. There are seven major elements in written work that can be counted in content analysis (Berg, 2001, pp. 246-247). These include words, themes, characters, paragraphs, items, concepts, and semantics. Each of these is a separate entity that can yield several groups of meaningful data. Our main focus of the analysis was concepts; these were ideas that were prevalent in many comments left by visitors. These ideas were identified based on their similarities to each other, and grouped accordingly. For this purpose, modifiers on certain words and identifiable thought patterns were searched for. The following describes our process.

To group similar ideas among statements, we read over each comment to determine the criteria of selection. Once each question has been reviewed and "flagged" with a response answer, the comments with similar responses will be grouped together. Thus a general statement can be formulated which can put forward a percentage of visitors who have a certain feeling on a particular subject. Groupings of the comments generally

varied from topic to topic, but for each kiosk they provided the information necessary to our project's analysis of the Tell data. They provided information about the range of responses to controversial questions that were not only of great interest to the Science Museum, but to us as well in understanding how some members of society viewed some scientific advances and how society sees itself affected by the advent of new developments in science and technology. By analysing these comments, a greater understanding of the age groups of persons visiting the museum and their opinions and views has been documented.

### 3.1.3 Effectiveness of Tell

The combination of both the quantitative and qualitative analyses described above provide both the Science Museum and ourselves with a concrete description of the computer-based Tell system. Standing alone, either of these analyses would be insufficient for this project, but by conducting both of them, we were able to gain a holistic understanding of the functioning of the system and the ability to describe the comments that were left in a knowledgeable fashion. This met the first objectives of our project, and also provided a basis on which to judge the effectiveness of Tell.

The analysis that was described above provided the other half of the information necessary to compare the current system with a previous pen and paper system. This system was very labour intensive for the museum to maintain, as the visitor would write his or her comments on a sheet of paper and submit them into a comment box. The museum personnel would then come along, pick up all the comments, sort them based on appropriateness, type them up, and finally submit them into a book that all visitors could read. This system also was susceptible to a high percentage of graffiti.

The estimation of the effectiveness of the new Tell system is based on the following criteria that relate to the performance of the previous pen and paper system.

1. The Tell system should save time by eliminating the need for museum personnel to type up each individual comment. Since the comments are submitted electronically, they should only need to be edited and displayed.
2. The Tell system should be cost effective by eliminating the need to type each comment and place them in a book.
3. The Tell system should be easier than the pen and paper system to use, update and display comments to the public.
4. Tell system should allow comments to be posted on the Internet, allowing visitors from around the world to view the comments.

In order to support these points, we compared the analyses of the two systems on each of these points. This comparison allowed us to discern which system met these qualifications more effectively, and in what ways the strengths of the Tell system were made clear. In addition, we were also able to obtain an understanding of the role the new and more interactive exhibition environment played towards the success of the galleries.

### 3.2 Generation of New Content

Analysis of the Tell system database was the first goal of our project. The generation, upload, and analysis of new Tell content made up the second goal. Before the second is explored, it is important to note the linkage between these two phases. By analysing and studying the current Tell database, we gained an understanding of how the Tell system functioned, what it's strengths are, and the differences in presentation between successful questions and those that failed to elicit a large volume of responses. With this knowledge

in hand, we went into the generation of new content with a set of mental guidelines and a deeper understanding of the system we were exploring.

Taking the following steps resulted in the new content we produced for the Tell system. Firstly, we conducted research on current scientific topics, ideas and theories in a variety of methods. After conducting formative interviews and gaining the approval of the Science Museum staff, we distilled the research into questions that will both challenge the visitor to think about current issues as well as teach them about breakthroughs in scientific discoveries. Finally, the newly formed questions were implemented into the database and feedback from museum visitors was gathered via interviews.

Research in the areas of science and technology encompassed a wide variety of sources. First, a wide variety of news sources were examined to determine current events in science, technology and medicine. Such sources included major newspapers such as the *New York Times*, *Washington Post* and the *Times of London,* along with sources on the Internet. These sources provided a base idea of what is going on in the world, and while some of them lacked a rigorous examination of the issue at hand, we found them to be useful in determining popular trends and emotive issues.

Scientific journals and research articles were also used to determine current events in science and technology. These journals provided even more information used to formulate appropriate questions to implement on the Tell system. These sources were judged useful because of the cutting edge examination of issues on the very cutting edge. Several examples of scientific journals that were used include the *New England Journal of Medicine*, *IEEE Spectrum, Nature, Science, New Scientist,* and *ASME News*.

University and college research and theses from around the world were used next to explore the theories and ideas found in the newspapers and press. Professors and research students were contacted if their research material was applicable to the question, and also to check the factual accuracy of the writings we found on the subject of the question. This step allowed us to confirm the veracity of the readings we had done as well as gain a greater accuracy in our descriptions.

In an effort to do some formative research on potential issues, the group conducted research to determine what issues interested visitors to the museum. This research took the form of interviews with visitors to the museum that asked for their opinions on new subjects for the Tell system. These interviews were structured and sought to adhere to the interviewing principles (i.e. formulating questions to produce meaningful responses). We conducted these interviews in order to more closely learn the wishes of the visitors to the museum, who will naturally be the people using Tell. In this way we were able to chart their wishes and incorporate them into the new content, thus creating a stronger link between the content and the visitors. This link is important as Tell depends on it in order to succeed.

Theories from the areas of science, technology and medicine were combined and formulated into a question that should fit in the following criteria devised from a combination of previous Tell questions and our own understanding based on the data analysis:

1. The question should provide valuable insight into the problem or theory, thus making it educational and solidly based in fact.

2. The question should be easy to understand by users of any age, as Tell users range from the very young to the very old.

3. The question should allow a reply that is more than a few words in length, but less than a few sentences. This fulfils the requirement that the question be open-ended.

4. The question should be interesting as well as informative to users, and have many sub-issues that can be explored. It must be capable of evoking an emotional response, and must also be somewhat controversial. This entices visitors to comment and make their feelings heard.

Once the questions had been devised and checked, they were implemented onto the Tell system. Museum staff reviewed the questions for content and quality based on their own set of standards. When the questions were approved, they were uploaded onto the Tell system. In addition to uploading the questions themselves, the group also wrote short film scripts and created appropriate images to be uploaded as supporting material onto the system. These films and images were created with the help of Science Museum staff and uploaded along with the text of the questions. They function as a set of introductions and offer differing opinions in an effort to stimulate comment.

The questions were assigned to a particular kiosk based on the type and genre of the question. Since each question has a "theme", the question was sent to the particular kiosk for that theme. For example, questions on genetic testing for Huntington's disease were originally sent to the Tell Station in the section of the Wellcome Wing housing the genetics exhibits. This allows for continuity and makes the question mesh better with its surroundings.

### 3.3 New Content Evaluation

A copy of the survey administered to Museum visitors follows:

**Questions for Formative Interviews**

1. Having seen a Tell question, which other topics would you like to see featured?

2. Of the following list, which topics would you most like to see on the Tell system?

| **Who Am I?** | **Digitopolis** |
|---|---|
| Euthanasia | Digital Divide |
| Legalisation of Marijuana | Wireless Tracking Devices |
| Selling of human sperm and eggs | Internet Privacy |
| Stem Cell Research – The use of human embryos in research | Cyborgs – Technologically advanced humans |

3. For the topics you have selected, what sort of introductory information would be useful for you to see before you leave a comment?

| Who Am I? | Digitopolis |
|---|---|
| | |

4. What is your opinion on these topics?

These interviews allowed us to gain a more personal knowledge of what guests felt about the new question proposal, why they were intrigued, and generally how well the questions were succeeding in getting the museum visitors much more actively involved in the exhibitions.

# Chapter 4 – Analysis and Results

## 4.1 Introduction to Data Collection

As has been discussed, the data for our project included both the database of edited comments (June 2000-January 2001) and the data obtained from the formative interviews that pointed us towards the best presentation of new Tell topics. The data obtained from the comments is examined first.

In the comment database from June 2000 to January 2001, there were three types of raw data; the number of comments per kiosk, the age of the visitor leaving the comment, and the comment itself. As the first two types are number-based, the analysis was quantitative in nature. First examined were the age distributions, both for the entire Tell system and for each individual Tell topic.

## 4.2 Age Distributions Results

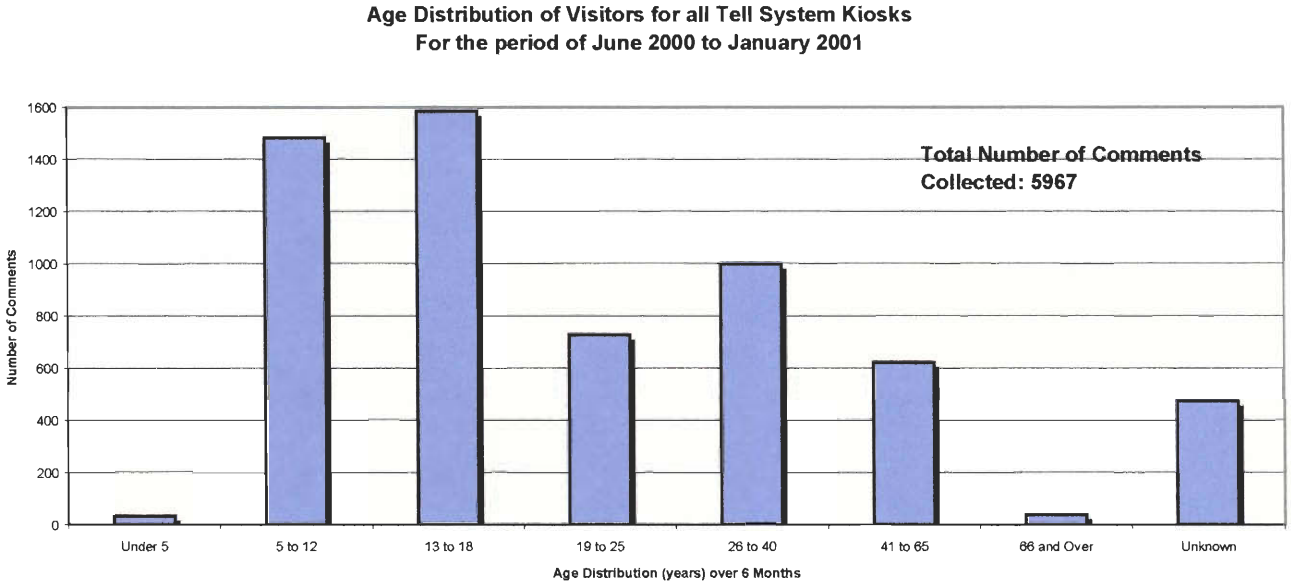


Figure 4.1 – Age Distribution of Visitors for all Tell system Kiosks

During the period of June 2000 to January 2001, there were 5967 total acceptable and edited comments uploaded onto the Tell System. These 5967 comments were reviewed and sorted into the age groups. Figure 4.1 (above) shows a bar graph of the number of comments per age group for the trial period of time.

The visitors who left comments were divided into seven distinct age groups: under 5 years old, 6 to 12, 13 to 18, 19 to 25, 26 to 40, 41 to 65, and finally 66 and older. This was done to break the visitors up into groups such as children, teenagers, working adults and finally senior citizens.

Since Tell is an unobtrusive research method, it does not force a user to input a name and age. Therefore, several entries may have an age of 0, representing a visitor who chose not to input an age. Also, some visitors feel that it is humorous to input an extremely high age (over 110). This is obviously inaccurate. To address this problem, a category to encompass all comments left by visitors of unknown age was generated and all comments with ages of 0 or over 100 were input into this category. This produced eight distinct age groupings.

One major note that must be addressed is the accuracy of the study. Since people can lie about their age, we cannot assume that visitors have input their real age. Although most of the humorous ones have been discarded, a person may adjust their age slightly. When interpreting the data, one must therefore be careful not to draw any distinctions that are based on absolute specifics or boundaries of age. There is a margin of error present in this data, but the Science Museum and our IQP group feel that this type of study is accurate enough to gain the desired results and information sought after.

One will notice that the graph in Figure 4.1 is skewed to the left, showing that the majority of comments left on the system are children and teenagers from the ages of 5 to 18. Museum statistics show that approximately 50% of all visitors are under the age of 18. As the Tell statistics reflect this approximation in its own age distribution, we can conclude that as a whole, equal percentages of each age group that visits the museum make use of the Tell system. This is very useful information because it confirms that no one age group of typical visitors is over-represented in the Tell comments, and therefore Tell reaches out to all age groups equally. The second largest age group are visitors from the ages of 26 to 40. Based on this, we can surmise that this trend exists due to the fact that many children who are not on a school trip are usually accompanied by their parents. These parents would also be exposed to and use the Tell system frequently.

The following material is an analysis of the age distribution results obtained for each individual Tell topic. The trends for each topic will be examined below and the graphs for each station will be referenced to Appendix B.

**Censoring the Internet**

Out of all the age groups, the 19 to 25-year-olds produced the highest number of comments. Approximately 25% [Figure B.1 in Appendix B] of all the comments left by visitors were from this age group. This can show that a large majority of Internet users in this age bracket are concerned about censorship issues. The next highest peak of comments was from the 41 to 65-year-olds, persons of working age. Twenty percent of the comments left on this kiosk are from this age group. Many people in today's world use the Internet both as a means of communication and as a business tool. Thus, those of

working age would indeed be concerned with Internet censorship issues, as is reflected by the peak in this category.

In our examination of each kiosk, we found that there tends to be an age pattern that allows certain conclusions to be made. Each section on each kiosk will examine these conclusions.

**Huntington's Disease**

The "Genetic Testing for Huntington's Disease" Tell kiosk was somewhat different from the others in that rather than posing a controversial question, it displayed a fictional situation and asked visitors what they think the characters should do. The main character, Mark, is asked whether he should take a test to see if he has Huntington's disease. His grandmother did have the disease, so the chances are greater than minimal. There is no cure, so the test would simply be for the knowledge and for medical benefit. If he does have it, his father probably does as well, and so Mark's mother does not want him to take the test, because it would signal that Mark's father only has a few more years to live. Mark wants to know if he has the disease in order to plan out his life.

The age distribution graph found in Figure B.2 in Appendix B is very skewed towards older adults. It appears that the mature and thought provoking nature of this question was skewed more to adults and thus many children and teenagers tended to avoid it. The older population (visitors in the 40-65-age bracket), many of whom may actually have to face this disease, left approximately 44% of all the responses. Only 10% were from 13 to 18 year olds.

**Computer Games**

The computer games Tell topic addressed issues related to the use and abuse of computer games. Of the 289 comments left, approximately 58% were comments left by people with ages between 13 and 25 years old. The remainder was scattered throughout the other age brackets. The fact that there is a majority figure in the age distribution shows that interest in this question was based mainly among the young, who make up the majority of gamers. Figure B.3 in Appendix B displays the computer game kiosk age distribution chart.

**Growing Young**

The Growing Young kiosk supposed that in the future, older people could undertake procedures to make themselves appear young again. Approximately forty-seven percent of the total 198 comments were written by guests between the ages of 18 and 25 and thirty percent of the comments were written be persons of 41 years and older. As is discussed in the content analysis, there were two perspectives to this, and both expressed strong feelings about this issue. However, these feelings were the exact opposite of each other. Interestingly enough, the two perspectives were directly polarised in respect to the two age groups mentioned above. There is a dichotomy between the young and the old.

**Holidays in Space**

This Tell topic asked visitors what they would like to do on and how much they would pay for a holiday in space. "Holidays in Space" had an age distribution that was appropriate to the question. Although not a very controversial question and subject, children were enticed to respond as it allows them to give their creative input into an

interesting subject. As Figure B.5 in Appendix B shows, thirty percent of the 522 comments left on the system were input by visitors over the age of 25, leaving seventy percent for those aged 25 and under. The supposition that this question appeals to the young is thus supported.

**Human Cloning**

Addressing the social and moral effects of human cloning, this question garnered the most responses from 26 to 40 year olds, who left thirty-seven percent of the 397 acceptable comments. The next larger group were adults aged 13 to 18 with twenty-five percent of the total comments. This type of distribution shows that this particular question is a controversial one geared away from children, who would not understand the implications of cloning. It also shows that this is an issue that does not appeal much to the elderly.

**Animal Testing**

Presenting the issue of animal testing for medical, scientific, and business purposes, this kiosk had approximately thirty-three percent of comments from visitors aged between 13 and 18 years, forty-three percent from the age group of 19 to 25 and finally, twenty-three percent from the age group 41 to 65 years. This is a fairly even distribution among the middle of the age distributions. Few comments were left by those younger and older than these groups, showing that the main activism in this group is focused there, especially among young adults.

**Male Pregnancy**

The Tell question addressing the possibility of men having babies is of course most relevant to those of childbearing age. This is reflected in the age statistics, which had three major age groups that composed the majority of the comments. Twenty-two percent of the comments left on the system for this question belonged to the age group of 13 to 18 year olds. The highest percentage, almost one quarter of comments, were from young adults aged 18 to 24 and finally, twenty-three percent of the comments were entered by 41 to 65 year olds.

**Robot Submarines**

One hundred-ninety eight comments were left on this station in the six month time period and the age distribution graph (Figure B.9, Appendix B) yields that 36% of the comments were left by teenagers in the 13 to 18 year old category and twenty-six percent of the comments were left by young adults of ages 19 to 25 years. As this Tell kiosk is located on the first floor, it may have a higher chance of children leaving comments, as the later ones are 'old hat'.

**Performance-enhancing Drugs**

This question, asking what visitors thought of performance-enhancing drugs in sport, has an interesting age distribution. An overwhelmingly large percentage of comments were input by teenagers who are aged 13 to 18 and young adults aged 19 to 15. Both age groups captured 33% of the total comments listed; thus the teens and young adults input over two thirds of the entire number of comments for this kiosk. A large proportion

suggests that people in these age groups are very interested in performance enhancing drugs and sports and are willing to give their views. This is a good example of a modern question that students face and this age distribution chart (show in Figure B.10 in Appendix B) is a good indication of this.

**Self-Driving Cars**

The kiosk for "Self Driving Cars" exhibits similar age distributions as the 'In Future' kiosk, as a large majority of the comments are generated by teens of ages 13 to 18 and then young adults 19 to 25. Finally, the third largest age group are the adults of ages 41 to 65. Of the 275 comments, the teen age group generated twenty-nine percent, the young adult age group input twenty-four percent and finally the 41 to 65 year old age groups generated 20 percent. This question appealed to a large audience, the entire driving population, and thus the comments came from visitors of all ages.

**Sex Selection**

This Tell kiosk asked visitors to leave their comments on selecting the sex of babies. After the age distribution chart was generated, an interesting age trend was discovered. It appears that 30% of the visitors who left comments on this station were in the age group of 19 to 25 years old. This is a popular age for people to have children in today's society and this is a burning issue this age group must address. The large number of comments (280) reflects this group's deep feelings and ideals on the subject matter. It also portrays the relevance and relationship that the visitors found towards this particular topic.

**The Future**

Following the trends of exhibits on the Future section on the third floor, the majority of the comments come from teenagers and young adults. Of the 307 comments left in this station, thirty-one percent were left by teenagers of ages 13 to 18. Twenty-three percent of the acceptable comments left on the system were from young adults aged 19 to 25 and finally the three older age groups of 26 to 40, 41 to 65 and 66 and older contributed approximately eleven percent each. As children would be the ones living in the future and imagining it, they left the majority of the comments.

**Tracking Children**

There were 276 acceptable comments and the largest age groups that left notes were the 13 to 18 group with twenty-six percent, 19 to 25 group with twenty-four percent and finally the adults of 41 to 65 leaving eighteen percent of the acceptable comments on this kiosk. As this question directly affect parents and children, these age groups make sense for a majority in the distribution.

**Intelligent Homes**

The Intelligent Homes Tell question is phrased in a way that appeals to the young (see Appendix D). This is reflected in the age distribution as twenty-nine percent of the visitors who left comments were between 13 and 18 years old and twenty-five percent were between the ages of 19 and 25. The next highest age group were adults between the age of 41 and 65 with twelve percent of the 258 comments left. One can surmise that this is due to the fact that many of these adults are the parents of the children using the Future

exhibit of the Wellcome Wing and are willing to input their concerns and ideas about modern homes and how they can make life easier for us.

**Treating Depression with Drugs**

This kiosk had very high turnouts from the older crowds. Of the visitors who left comments the largest groups were the 19 to 25 and 41 to 65 year olds each contributing to 22% of the total comments. The next two largest groups were the 13 to 18 and 26 to 40 year olds each contributing approximately 17% of the total comments. This very controversial topic had an excellent turnout as well as approximately evenly spaced age distribution, although our content analysis turned up some unfortunate facts about the content of the comments left by visitors.

The differences in age groups that were drawn to each Tell topic is linked to the content and the phrasing of the question. The above data supports this conclusion again and again. By examining the age distribution and combining that distribution with the question itself, we were able to confirm that questions geared towards children in attitude, phrasing, or content will have comments left behind by children and vice-versa. When we put together our own Tell content, these conclusions were extremely important so that we drew an appropriate audience.

## 4.3 Total Comments Per Tell Station

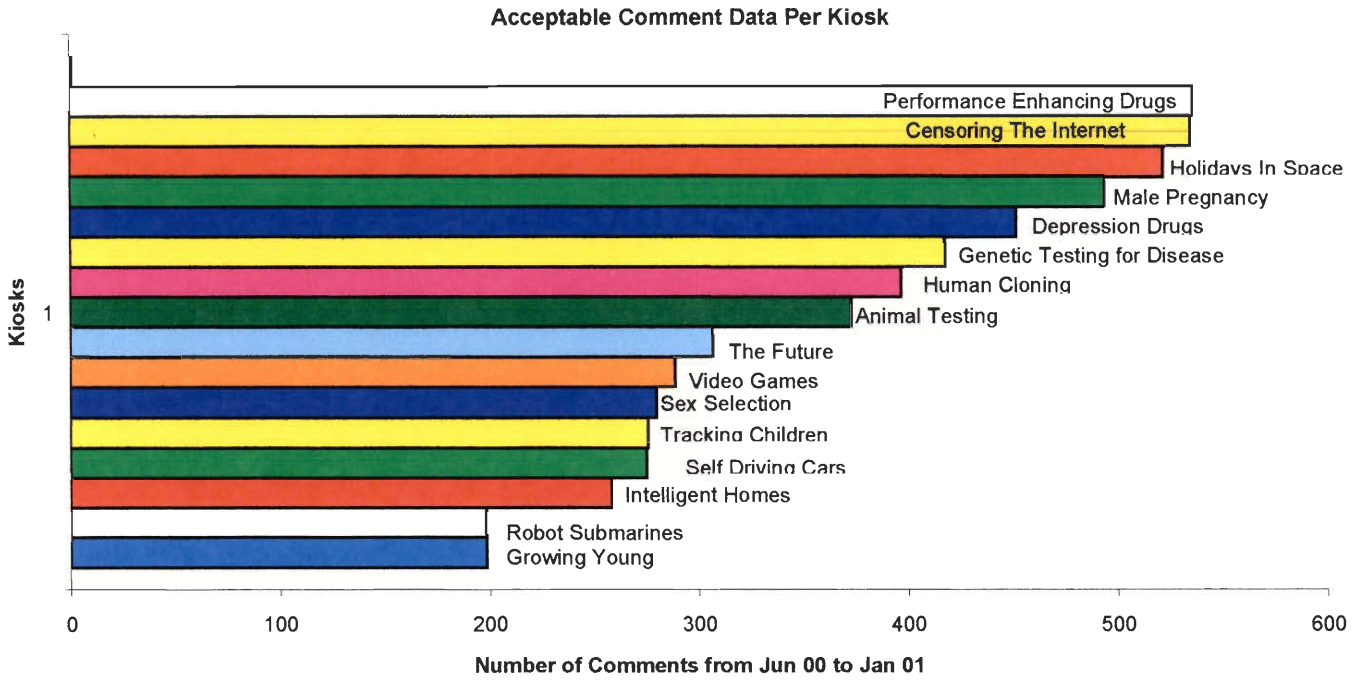


Figure 4.2: Acceptable Comment Data per Kiosk

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The data from the age distribution charts was then summarized and the total number of comments per Tell kiosk was then compiled. Figure 4.2 shows a bar chart of all of the Tell stations along with the total number of acceptable comments left by visitors per kiosk. While this is not a judgment of popularity in any sense, as the data set consists solely of acceptable comments, it is useful as a way to judge what topics prompted people to leave coherent opinions. Treating Depression with Drugs, Performance-enhancing Drugs, Male Pregnancy, Holidays in Space, and Censoring the Internet achieved the highest number of comments, and it can be deduced that these topics were the most emotive and controversial and prompted the most responses.

There are several conjectures as to why some topics ended up with higher numbers of acceptable comments than others. Firstly, any analysis needs to take into account floor patterns. There is a distribution of the kiosks across four separate floors, and part of an explanation for the success of some kiosks may be that upper floors take more effort to reach, or that some kiosks are placed more accessibly than others. This is only a small part of the explanation, as three of the five highest-ranked topics are on the two upper floors.

Another interesting point is that some kiosks did not perform as well as their designers expected. For example, Human Cloning and Animal Testing scored approximately 175 fewer comments than Censoring the Internet. We believe that the media has overexploited these issues in Great Britain and that many visitors lack the continued interest in these subjects to reopen them in their minds. We feel that visitors prefer more original and contemporary issues such as the five highest ranked topics rather than such overworked subjects.

### 4.4 Graffiti Data Comments

Our analysis of the graffiti comments allowed us to compare the computer-based Tell system to the older pen-and-paper based system. When analysed, we found that 74% of all comments left on Tell are graffiti, while 78% of all comments from the pen-and-paper system were unacceptable. The Tell system did reduce the total number of inappropriate/unacceptable comments by 4 percent. While this difference may seem insignificant, the fact that the Tell system is judged under a much stricter set of guidelines makes this percentage more important. Whereas in the earlier system any comment that

mentioned the topic in any way or that voiced any opinion on the subject was left in, Tell's editing policy (see Appendix E) removes this type of comment. Editing tell also removes a higher percentage of repeated comments. This distinction is what makes the percentage relevant for our analysis.

We posit several reasons for the success of Tell in this area. Since the Tell system has a large deal of information to be viewed before any comments can be input, this discourages 'hooligans' from just blatantly typing inappropriate comments on the system. Also, since a greater amount of time must be invested in viewing the background statements, visitors are usually now inclined to leave a real opinion on the system. This helps to make Tell a better system for both visitor interaction and feedback than its predecessor.

### 4.5 Content Analysis

Our content analysis was conducted on each individual kiosk of the Tell system. The intent was to categorise the material left on Tell by identifying certain themes that ran throughout several comments. Comments that fit into these themes were identified by the presence of certain words or phrases that indicate the feelings of the visitor. These indicative phrases and words are explained and associated with the proper grouping in the following section. For each kiosk we have described exactly what criteria of selection we used to assign each comment to a group. If there was any doubt as to the category that the comment belonged in, we assigned it to the "Unable to Group" section. Charts depicting the breakdown of comments for each kiosk and a description of the criteria on which the

comments were categorised are available in Appendix C. The full text of the Tell questions is located in Appendix D.

A successful Tell question produces a high number of comments that reflect both visitor thinking and emotion and argues and articulates a point clearly. The criteria for determining whether a body of comments reflects this success can be determined by conducting content analysis in the manner described below. As an example, the analysis of 'Censoring the Internet' follows as an example of a well-constructed Tell question, one that attracted a diverse group of well-thought out responses, while 'Robot Submarines' comes after as a less successful question, with only a few categories and no real depth to the comments therein. Appendix C contains a transcript of the methods used to conduct the analysis for each Tell question along with graphical breakdowns of the categories.

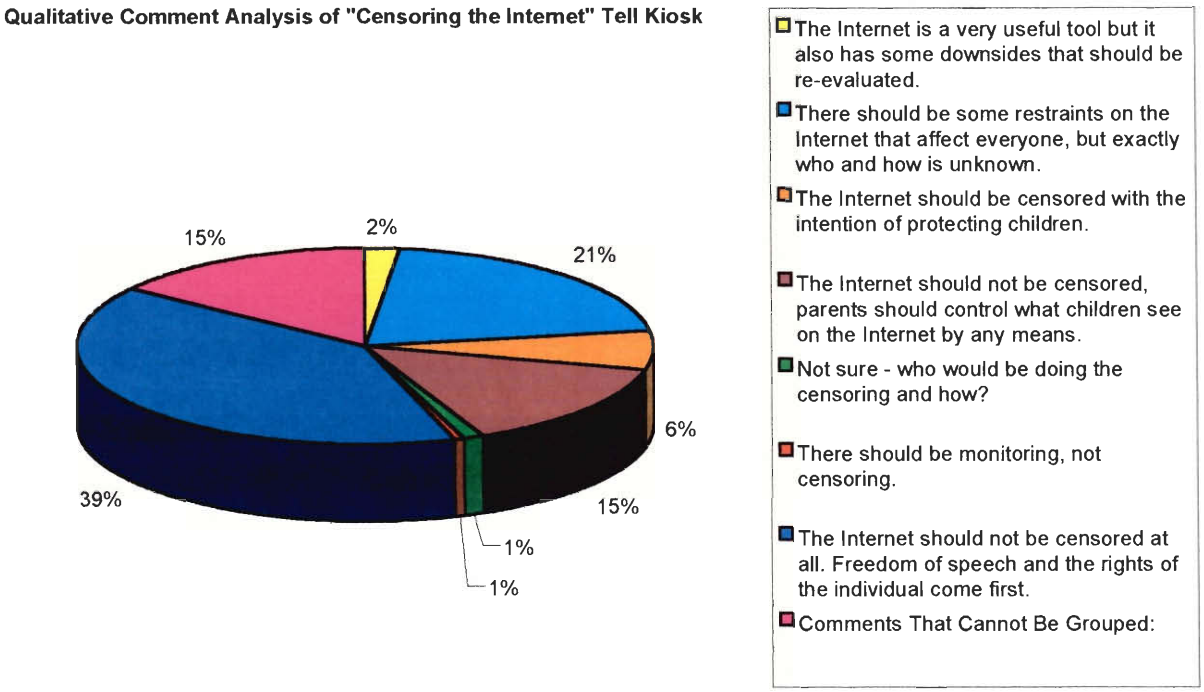


Figure 4.3 – Qualitative Analysis of "Censoring the Internet" Tell Kiosk

The following is a breakdown of exactly what led us to place a comment into a specific category. This process is replicated for each Tell question in Appendix C.

1. **"The Internet is a very useful tool but it also has some downsides that should be re-evaluated."** Comments matching this summary statement contained some form of equivocation. The comment was generally two-fold, with one half listing benefits of the Internet and the other offering the opinion that there should be some control for various reasons. Words such as "not sure" and "two sides" indicated that the comment in question belonged in this category. 1.87% of comments were assigned here.
2. **"There should be some restraints on the Internet that affect everyone, but exactly who and how is unknown."** This group, making up 20.56% of the comments, can be described as those who identified that there was a problem and that some sort of censoring should occur, but did not have any ideas on what to do or how to carry this out. Phrases such as "some censorship" and "some of the things…should be banned" and words that expressed doubt such as "unsure how" can be found in this group.
3. **"The Internet should be censored with the intention of protecting children."** Comments that were categorised here included positive words referring to censorship such as "yes" and "needs to be" modifying the Internet, and contained the words "kids" or "children" as an object of the verb "protect" or "screen". Some comments suggested age limitations on web sites, or age limiting software

packages, but all agreed that censorship of the Internet was necessary to protect the young. The overall percent of comments in this category was 6.36%.

4. **"The Internet should not be censored, parents should control what children see on the Internet by any means."** This section also contained suggestions concerning software packages limiting access to children, but the main difference between this section and the previous is that these comments contain the word "parents" and discuss the fact that parents need to control what children see online. The verbs "limit" or "control" must follow any mention of parents in order for a comment to be put in this section. 14.58% of comments met these specifications.
5. **"Not sure - who would be doing the censoring and how?"** There were very few comments that fit in this section. Several of these comments were exactly the same; "Who censors the censors?" Others questioned who would be in charge of the censors, and some included the word "government", often modified by "don't trust". 1.12% of comments fit here.
6. **"There should be monitoring, not censoring."** This set of comments felt that monitoring was worth more than censorship. All comments here contained the word "monitoring" and modified the word "censorship" with negative associated words. The percentage of comments here was 0.56%.
7. **"The Internet should not be censored at all. Freedom of speech and the rights of the individual come first."** These comments made up the majority. They contained the words "freedom of speech" or "individual rights" in almost every case. Some suggested that if someone did not want to look at something, they

could choose not to, while others discussed that censorship is one step on a slide to total control. Many have modifiers for the word "censorship" that had negative connotations, and many others mentioned that the Internet is the last place left where there is total freedom of speech and wanted to maintain this status. The percentage of comments falling into this category was an even 40.00%.

8. 14.95% of comments could not be grouped.

"Robot Submarines" was less successful; the quality of the comments was low and many could not be grouped into relevant categories, as is seen below. This topic was not very controversial and lacked a personal connection with the visitor.

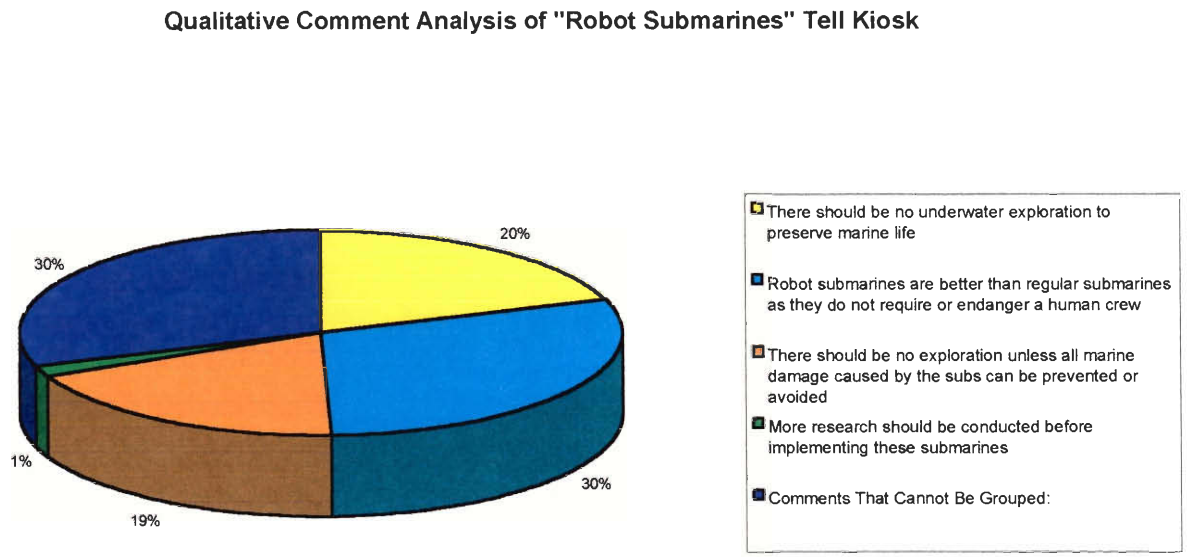


Figure 4.4 - Qualitative Comment Analysis of the 'Robot Submarines' Tell Kiosk

1. **"There should be no underwater exploration to preserve marine life."** Comments in this category condemn all undersea exploration, manned or unmanned, due to the interference of man with marine life. These comments stress that man is "destroying" the undersea environment and "disturbing" things better left alone. Words such as "destroy" and phrases such as "leave it alone" without any other points in the comment indicated that the visitors' feelings were most closely aligned with this category. 19.61% of comments on this kiosk were in this vein.
2. **"Robot submarines are better than regular submarines as they do not require or endanger a human crew."** This set of comments extolled the virtues of unmanned submarines as they did not endanger nor require a human crew. Words such as "safe", "safer", "no risk", and "more accessible", when not accompanied by other negative words are what placed a comment into this category. 29.90% of comments fell into this grouping.
3. **"There should be no exploration unless all marine damage caused by the subs can be prevented or avoided."** Visitors who felt that exploration of the sea with robot submarines was acceptable with the qualification that no marine life was disturbed in any way were responsible for this set of comments. This qualification was what marked a comment as belonging to this group. The phrase "only if" or "not unless" followed by the qualification above was the common trait of these comments. 18.63% of the comments belong to this category.
4. **"More research should be conducted before implementing these submarines."** Some visitors were concerned with the effects of the robot

submarines on wildlife, especially in the area of sonar and radar interference. The phrase "more research" and "must be conducted before" characterised this group. The percentage of comments that matched these criteria was 1.47%.

5. 30.39% of comments could not be grouped.

Through our content analysis, we found that there were three main indications of the success of a Tell question. The first of these is a high number of different categories that comments fell into. In the above graph, there are a total of seven discrete categories, each representing a separate theme that ran through the set of comments. This is a high number of groups when compared to other kiosks. When there are many different groups of opinions, it is a sign that the question engendered much discussion and that visitors responded to others' comments. Figure 4.4 shows the 'Robot Submarines' Tell content analysis, and it is easy to see that with only three discrete themes, there was not a lot of differing opinions or cross-visitor commenting.

The second sign of a successful Tell question is a low percentage of comments that could not be grouped. This percentage is 15% for 'Censoring the Internet', and 30% for 'Robot Submarines'. The reason this is an indication of success is that this group is generally made up of comments that relate only vaguely to the question, or comments that were barely acceptable. A high number in this category shows that there was less of a discussion or opinion giving, and more of a random commentary.

Finally, categories that are close to 'yes' or 'no' are indicative of a closed-ended question. This is a good way to identify questions that are not open-ended enough, as they allow the comment to simply be affirmative or negative and discourage an active

dialogue. Some of the categories in Figure 4.5 fall into this category, as well as more notably the 'Male Pregnancy' chart, which can be found in Appendix C.

A discussion of the results from each individual kiosk not examined about follows.

**Animal Research**

It is clear by this analysis that the number of comments supporting animal research is slightly higher than the number opposed, with a smaller group than either approving of animal testing solely for medical purposes. Some concerns that ran through the comments included the condemnation of cosmetics testing and avoiding irresponsible behaviour in this field.

**Computer Games**

There were both negative and positive responses to this question in a fairly broad range of categories. The most interesting thing about this set of comments was the correlation between age and grouping. The majority of those under the age of 18 fell into the first category, and it seems logical to conclude that since the majority of gamers are under the age of 18, the majority of comments in that age range would be supportive of gaming. This was supported by our content analysis. In contrast, many of those who were concerned about violence were parents. Interestingly, those who were concerned about antisocial behaviour were split between the old and the young.

**Treating Depression with Drugs**

This kiosk produced a very interesting range of responses. This was the only kiosk in which a significant number of the responses misunderstood the meaning of the question. There was also a fairly even split of opinion, with no clear leader in the percentages. The categories we found follow. The fact that the categories were extremely evenly split implies that there are several different ways of looking at this issue, and that there is not one main consensus. Also important is the fact that the question was misunderstood by 13.97% of all visitors. This implies that the question needs to be clarified to make it clear that illegal drugs are not the issue at hand.

**Growing Young**

The categories were again many and varied. 55% of the people leaving comments on this station seem to disagree with the idea of growing young, while only 38% were exited about it. It is important to note that most of the comments disagreeing with the topic have a clear statement of why they do not agree while the vast majority of comments agreeing simple agree without giving much reason why. Again, some restructuring of the question may be necessary.

**Human Cloning**

In the topic of Human Cloning, we found a wide range of responses, which could be summed up as follows. 43% of the comments ultimately agree with the idea of cloning while 51% of them disagree. Most of the comments are backed up with concrete opinions although most of these suggestions vary significantly. The close margin

between people agreeing and disagreeing (with cloning) show that the world faces a big dilemma and finding a solution to it will not be the easiest task.

**Huntington's Disease**

This is the first of two Tell questions that generated a category into which more than 50% of comments fell. It seems that individual determination is very important to most visitors and that in their eyes knowing about the presence or absence of the disease is more important than preserving ignorance on the matter. Also, as this was a successful question on the age distribution, number of acceptable comments, and the variety of content categories, it is worth recommending that alternative methods of presentation are a way of attracting visitors to comment.

**Intelligent Homes**

The low percentage of comments that could not be categorised is interesting. This kiosk apparently generated very few comments out of the categories found in the body of the comments. This content was not very controversial, and in our experience with non-controversial topics, the content is either very similar, or wildly different. This kiosk seems to have produced a similar grouping.

**Male Pregnancy**

A surprising variety of responses resulted from this question, most of them in the negative towards the idea of male pregnancy. The existence of substantial amounts of

'yes' and 'no' responses indicates that the scenario needs to be reworded in order to make it more open-ended.

**Performance Enhancing Drugs**

. Regardless, this kiosk resulted in the most overwhelming majority viewpoint throughout the entire Tell system. It is interesting that such a large majority of comments in this group thought that the idea of performance enhancing drugs in sport was terribly unfair. This is the closest the Tell system came to producing a general consensus on a topic.

**Self-Driving Cars**

Responses were not terribly varied, but raised a number of interesting points on the subject. Self-driving cars may be in the future, and there is some support for the idea, but they are not yet universally accepted in this day and age.

**Sex Selection**

The presence of another category with a 'yes' response may indicate that some rewording of this question might be useful. Sex selection did result in a larger number of categories than some other kiosks, and the variations were emotive. This topic is still a strong one.

**Tracking Children**

This topic was fairly controversial, and led to an almost complete polarisation of viewpoints left on the system. Tracking children is a very controversial subject. It is

interesting to note that the majority of visitors against the idea were younger than 25, while those that supported the idea were generally in the age range of parents and above.

**Holidays in Space and The Future**

Two Tell kiosks were unable to be analysed in this manner. These included the "Holidays in Space" kiosk and "The Future". Both of these, when examined, had such a wide variety of comments that any attempt to group them appropriately would have been ridiculous. "The Future", especially, was unable to be grouped because the question was so open-ended; it asked what visitors thought the future was going to be like in general. "Holidays in Space" was also general due to the fact that it asked what a visitor would like to do on a vacation in space, and the variety of answers to that question was simply enormous. For these reasons, neither of these two kiosks is featured in our content analysis.

Our content analysis revealed a number of pitfalls to avoid in putting together our new content and engaging the audience. Content that is controversial, emotive, and has a wide range of responses is the most effective and results in the best response rate and response quality. Content which allows the visitor to answer 'yes' or 'no' or content that lacks an emotive connection with the visitor is often ignored or produces few differing views. When we put together our new content, we were sure to keep this in mind.

The Tell database analysis allowed us to learn what exactly made up a good Tell question as far as gearing a question towards a certain age group, the emotive content of the question, and the type of question that gives the highest quality turnout of responses.

This information was invaluable when used as a background for selecting the new topics and putting together the new content to update the Tell system.

The next chapter discusses procedures for putting together new content and recommendations on what should be sought out or avoided when choosing new content and why.

# Chapter 5 – Construction of New Tell Content

As the Tell data analysis progressed, research was being conducted at the same time to determine current and controversial topics that could possibly be used as new Tell content. As has been previously stated, we explored the following proposed topics: stem cell research, euthanasia, the selling of eggs and sperm by models and celebrities, and the legalisation of marijuana for the 'Who Am I?' section and cyborgs, Internet privacy, wireless tracking, and Digital Divide for Digitopolis. Based on visitor surveys and the results of our analysis, we chose to implement Stem Cell Research, Euthanasia, and Internet Privacy as new Tell topics.

**New Tell Topic Formulation**

Before any new content can be generated for the Tell system, background research must be conducted. After we conducted research on the Internet to determine what contemporary issues in science and technology were current, intellectually challenging, and offered the possibility of a thought provoking, stimulating response, the group narrowed the choices down to eight. Four of these dealt with human genetics and biology, and the other four addressed issues in digital technology. This reflects our choice to update two kiosks in the 'Who Am I?' section of the Wellcome Wing, and two in 'Digitopolis'. These topics were stem cell research, euthanasia, the legalisation of marijuana, and the selling of supermodel/super genius egg and sperm for 'Who Am I?', and cyborgs, Internet privacy, wireless tracking, and the Digital Divide.

The next step was to conduct formative interviews with museum guests in order to determine which of these we should select as new topics. Based on the results of these

interviews, four new topics were selected to form into a Tell package to update four new Tell kiosks.

**Formative Interview Data**

The two main factors we took into account when evaluating the survey results were the number of votes for each topic and the quality of the sample response left by the interviewee. When tallied, the highest number of votes of interest for 'Who Am I?' was nine for stem cell research, followed closely by euthanasia with eight. The legalisation of marijuana and selling of human eggs and sperm received six and five votes, respectively. Both euthanasia and stem cell research produced quality intellectual responses, and so we selected them for implementation.

The 'Digitopolis' survey returned clear winners with twelve votes for Internet privacy and ten votes for cyborgs. However, when we analysed the sample responses for cyborgs, we found that they consisted mainly of positive or negative comments with little real thought exhibited. Based on this information, we selected only one topic to implement in this gallery.

Our surveys also produced some interesting ideas for new Tell topics that may be of use to the Science Museum in the future. For the 'Who Am I' section, visitors recommended the Greenhouse effect, diseases, genetics and animal genes, psychological issues, workings of the human body, medicine, speech centres in the brain, drug use and research, genetic engineering, breast cancer, and genetically modified foods. For Digitopolis, they suggested mobile phones, the armed forces, current events, workings of computers and the Internet, chips, and the significance of existence. The surveys also

gave us some indication of what background information would be required in order to formulate an educated response.

## New Tell Content Research

Once we had selected the topics, we conducted further research as an aid in writing informed and knowledgeable scripts. The following are the results of this research.

### Internet Privacy

With increased Internet access comes an increased concern over the issue of Internet privacy, another issue we researched. The wide application of Internet technologies raises questions on the privacy of the net users. There have been calls for tougher legislation to protect people's privacy as their details are fed into computers and into the Internet. Companies and organisations on the web have been accused of collecting personal data on their users and selling this information to other persons or companies for commercial purposes. Based on a study by Advocacy group Consumers International (CI), European websites are no better at protecting the privacy of visitors than their American counterparts despite tighter EU regulations.

Advocacy group Consumers International (CI) is advising net surfers on both sides of the Atlantic to be wary of details they submit online, because companies are failing to tell them how that information is being used. Two thirds of British and American websites surveyed were found to collect personal data, but only a few gave visitors the option of how this data would be used.

Consumers visiting a range of retail, financial and health websites were often given no choice about being added to mailing lists or their details being passed on to third parties.

Anna Fielder, a Consumers International director, said: "We've found that too many companies collect a lot of unnecessary, very personal information about their customers.

"Because of inadequate implementation of existing government measures, people don't have control over their data." [BBC News Online, 2001].

Responsible policing or inappropriate prying - that is the debate in the UK over whether the government should have the power to read your e-mail or track your surfing on the web. Ministers argue that the Internet is easily harnessed for crime and so the power to intercept electronic communications is essential. But critics have been fierce in their opposition, describing the proposed laws as appalling, objectionable and bad for business. Civil liberties groups say the laws, if passed, would invade privacy. They are also worried about one proposed power which could jail people who cannot prove they never possessed the key to encrypted information found on their computers. Business says that, if the cost burden for snooping equipment is placed on them, the UK's competitiveness in e-commerce will suffer [BBC News Online, 2000].

**Euthanasia**

Euthanasia is one of the most important public policy issues being debated today. It consists of allowing people to choose assisted dying in the event of a terminal illness in which he lacks consciousness or the ability to communicate. Euthanasia will profoundly affect family relationships, interaction between doctors and patients, and concepts of

basic morality. Many people object to euthanasia on moral and religious grounds, but others counter that sometimes it is the only moral thing to do. This loaded issue would definitely be appropriate as a topic on the Tell system, as it would engender a wide variety of responses.

**Stem Cell Research**

Stem cells refer to 'cells that can develop into many different types of tissue, such as bone, muscle or brain. There are three basic types. "Totipotent" stem cells - the cells formed when a fertilised egg first divides - can turn into any type of tissue and form a "total" organism. About five days after fertilisation, a hollow ball of about 100 cells called a blastocyst forms. The cells on the outside develop into the placenta, while those on the inside turn into the embryo itself. The 50 or so inner cells are "pluripotent" - they can turn into almost all types of tissue, but not a whole organism. As the embryo develops further, stem cells become "multipotent" - they can give rise only to specific kinds of cells. Totipotent and pluripotent cells are also called embryonic stem cells, and multipotent cells are also known as adult stem cells.' [NewScientist.com, 2001]

The controversy arising from stem cell research is a result of their only source, the human embryos. This is why many pro-life organisations are opposed to this kind of research. Pro-lifers say that it is 'immoral to end the blastocyst's potential for life' [NewScientist.com, 2001], and also suggest that there is a risk that people may want to clone themselves. Nevertheless, various world governments have given the go-ahead for this kind of research in the medical arena.

We then turned to the actual construction of the scripts for each topic. Rather than the older Tell questions (see Appendix D), we decided to contact important people in the fields that we were looking into, and get their opinions as well as check for factual accuracy for the movie clips for Tell. The comments, edited by the various specialists, were then transformed into video clip. Museum staff and WPI project team members were the actors and actresses.

After the introductory clips were filmed and edited, we transcribed them and created a set of scripts that contained both the text of the movies and the condensed background research that is posted in the 'More Information' section of Tell. These were sent to the Science Museum staff for approval. When that approval was received, we uploaded the new content onto the system and confirmed that all was functioning as intended.

It is important to note that it is strictly necessary to confirm with experts the factual accuracy of any content to be posted on the Tell system. Incorrect phrasing or word use can invalidate a Tell question or mislead visitors. Such misinformation is unacceptable for the Science Museum and for the Tell system.

By conducting our analysis, we learned what made up a good Tell question. It had to relate directly to the visitor in some way, produce an emotional response, and address a contemporary issue in science or technology. By following these principles, we created new Tell content that is interesting, educational, and controversial.

**New Content Scripts**

In order to upload the new content onto the Tell system, scripts on Stem Cell research, Euthanasia and Internet Privacy were prepared. The scripts contain introductory comments on the various topics and also further information on the topics. Video clips

with museum staff and the WPI Project team as actors and actresses were filmed. The video clips contain introductory comments for Tell. The actual scripts are as follows:

**Feedback point content document: Stem Cell Research**

DK, SM, DS, DY 20/4/2001

**Top level question:** Tell us what you think about stem cell research using human embryos

## Script:

Interviewer: We want you to tell us what you think about stem cell research using human embryos. Listen to what these people have to say, then type your comment.

Research into the therapeutic potential of both embryonic and adult stem cells should be allowed, in the interests of patients who could benefit from new treatments. We have to use embryonic stem cells – adult ones just aren't as useful.

Research at the expense of living human embryos just isn't right. It's immoral and it needs to stop.

It is not such a brilliant idea to just ignore research that can lead to medical discoveries like those promised by stem cell research –it is too valuable to dismiss but there is need for a thorough code of conduct.

**Further information:**

**So what are stem cells, exactly?**

Stem cells are cells that can develop into many different types of tissue, such as bone, muscle or brain. In theory, they could be used to grow new cells to replace those parts of the body that are damaged because of injury or disease.

**Which ones will doctors use?**

Most scientists think the stem cells with the greatest medical potential are the ones that come from human embryos. These embryonic stem cells allow researchers to produce the widest range of different tissue types. Research into stem cells could lead to treatments for diseases such as Parkinson's, Alzheimer's and insulin-dependent diabetes.

**So where would you get them?**

Because the most useful stem cells come from embryos, pro-life groups are opposed to stem cell research. Three research groups around the world have found ways to grow potentially limitless supplies of inner cells that can turn into almost all types of tissues in the lab - but these did come from embryos in the first place.

**In the news**

In December 2000, UK politicians, voted decisively in favour of extending the research that can be done on human embryos. As it stood, the law only allowed research using human embryos up to 14 days old and for strictly limited purposes relating to infertility. The amendment extends the law so that early-stage embryos can also be used for research into non-congenital diseases.

**Feedback point content document: Voluntary Euthanasia**

**DK, SM, DS, DY** 20/4/2001

**Top level question:** Tell us what you think about voluntary euthanasia?

## Script:

Interviewer: We want you to tell us what you think about voluntary euthanasia. Listen to what these people say, then type your comment.

We allow animals in pain to have a dignified death, how can we justify denying human beings the rights we give to a dog?

'Mercy killing' is ethically and morally wrong. Taking away someone's life simply cannot be justified. We should not interfere with nature.

Although euthanasia raises serious ethical and moral issues, doctors have the responsibility of helping terminally ill patients, and euthanasia is one of the options. Nevertheless, there is need for a thorough code of conduct to ensure that the practice is not abused.

Will we end up with a situation here older people are being pressured into euthanasia by doctors looking to save money or relatives tired of caring for them?

**Further information:**

**What is euthanasia?**

According to the Voluntary Euthanasia Society, a modern definition of euthanasia is: "A good death brought about by a doctor providing drugs or an injection to bring a peaceful end to the dying process." The Pro-Life Alliance defines it as: "Any action or omission intended to end the life of a patient on the grounds that his or her life is not worth living.

**Types of euthanasia**

Three classes of euthanasia can be identified - passive euthanasia, physician-assisted suicide and active euthanasia - although not all groups would acknowledge them as valid terms. Active euthanasia occurs when a doctor administers medication knowing it will shorten a patient's life. Passive euthanasia is an alternative name for withdrawal of treatment - the doctor withholds life-sustaining treatment. Physician Assisted Suicide: A physician supplies information and/or the means of committing suicide (e.g. a prescription for lethal dose of sleeping pills, or a supply of carbon monoxide gas) to a person, so that they can easily terminate their own life.

**Euthanasia in Holland**

Holland recently became the only country in the world where euthanasia is legal. In all other countries, practising euthanasia is considered a criminal offence sometimes classed as murder or manslaughter.

**First Legal Euthanasia Machine**

The first legal euthanasia machine was in the Northern Territory of Australia, but the country's government quickly overruled the state government. You can see a machine used by four terminally ill people to kill themselves in 1997 on the ground floor of the Wellcome Wing.

**Strict Rules for Legal Euthanasia**

The new Dutch law insists adult patients must have made a voluntary, well-considered and lasting request to die; that they must face a future of unbearable suffering and that there must be no reasonable alternative. A second doctor must be consulted and life must be ended in a medically appropriate way.

**World Debate after Dutch Euthanasia Legislation**

The Voluntary Euthanasia Society in Britain called the Dutch legislation ``part of the global trend of the general public taking control of how they live and die.'' Belgium and Spain are also considering changing the law on euthanasia.

**Euthanasia in the UK**

In the UK, so far, there have been only a few court cases revolving around the question of euthanasia. The true extent of how many people are helped to die is far from clear.

## Feedback point content document: Internet Privacy

**Top level question:** Tell us what you think about Internet privacy

**Videos:**

> We'd like you to tell us what you think about Privacy on the Internet. Listen to what these people say, then type your comment.
>
> Tapping phone lines is no longer enough to track criminals and terrorists. They're now using computers, so the police need to be able to track them there too. If they can't, then the bad guys will just get away with it.

My boss can look at all my emails, and I don't think he has the right to snoop on my private life, however I may decide to live it.

If I'm paying someone to do work for me, I expect him to do it. Every minute an employee spends on the Internet is time in which he does no work and this affects the company. I want a way to know the computer habits of my employees and punish those that are wasting my time.

**Further information:**

**Privacy in the business environment**

Many cases have been reported of employees sending dodgy emails or accessing suspicious websites at work. Employers say they have a right to know when their systems are being abused like this. Even just using email to arrange where you're meeting your mates constitutes slacking on the job.

**Leaving traces behind**

Every time a web page is accessed, the company that manages it keeps a record of the visit. By accessing a web page, bits of personal information are left behind. However, how much of your information remains on the site can be controlled by software that is available in the market.

**Tapping the Internet**

As technology progresses, terrorists and anti-social groups find new ways to communicate without being detected by authorities. Criminals are now using the Internet to communicate and the authorities want to track them. However, civil rights groups claim that in trying to trace these people down through the Internet, privacy of law-abiding citizens is being violated.

Using the results of the analysis, we crafted these questions to be both emotionally evocative and appealing to a large audience. Two of the three are phrased so as to appeal

to more mature audiences (Stem Cell Research and Euthanasia), and one for a wider, younger audience (Internet Privacy). The phrasing of the questions is such that it attempts to involve the reader directly and draw out their opinions. Finally, we attempted to make the questions as open-ended as possible to discourage simple positive and negative answers. We believe that taking these steps will result in the success of these new Tell questions.

# Chapter 6 – Conclusions and Recommendations

The Tell system is one of the latest developments in the trend of bringing interactivity and visitor involvement to museums. By allowing visitors to present their opinions to the museum, the experience of being a part of the exhibition material is heightened. Our analysis allowed us to complete the update of the Tell system in a way that pays attention to the facets that make a Tell kiosk successful.

## 6.1 Statistical Analysis Conclusions

The total number of comments for each kiosk between June 2000 and January 2001 were tallied and compared. We determined that several Tell kiosks had higher numbers of acceptable comments left by visitors than other kiosks. The kiosks that had the most comments were the ones that combined an emotionally evocative question with a thought provoking and educational concept. In the future, this kind of data can be used to track and determine questions that were more popular or intriguing than others. Questions to come should bear in mind all of the aspects that we found that affects the success of a question, from clarity to openness to intended audience.

A comparison of Tell to a previous pen-and-paper system revealed that the percentage of graffiti comments was slightly lower on Tell. While the percentage was close, the fact that the two systems were judged on a different basis makes this difference significant. The Museum has much stricter criteria for comment acceptablility than the other system, so the fact that nonetheless the percentage is lower shows that the Tell system is an improvement as far as graffiti is concerned.

**Age Distribution Conclusions**

Overall, the main conclusion that we draw from the analysis of the entire Tell system's age distribution is that it corresponds to the Science Museum's understanding of the general distribution for all the visitors; that is, 50% school age, with the rest of the visitor population distributed between the ages of 19 and above 65, with a swelling at parenting age. This shows that the age distribution of Tell system users is similar to that of the museum in general and that Tell neither excludes nor focuses on one particular age group.

The relation of the age group of visitors to the topic they commented on is worth noting, and two major points were determined. First, each Tell question had a certain age range based on the type and depth of the question. For example, a question that had a lighter tone such as "tell us what you think about self driving cars", a higher percentage of the audience were children around the ages of 5 to 12. This type of question allows children to express their creative comments while still contributing to the collective.

The second type of question contained a highly controversial modern scientific issue. Children were not as interested in this type of question, and the data clearly shows that the majority of visitors who answered this type of question were older persons such as adults with children.

Although not officially planned during the development stages, some questions seemed to appeal to a pre-set age group. These topics had a higher percentage of responses from that age range. For example, the question on sex selection had a very high turnout of persons between the ages of 18 and 26. As this is a common age for people to begin to have children, we were able to conclude that the subject of a question directly

affects the age distribution of the respondents. The age distribution analysis provided much information on the types of people that visit each station and may be used in the future to base new questions around a certain age group.

### Highest Number of Acceptable Comments Conclusions

Throughout the Tell system, some kiosks generated a higher number of acceptable comments than others. This does not necessarily mean that a particular kiosk is more frequently visited than others, but it is an indication of what types of Tell questions and kiosks work better than others.

During the months of June 2000 to January 2001, there were four main Tell kiosks that had the highest number of acceptable comments left on the system. These kiosks include Treating Depression with Drugs, Performance Enhancing Drugs in Sports, Holidays in Space, and finally Censoring the Internet. A combination of factors explains the success of these topics, ranging from physical kiosk location to media overexposure. The most important reason, however, is that these subjects were presented in a way so that visitors were able to relate personally to the topic at hand, and thus interaction was facilitated.

### Graffiti and Comparison to Pen-and-Paper Conclusions

Although the 4% advantage of the Tell system graffiti content over the formerly used Pen-and-Paper system initially seems insignificant, the stricter statutes set by Tell make this difference much more important. The success of Tell in this area points not only to time and staff savings by the Science Museum but also a heightened visitor interest in

responding appropriately to such systems as Tell. We believe that these reasons, when taken together, suffice to prove that Tell is the superior method of providing visitors with an interactive way to express their thoughts and opinions on science and technology.

### 6.2 Qualitative Kiosk Analysis Conclusions

By analysing the content left by visitors, we were able to gain an understanding of what Tell topics led to a richer set of comments. Also, from a complete content analysis on each of the individual Tell kiosks, we were able to understand how visitors actually felt on certain theories and ideas. It was surprising to see that many people, although not phrased exactly in the same manner, have very similar opinions on topics. For example, on the Censoring the Internet kiosk, many people feel that the Internet should not be censored at all due to freedom of speech.

By examining the types of comments left by different visitors, it was not only possible to determine the way museum visitors felt about the topic but there was also a correlation to the quality of the Tell exhibit. For example, some kiosks had comments that were strictly closed responses such as yes or no. Due to the closed nature of the responses that the visitors could leave, it was not possible to clearly determine their exact feelings. Also, several kiosks were not controversial enough to allow a variety of responses and opinions

Overall, the three main points that content analysis revealed to be important for the quality of a Tell question are the number of comments that can not be grouped, the number of discrete categories that comments fell into, and the presence of simple yes-or-no responses as a significant portion of the comments. The presence or absence of these

qualities was indicative of the quality of the responses. Future developers of new Tell content should keep these three determining factors in mind when selecting and developing topics.

### 6.3 New Tell Exhibit Conclusions

The data we obtained and the conclusions we drew from it while planning the implementation of new Tell content is worth reviewing. We determined that the Museum's process of preliminary research needs to place emphasis on the different audiences that Tell attracts. The Museum should use questionnaires as they play an integral part in the formulation of new Tell material as we determined during the course of this project. First, the content was examined by conducting preliminary research and interviews that enabled us to determine the most popular topics to generate new content on. The new topics of discussion include Stem Cell research, Euthanasia and Internet privacy.

Our formative interviews were structured so as to not only gather visitor votes for new topics, but also gain a preliminary view of what sort of comments might be left for their topic of choice. The results of this additional piece of data were almost as important as the votes themselves. Based on the comments left by visitors hoping to see cyborgs as a new Tell topic, we rejected the idea as too close-ended and lacking in controversy. Again, future developers should definitely conduct a preliminary trial of any new topics before settling on them permanently.

## 6.4 Recommendations

Based on the research, data analysis and exhibit generation, several recommendations are suggested as to the improvement and implementation of future Tell Stations. These recommendations will assist in the development of new questions in by both setting outlines for a target audience as well as question formulation.

After background research has been conducted and a possible question topic has been selected, a target audience age must be determined. This was seen in the age distribution analysis. Thus, a range of questions that appeal to appropriate age groups should be selected to reflect the general age distribution of the museum visitors.

Secondly, the questions that are formulated for Tell should be very controversial and provide an opportunity for the visitor to expand on what they and others feel. A topic that has multiple opinions yield the best comment results and are the leading kiosks in number of comments left on the system. By following these guidelines, the interactivity inherent in the system can be utilised to the utmost. The Science Museum Tell System is a powerful interactive tool and it embodies the inspiration that has led museums to make their exhibitions involve the visitor more directly and interactively.

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# Appendix A - A Description of the "Tell Us What You Think" System

The "Tell Us What You Think" system, referred to in this document as the "Tell" system, consists of two main sections: the front end (the part viewed by the visitors) and the back end (the underlying database and structure) that is run and maintained by Science Museum personnel. These two sections make up the totality of the Tell System; visitors view scenarios and input comments via the front end and then the back end administrators are allowed to view, edit and post the comments for the public to read. The following sections outline the procedures and sections of the entire Tell System. All pictures are used with permission of the Science Museum.

### Tell Front End

The front end of the Tell System is the direct link between museum guests and the database. These links are made up of large display screens located throughout each floor in the Wellcome Wing. These screens have moving screen savers to entice the visitors to touch the screen to begin the session. Once the users have touched the screen, a series of movie clips run to give visitors background information on the scenario posited by the system and the question this kiosk asks the visitors. The visitors are then invited to view previous visitors' comments and/or add their own.

There are two main types of Tell stations located throughout the Wellcome Wing. The first offers a physical keypad under the screen, while the second variety presents an on-screen keypad. Figure 3.1 shows a typical Tell station with an external keypad.

Figure A.1 – Tell System with External Keypad (Science Museum, 2001)

The other Tell station contains a similar touch screen monitor. However, a small on-screen keypad replaces the external one. This allows the screen to be mounted on any surface and saves space. Figure 3.2 displays a touch screen keypad Tell station located on the second floor in the Digitropolis section of the Wellcome Wing. The picture to the left displays the entire Tell screen, while the picture on the right clearly displays the on-screen touch keypad.

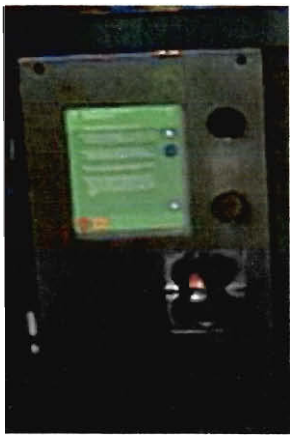


Figure A.2 – Tell System with On-screen Touch Keypad (Science Museum, 2001)

## Tell Back End

While the front end of the system is important, it is the back end of the Tell system that is crucial for this project, as it contains the raw data available for analysis as well as offering a method of updating the kiosks. The following sections of the Tell database have been examined.

### Main User Screen

The main user screen of the database allows access to all functions of the program. From the main user screen, a specific kiosk and question can be accessed. In this section, members of the Museum staff can edit, update, or rearrange the entire set of comments. The main user screen is the central control for the system and is used to access any other nested systems in the database. Figure 3.3 displays a screenshot of the main user screen of the system (courtesy of the Science Museum).

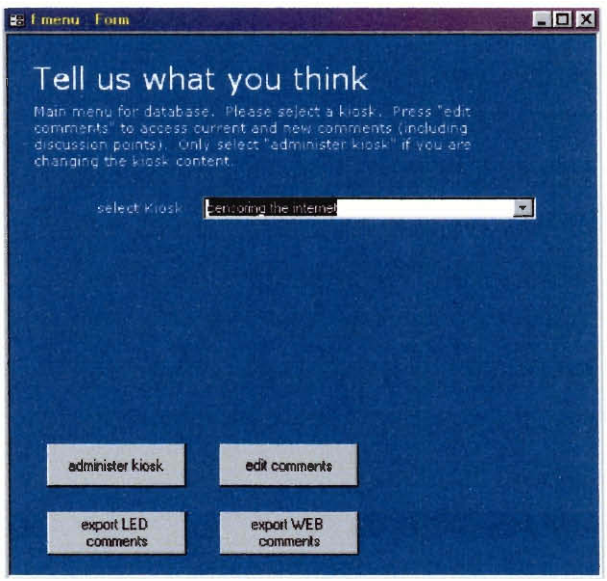


Figure A.3 – Main User Input Screen (Science Museum, 2000)

### Administer Kiosk Menu

The administer kiosk menu gives Science Museum personnel the administrative privileges needed to edit and update discussion points and questions for each Tell kiosk. In this screen, the scenario text can be edited, new film clips can be inserted, system properties can be changed, and the kiosk can be backed up.

### Edit Comments Menu

Science Museum staff use this section of the database to edit comments. This creates the task of determining which comments are acceptable and which should be edited or deleted altogether. Figure 3.4 displays the initial edit comments menu. From this menu, the user can select edit new comments and then select a kiosk. After this has been completed, the user can view all new comments, analyse them and then select which comments to leave on the system for all to see. Figure 3.5 shows a typical edit new comments screen for the Internet Censorship Tell kiosk.

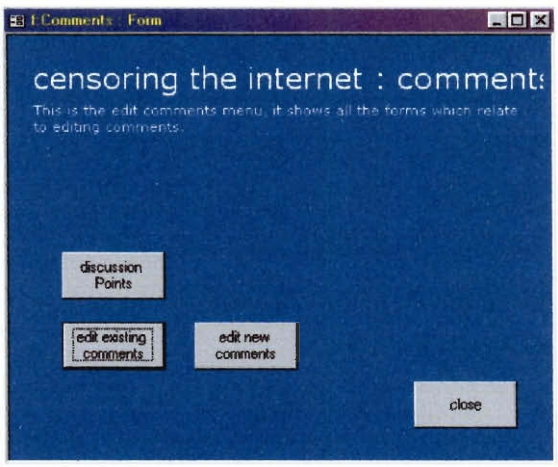


Figure A.4 – Edit Comment Menu (for the Censoring the Internet Kiosk)

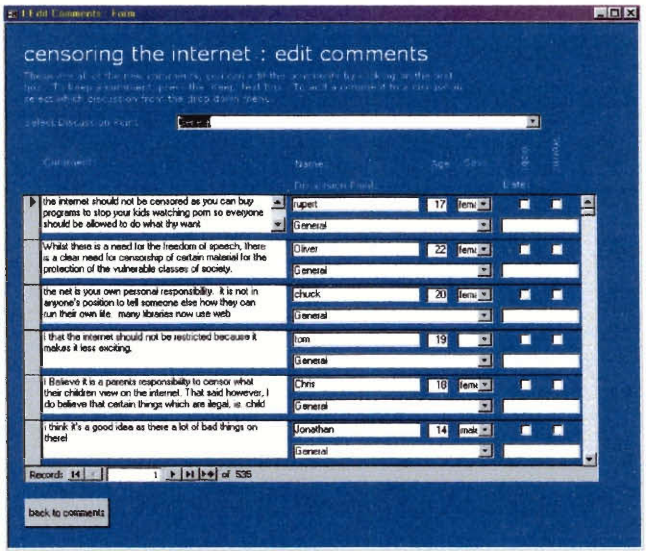


Figure A.5 – Comment Display Screen from Censoring Tell (Science Museum, 2000)

# Appendix B – Age Distribution Charts and Descriptions

## Age Distribution

The data has been converted into a bar chart showing the seven age groupings for each Tell topic, along with a category for the "unknown" ages. The total number of comments for each kiosk is printed in the upper plot area and the total number of comments per age group is displayed above each bar.

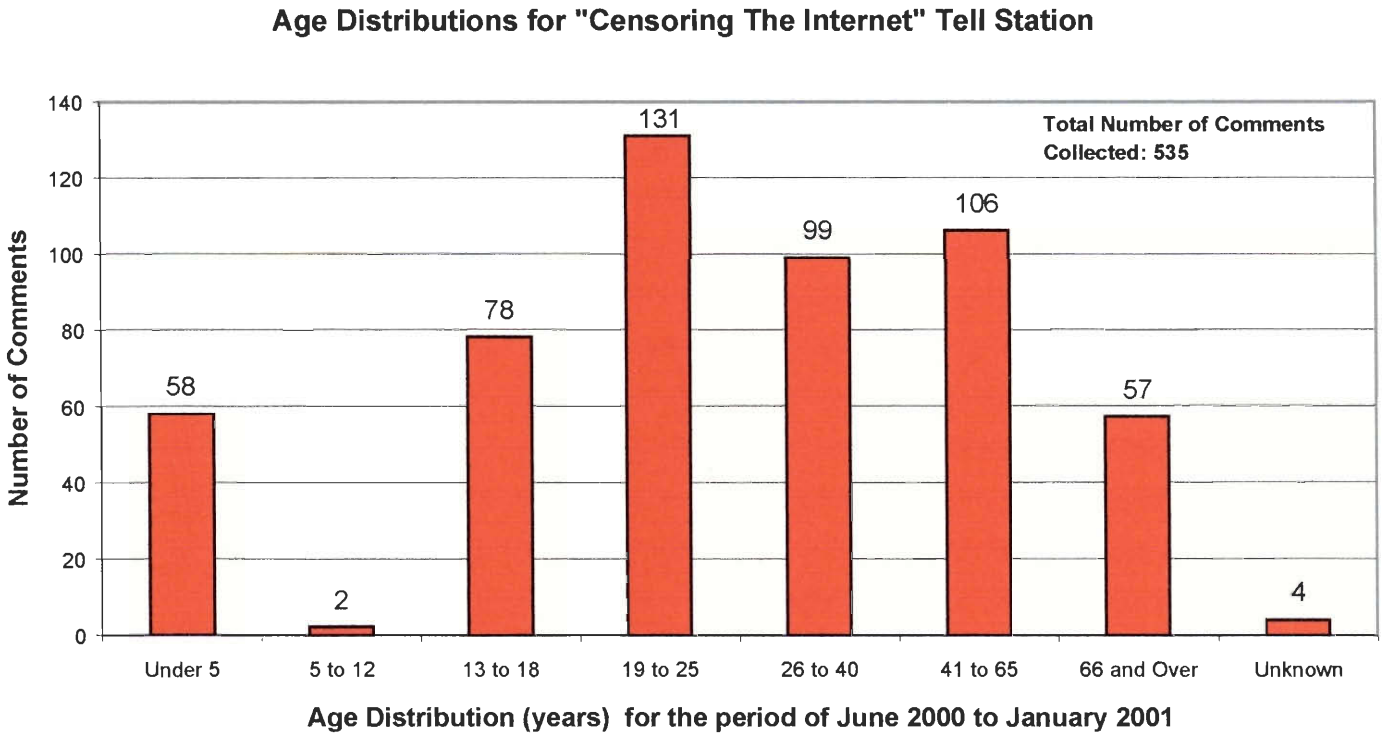


Figure B.1 – Age Distribution for the "Censoring the Internet Tell Kiosk

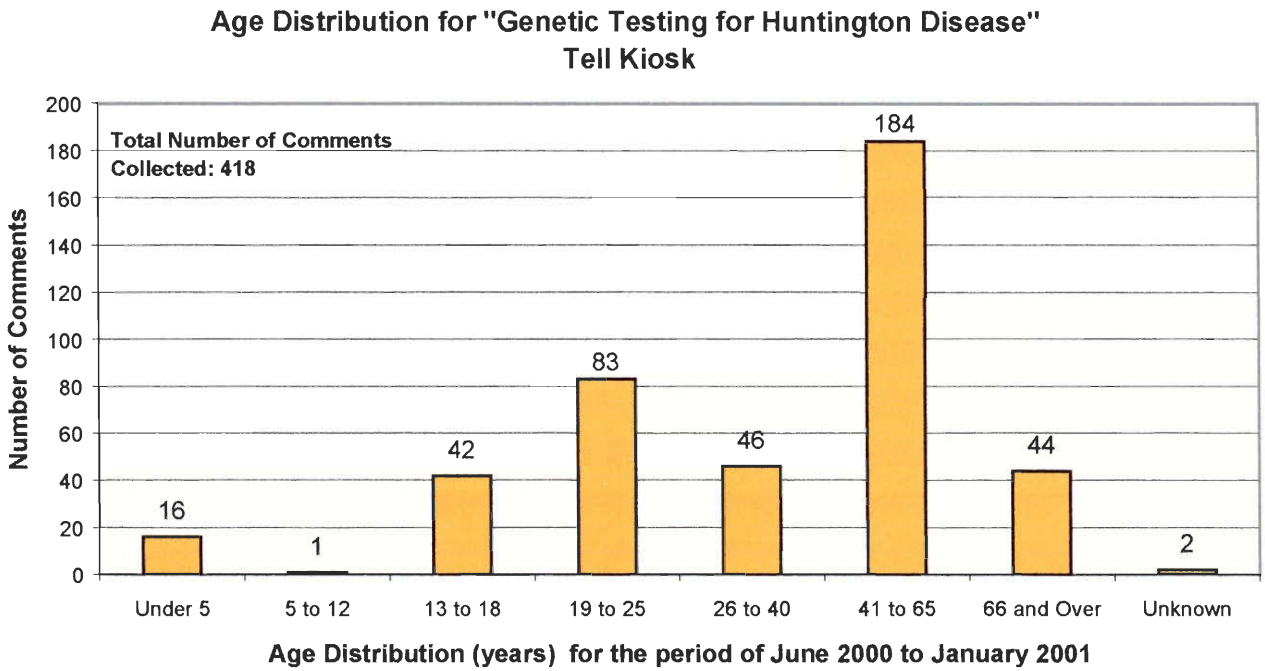


Figure B.2 – Age Distribution "Genetic Testing for Huntington's Disease" Tell Kiosk

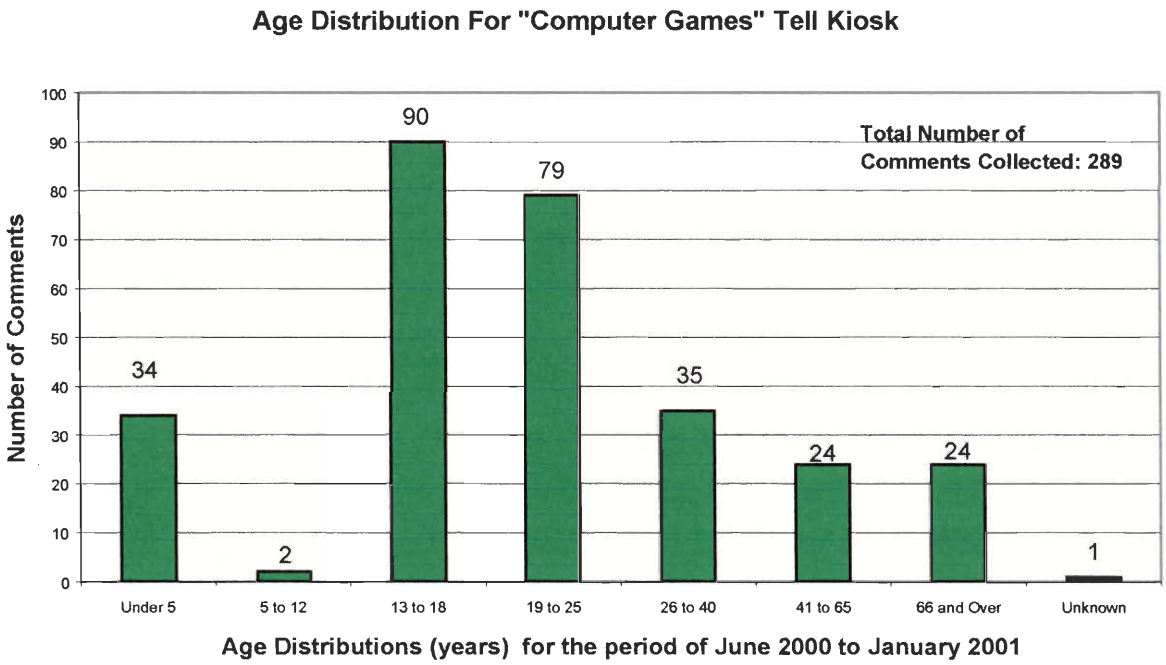


Figure B.3 – Age Distribution for "Computer Games" Tell Kiosk

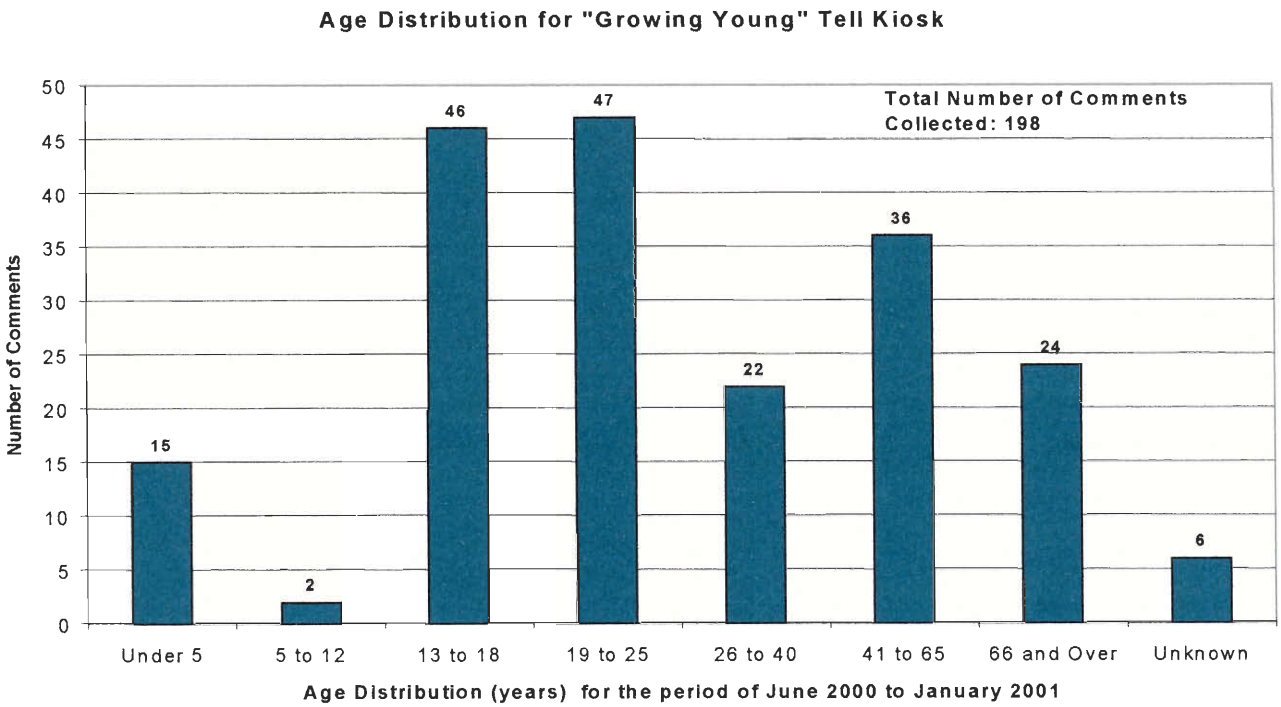


Figure B.4 – Age Distribution Graph for "Growing Young" Tell Kiosk

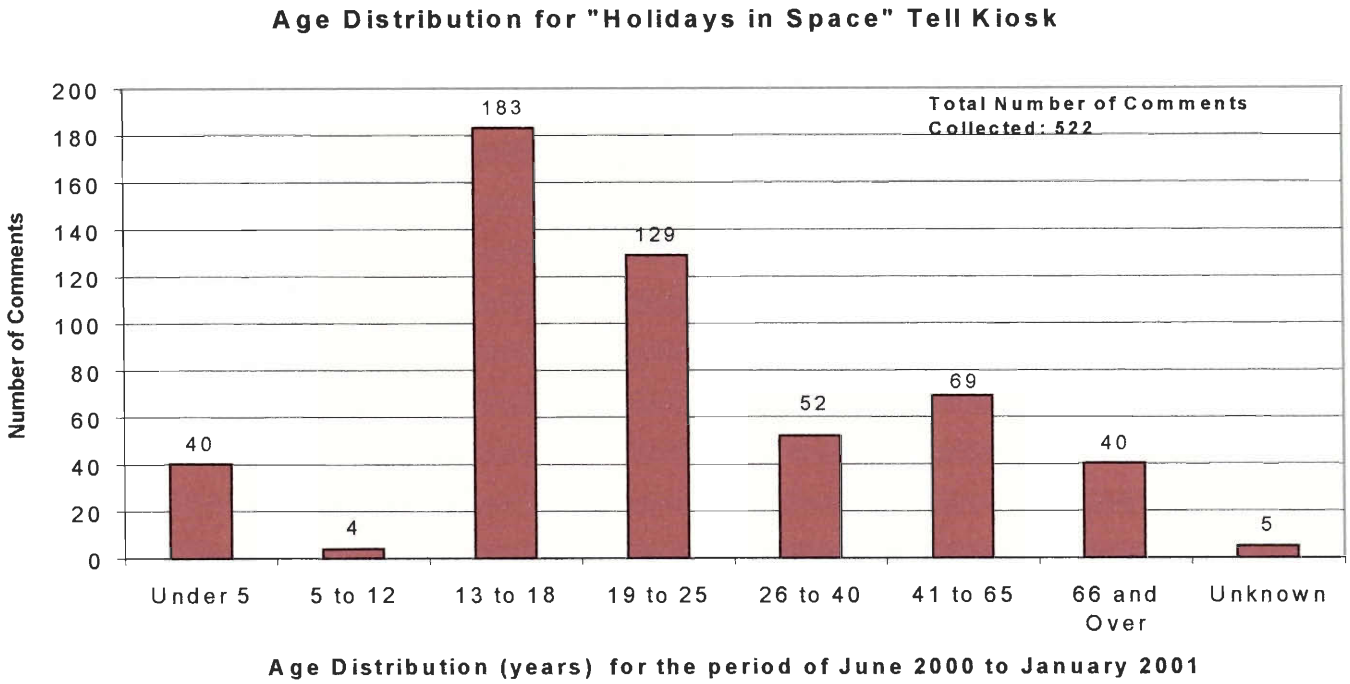


Figure B.5 – Age Distribution Graph for "Holidays in Space" Tell Kiosk

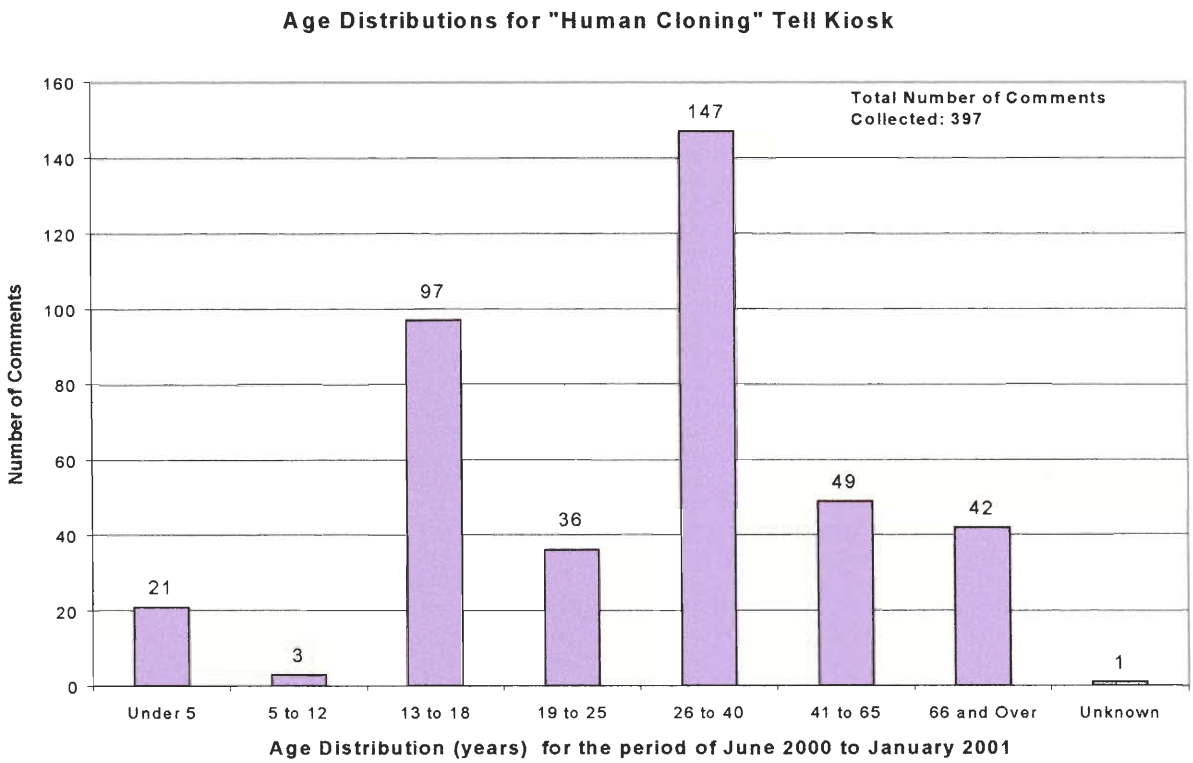


Figure B.6 – Age Distribution for "Human Cloning" Tell Kiosk

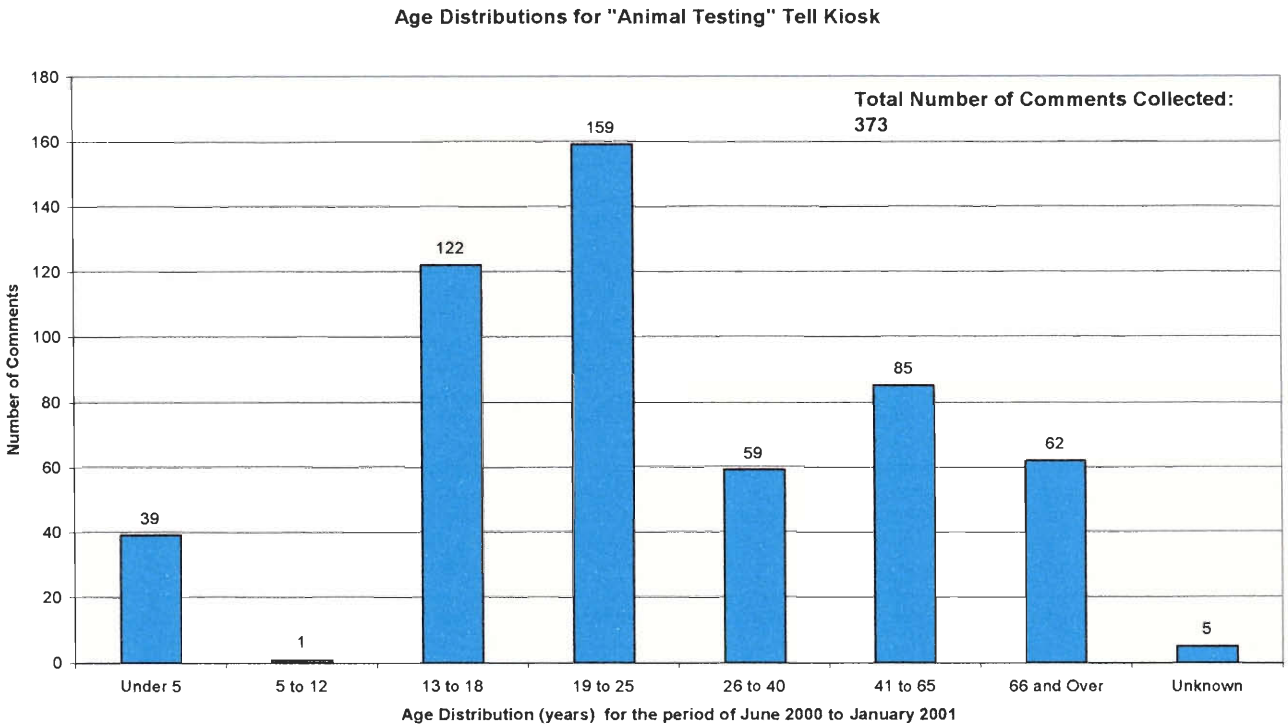


Figure B.7 – Age Distribution for "Animal Testing" Tell Kiosk

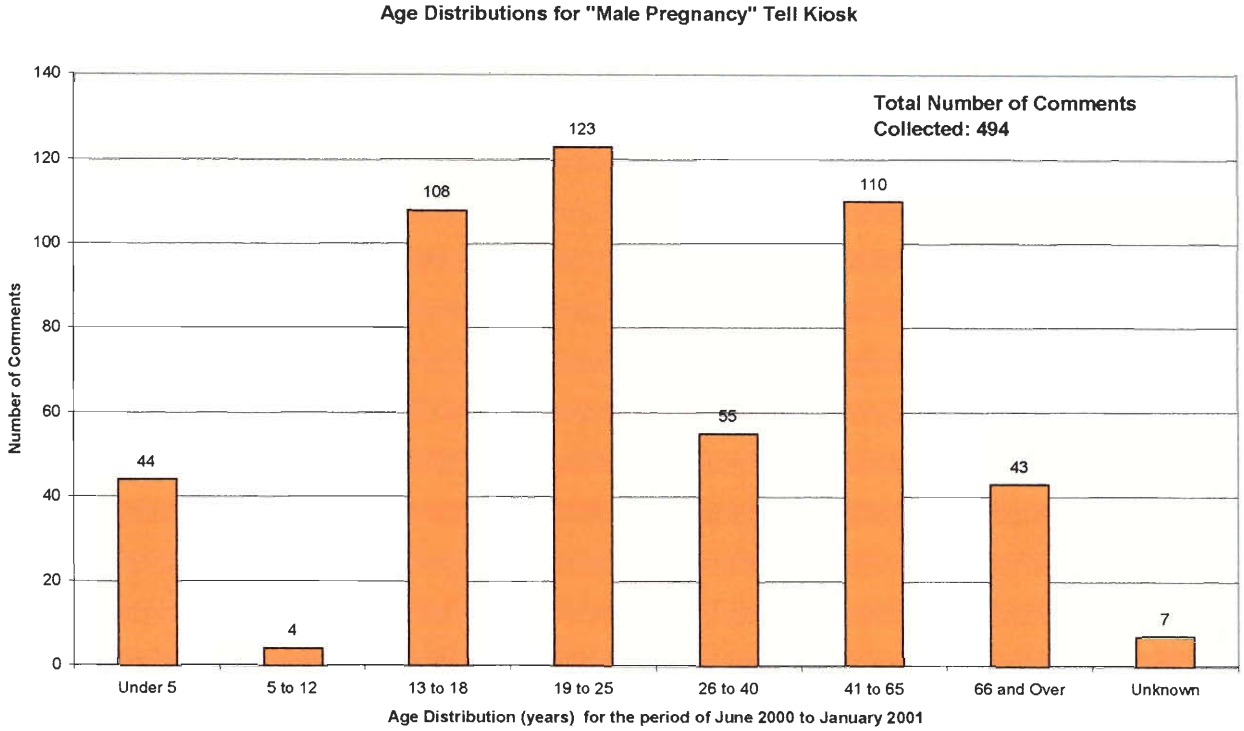


Figure B.8 – Age Distribution Graph for the "Male Pregnancy" Tell Kiosk

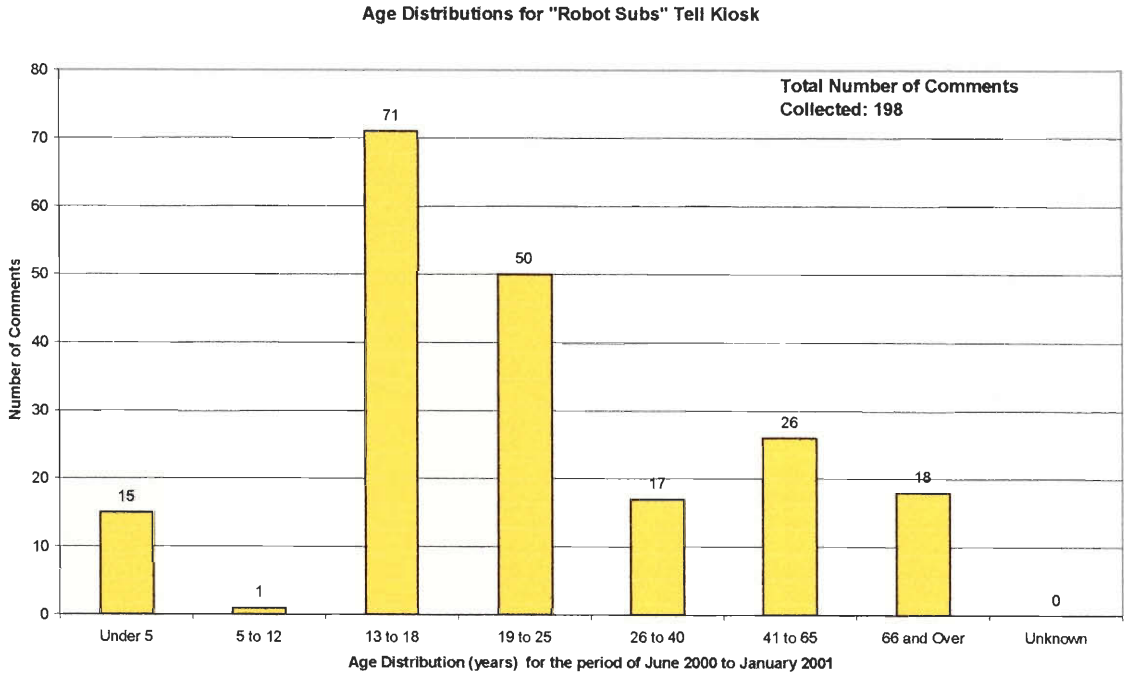


Figure B.9 – Age Distribution for the "Robot Submarines" Tell Kiosk

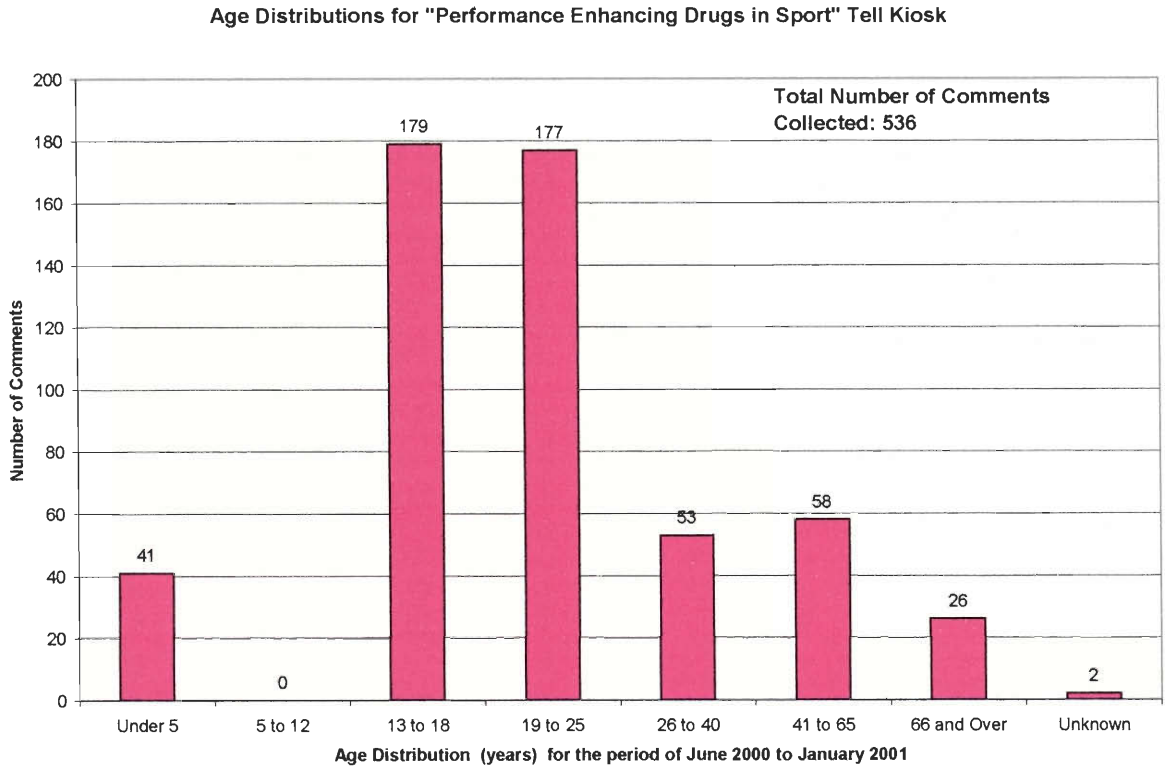


Figure B.10 – Age Distribution Graph for the "Drugs in Sports" Tell Kiosk

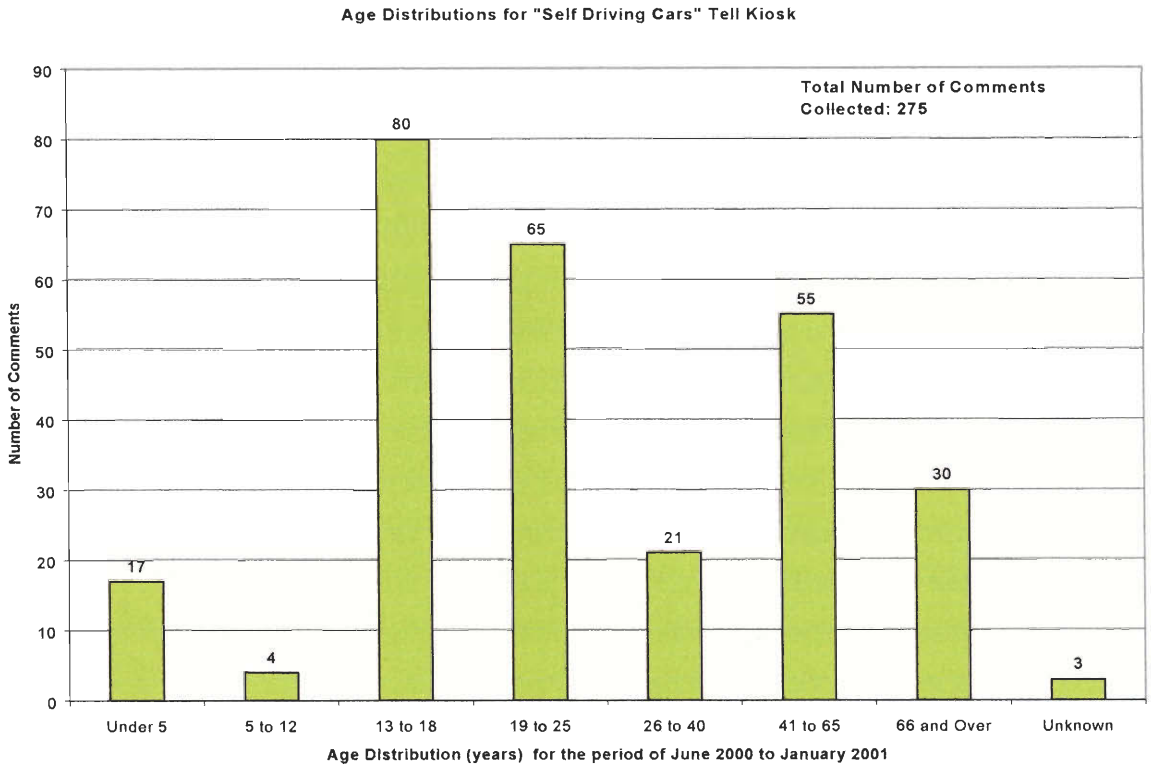


Figure B.11 – Age Distribution Graph for the "Self Driving Cars" Tell Kiosk

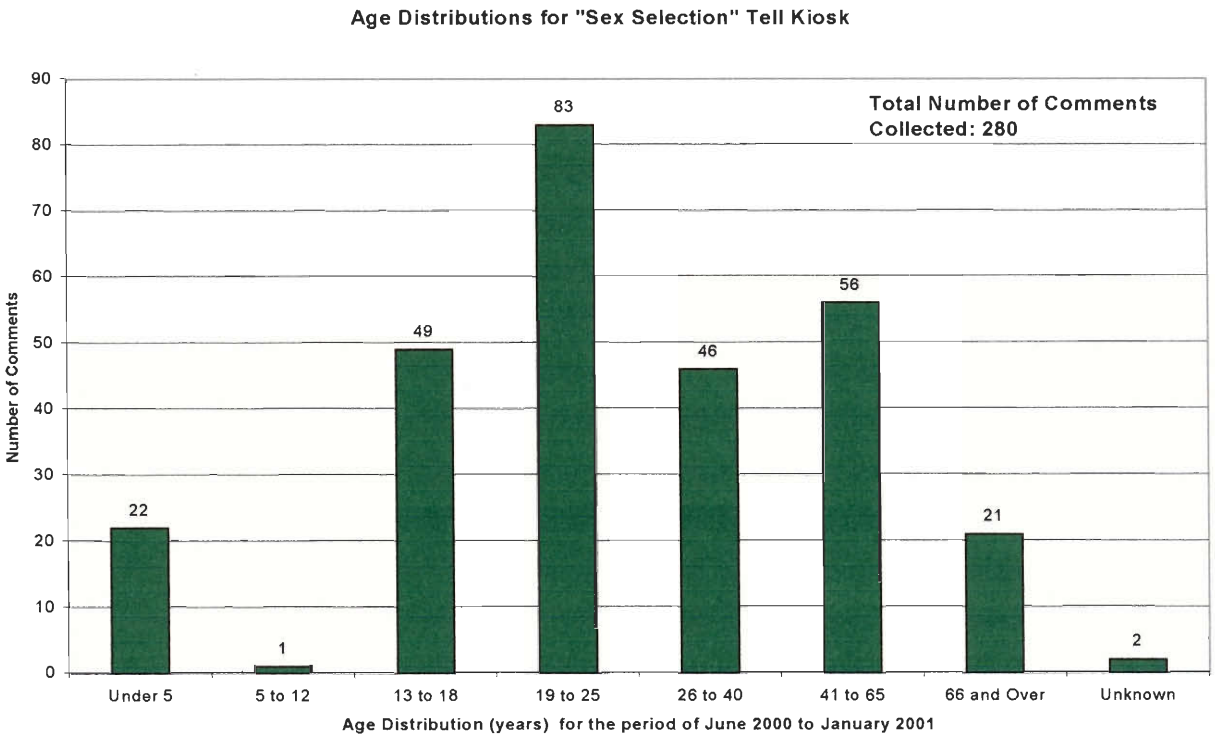


Figure B.12 – Age Distribution Graph for the "Sex Selection" Tell Kiosk

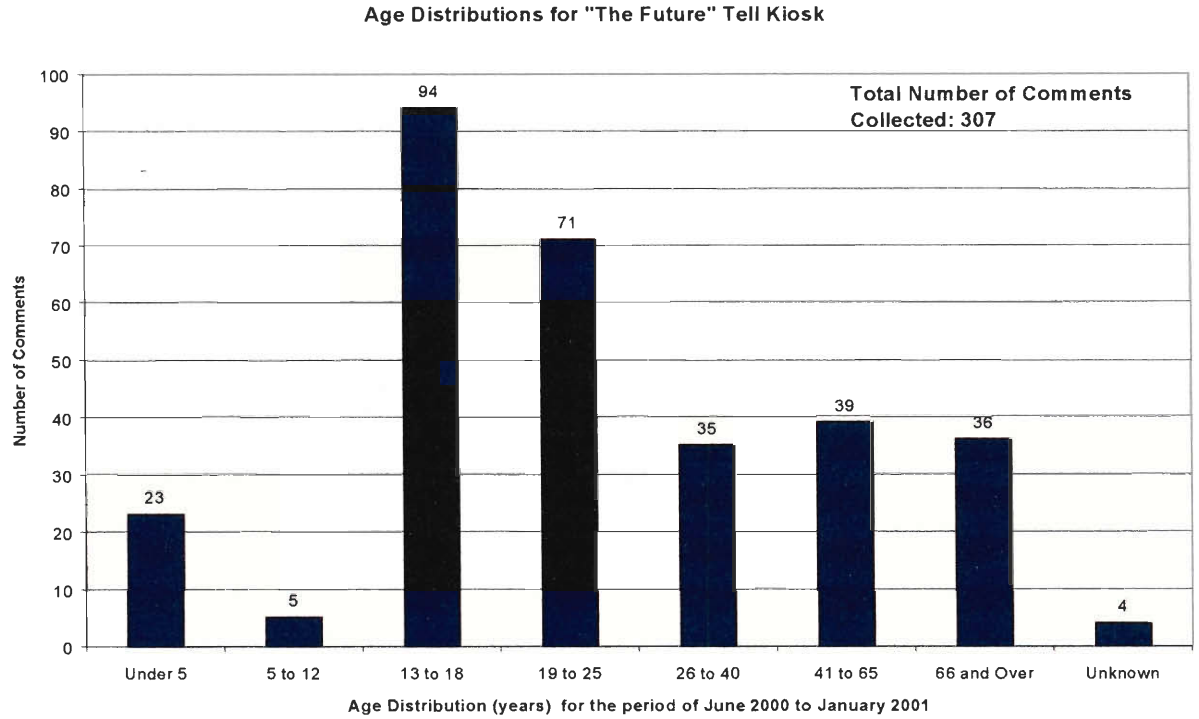


Figure B.13 – Age Distribution Graph for the "The Future" Tell Kiosk

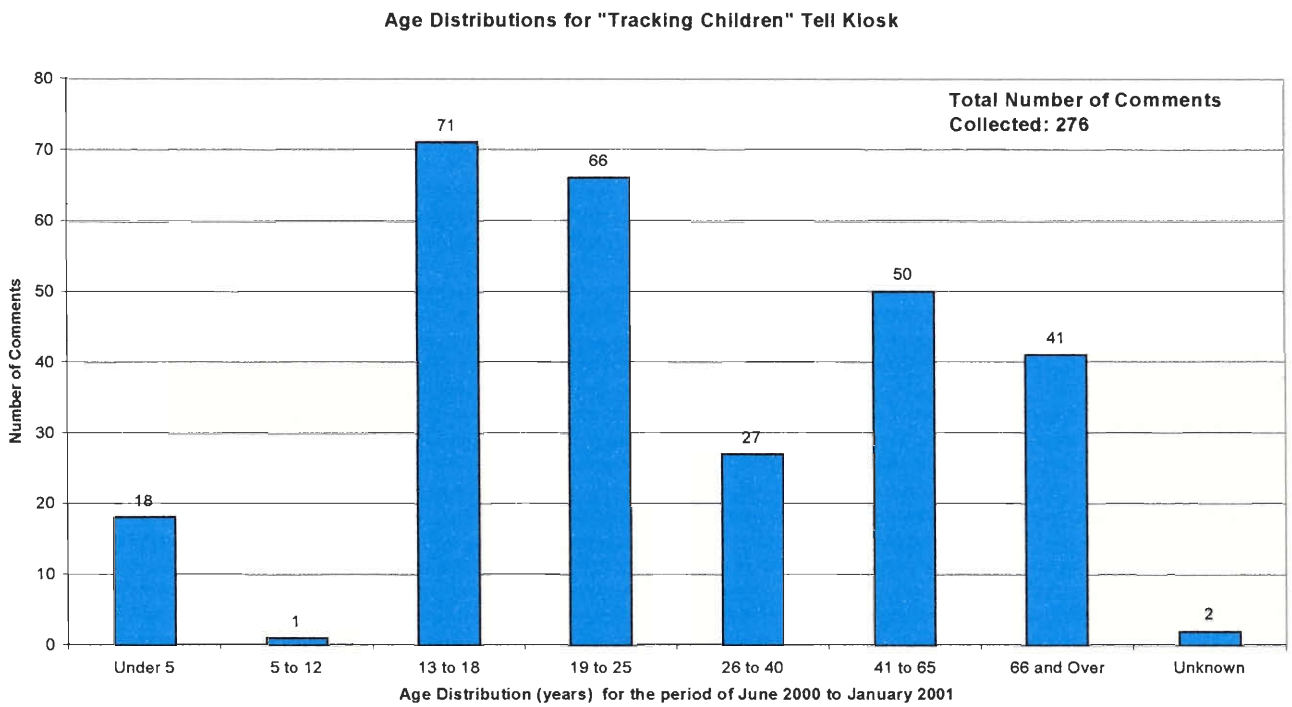


Figure B.14 – Age Distribution Graph for the "Tracking Children" Tell Kiosk

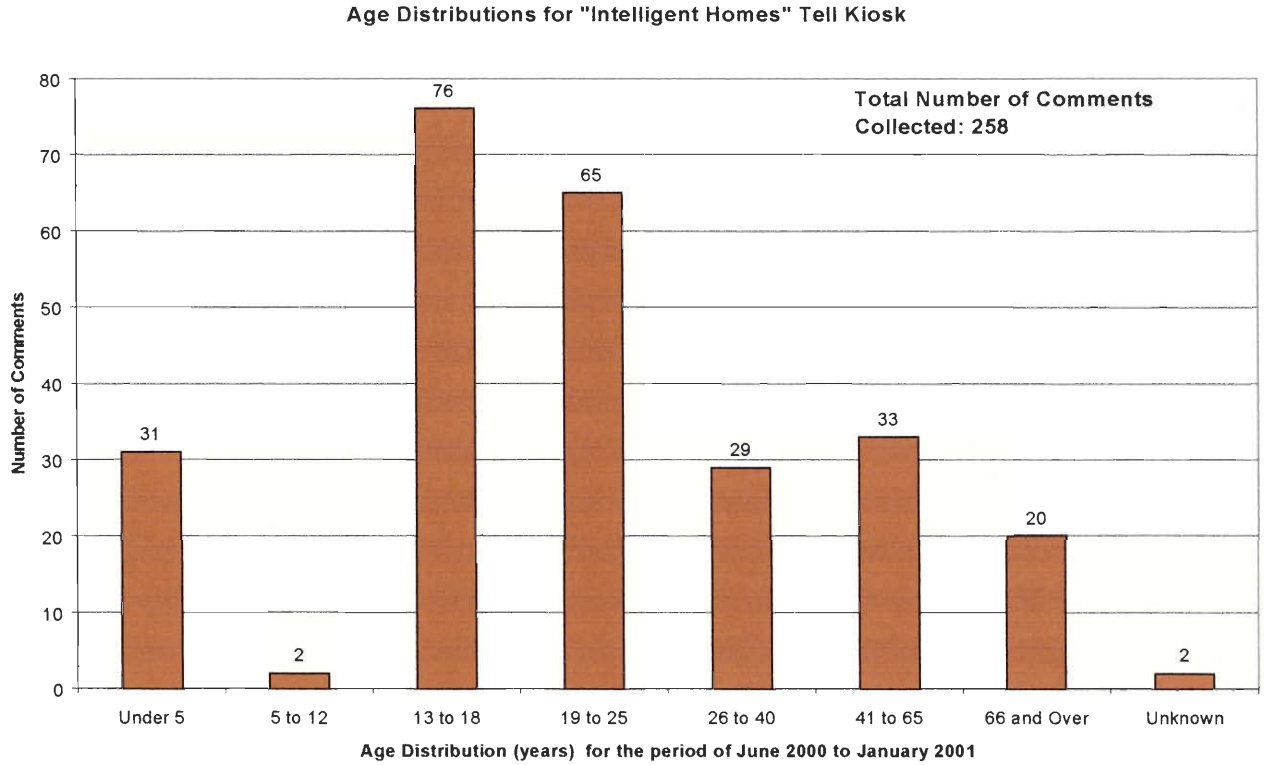


Figure B.15 – Age Distribution Graph for the "Intelligent Homes" Tell Kiosk

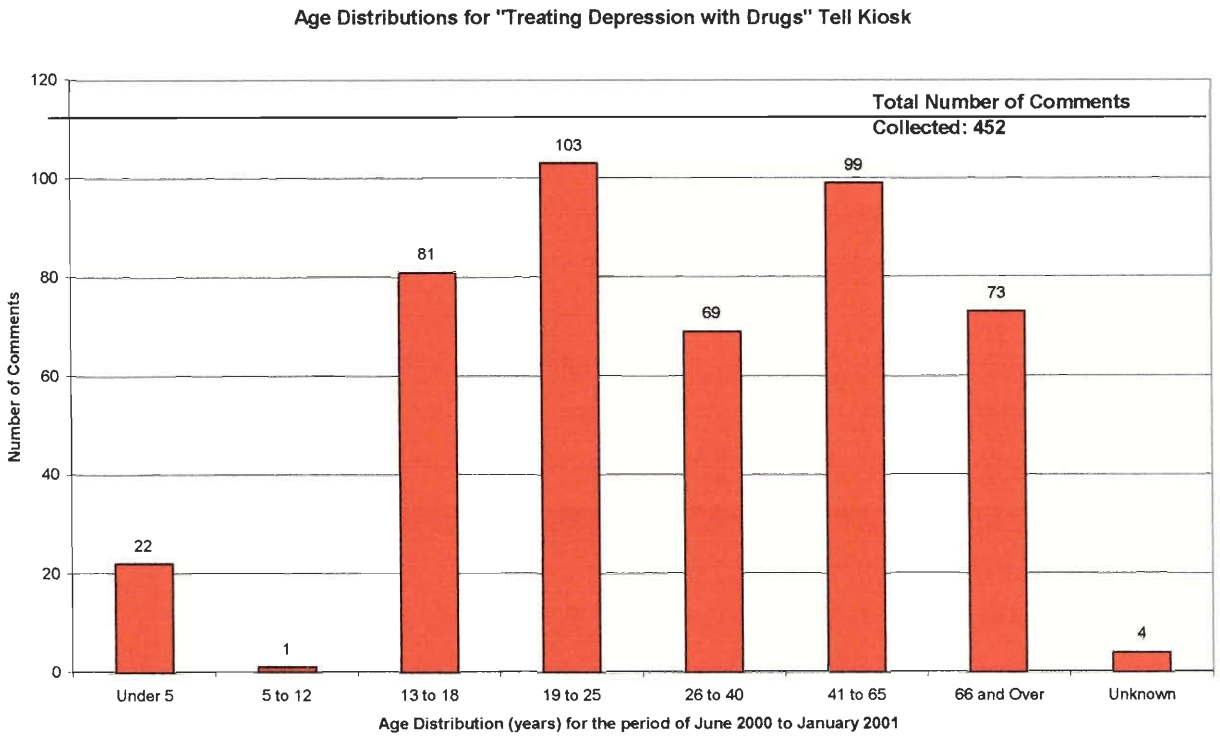


Figure B. 16 – Treating Depression With Drugs Age Distribution Graph

# Appendix C – Content Analysis Material

The content analysis was conducted on all manageable Tell kiosks and is displayed in the following graphs.

## Animal Testing

The kiosk that addresses the issue of animal testing broke down into three main groups of comments, listed below.

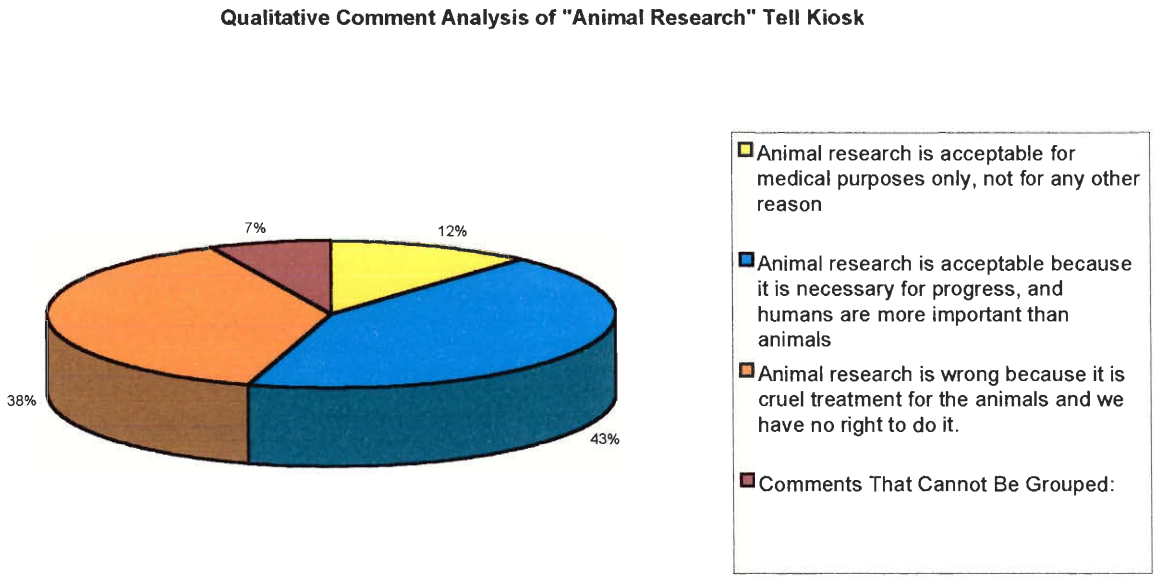


Figure C.1 – Content Analysis Graph for the "Animal Research: Tell Kiosk

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1. **"Animal research is acceptable for medical purposes only, not for any other reason."** Comments in this group had descriptors for the terms "animal testing" or "animal research" such as "good for medical research", "only for

medical research", and "medical research only". Many of the sentences that fit into this category were two part, separated by the word "but", with the first part supporting animal testing for medical purposes and the second condemning it for scientific or cosmetics testing. 11.74% of comments fell into this category.

2. **"Animal research is acceptable because it is necessary for progress, and humans are more important than animals."** Comments in this group contain phrases such as "beneficial for humans", "survival of the fittest", and words such as "progress". Adjectives modifying "animal testing" or "animal research" such as "fine", "acceptable", and "necessary" were present. Some comments had qualifications such as "clear aims and objectives" and "no unnecessary harm", and others included phrases that put human welfare above animal welfare such as "top of the food chain" and "more important" describing "humans" and "humanity", but there was always a clear indication that the comments supported the idea of using animals in research. 42.99% of comments fit into this category.

3. **"Animal research is wrong because it is cruel treatment for the animals and we have no right to do it."** Comments that fit into this group contained modifiers on "animal research" and "animal testing" such as "cruel", "unacceptable", "wrong", and "immoral". These comments often mentioned animal rights and put them on par with human rights. They also proposed situations in which humans received the same tests as the animals and included statements such as "animals have feelings too". The percentage of comments falling into this category was 38.45%.

4. 6.82% of comments cannot be grouped.

**Computer Games**

This question dealt with computer games and their implications for today's child.

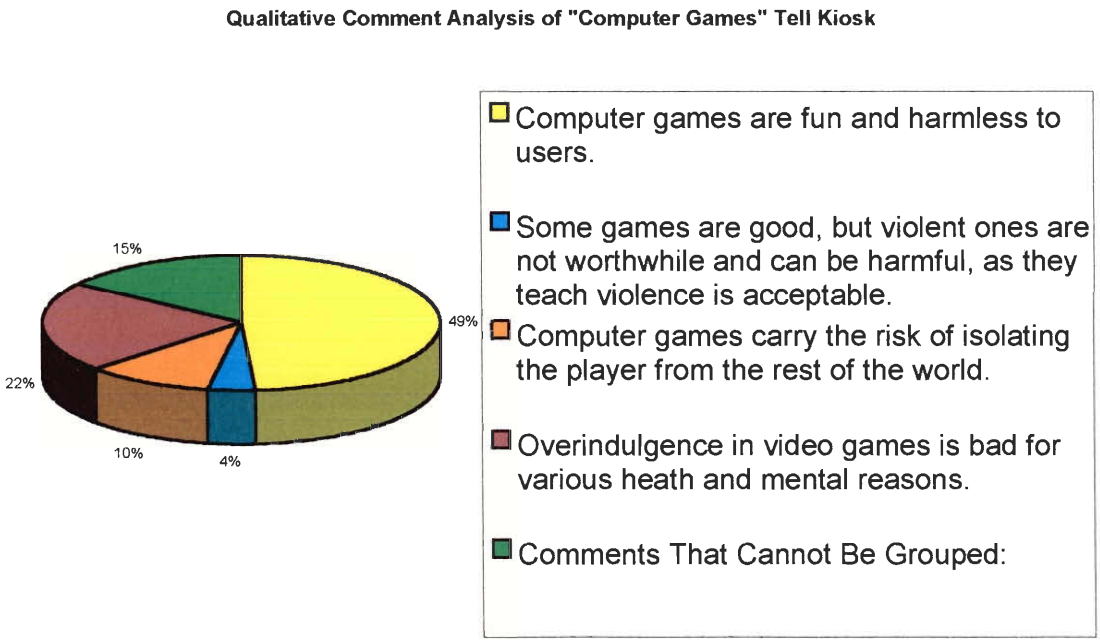


Figure C.2 – Content Analysis Graph for the "Computer Games" Tell Kiosk

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1. **"Computer games are fun and harmless to users."** A large percentage (48.82%) of comments fit into this category. Comments here had no words with negative connotations modifying "computer games" or "video games", and most of them flatly refuted any claims that games were not good for the individual. Positive modifiers such as "relaxing" and "entertaining" were found in this set of comments.
2. **"Some games are good, but violent ones are not worthwhile and can be harmful, as they teach violence is acceptable."** These comments were

qualified n nature. While they did have the same descriptors as were described for the previous category, there were qualifiers that made exceptions for violent games. Interestingly enough, there were no comments that condemned all video games as violent. The main word we looked for in this category was "violent" or "violence", and as long as those words were not modified with "not", the phrases went into this section. Phrases similar to "provided they are not violent" are what mark a comment as belonging to this category. The percentage of comments in this group was 4.04%.

3. **"Computer games carry the risk of isolating the player from the rest of the world."** Visitors who left this type of comment were concerned that too much playing of video games leads to antisocial behaviour and isolation. The main words that we looked for were "obsession", "antisocial", and "isolation". Most of these comments focused solely on overindulgence leading to isolation, but some left out that qualifier and condemned games altogether for this reason. The percentage for this category was 10.10%.

4. **"Overindulgence in video games is bad for various heath and mental reasons."** Respondents in this group were more vague in their condemnation of games for physical and mental health reasons than those who focused solely on isolation. The comments in this group contain phrases such as "physical activity", "killing the imagination", and "dangerous". Any comment that was negative towards gaming but did not specifically mention violence or antisocial behaviour was placed in this category. The percentage of comments in this grouping was 21.89%.

5. Comments that can not be grouped made up the final 15.15%

**Treating Depression with Drugs**

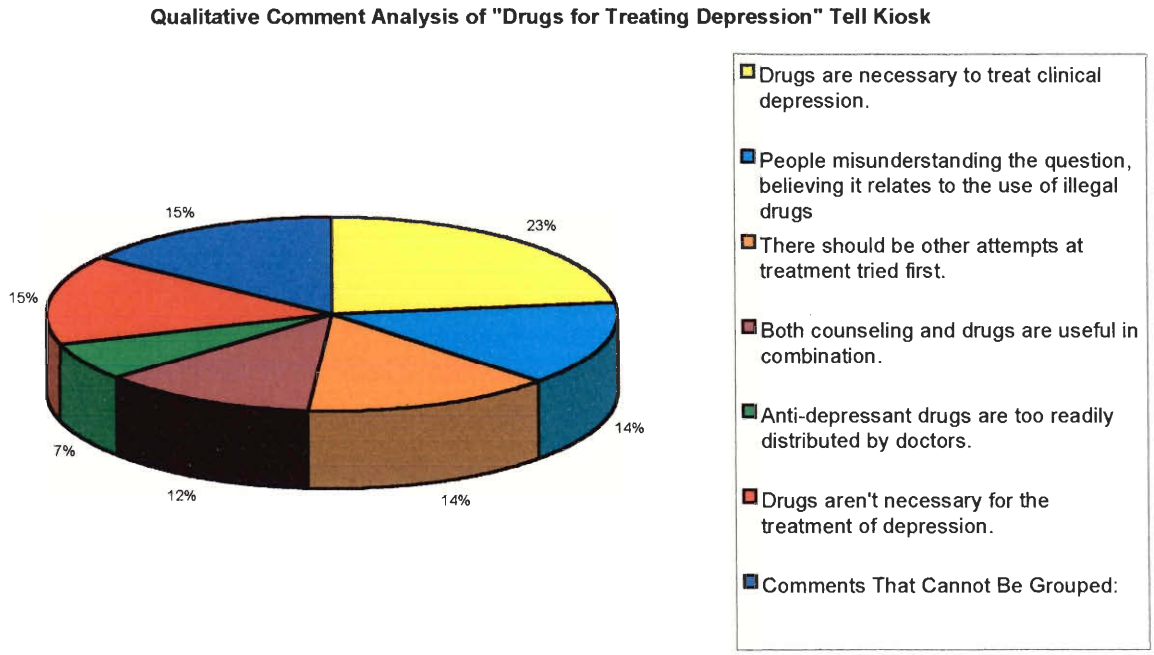


Figure C.3 – Content Analysis Graph for "Depression Drugs" Tell Kiosk

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1. **"Drugs are necessary to treat clinical depression."** Comments that fell into this category generally included the word "disease" or the phrase "medical condition" and often mentioned "chemicals" and "brain", and just as often "imbalance" was found in the comment. This set of responses saw depression as a clinical disease, and, when properly diagnosed, they believed that it merited treatment with anti-depressant drugs. 23.14% of comments were of this nature.
2. **"People misunderstanding the question, believing it relates to the use of illegal drugs."** These comments misunderstood the question, believing it related to the use of illegal drugs to deal with depression. The clues we looked for to

place a comment here were phrases such as "illegal", "stealing drugs", "addicted after a few", and "drugs will kill you". While these phrases alone are not indicative of a misunderstanding, the context that they were found in made such a conclusion inescapable. With only one exception, this category was made up of comments left by those under 18 and more than half of those were left by those under 12. The percentage for this category was 13.97%.

3. **"There should be other attempts at treatment tried first."** Visitors who felt that treating depression with drugs should only be used as a last resort left these comments. Many of these comments included the phrase "as a last resort", referring to the use of drugs. Others offered suggestions such as "counselling" or "therapy" and condoned the use of drugs only when other techniques resulted in "failure". 14.19% of comments fell into this group.
4. **"Both counselling and drugs are useful in combination."** These comments stressed that drugs and counselling must take place in combination to have any results. The main word that we looked for in this set was "combination", or the phrase "both drugs and counselling". Many of these comments felt strongly that both were required in order for there to be any results, but the majority used the word "useful" rather than "necessary". 12.23% of all comments on this topic belonged in this category.
5. **"Anti-depressant drugs are too readily distributed by doctors."** Some visitors believed that the main problem with anti-depressants was that doctors distributed them without proper examination of the causes. Phrases such as "take the time", "cure-all", or "panacea for depression" were commonly found in these comments.

Other common phrases were "like candy", referring to the dispensation of the pills. The percentage of comments that fell into this grouping was 6.55%.

6. **"Drugs aren't necessary for the treatment of depression."** This collection of comments was characterised by the phrases "aren't necessary" or "easy way out" modifying "drugs". This category was for visitors who believed that anti-depressants were not necessary for curing depression, as they did not take care of the "root causes". 14.85% of respondents felt this way.
7. Comments that cannot be grouped made up 15.07% of this group.

## Growing Young

The kiosk entitled "Growing Young" deals with the possibility of the elderly growing younger in the future and how this would affect society.

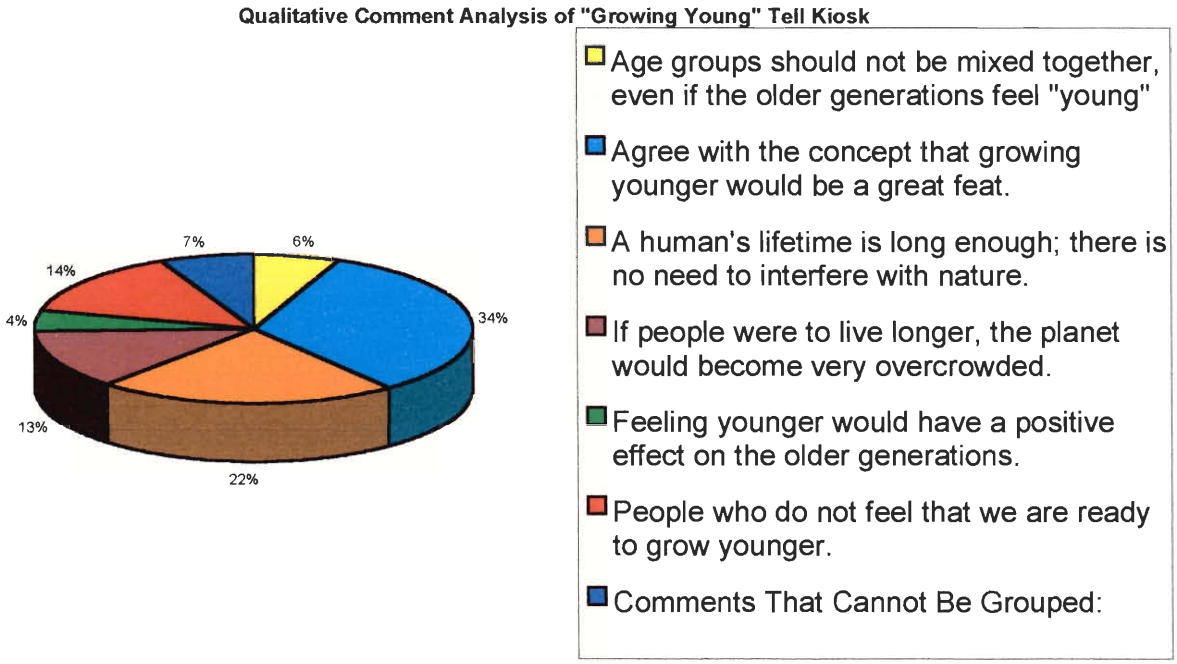


Figure C.4 – Content Analysis Graph for "Growing Young" Tell Kiosk

1. **"Age groups should not be mixed together, even if the older generations feel 'young'."** Comments that fit in this category display concerns with intellectually mature individual (people that have lived longer, e.g. grandparents, parents, etc.) blending with children and people of a different age range. Most of the comments in this category go along the lines of "I do not want my grandfather to be hanging out with my friends". 6.4% of the comments can be included in this category.
2. **"Agree with the concept that growing younger would be a great feat."** 33% of the comments left on the Tell System can be fit into this category that displays positive adjectives such as "great" and "fun". Also, comments seem to lead towards happiness. Some people limit their comments to a single word of appreciation (e.g. those mentioned above) but sometimes the best of feelings need few words to be described. Other comments that also appear here include those that show appreciation for not having to deal with relatives dying due to old age.
3. **"A human's lifetime is long enough; there is no need to interfere with nature."** A few of the comments say exactly this, and others which are suited to this category as well use words like "nature" immediately followed by "alone", or "as it is". Comments that are grouped in this category condemn altering the course of life in one way or another and argue that the time given is enough to enjoy life at it's fullest. 22.17% of the comments on this station perfectly fit in this category.
4. **"If people were to live longer, the planet would become very overcrowded."** 12.81% of those that left comments on this station seem to agree that extending life span will bring about overpopulation. Some of the comments include phrases

like "enough people as it is" or "not enough resources". Comments that appear within this category disagree with growing young but do not provide any other justification for their disagreement.

5. **"Feeling younger would have a positive effect on the older generations."** Most of the comments that fit in to this category show excitement about the idea and the prevailing words used to describe these are "energy" and "beauty". It is important to mention that most of the comments that fit in this category were left by people in advanced stages of their lives (e.g. above 40) who are already feeling the symptoms of old age and have an insight on what they would get from being young again. 4.43% of the comments may be found in this category.
6. **"People who do not feel that we are ready to grow younger."** Among the comments here, which include 14.29% of all the comments on this Tell kiosk we find various concerns of individuals. Among these are "unknown risks", "difficulty of finding people REALLY your age", "morally incorrect to degrade older people". In general, most of the comments that disagreed with growing younger that did not fit into the previous three categories condemning it fit into this category.
7. Comments that could not be grouped made up 7% of the total comments left.

## Human Cloning

The kiosk entitled "Human Cloning" deals with the possibility of being able to replicate human beings from a small sample of genes.

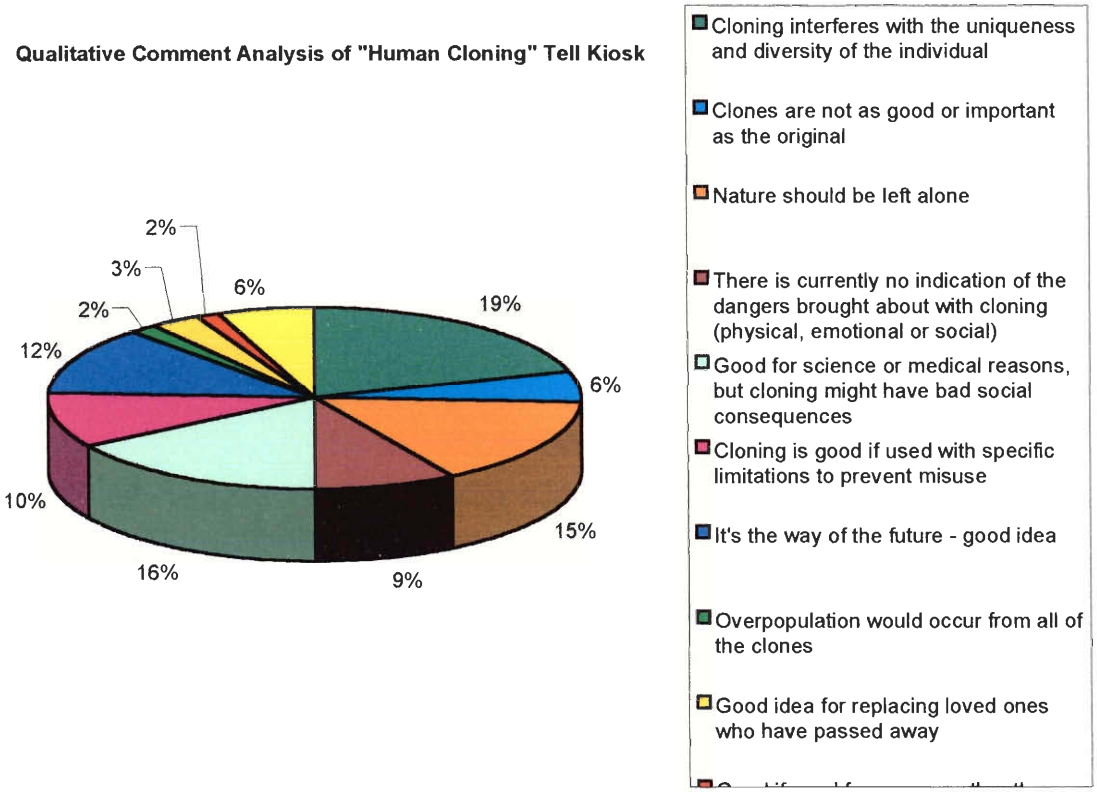


Figure C.5 – Content Analysis Graph for the "Human Cloning" Tell Kiosk

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1. **"Cloning interferes with the uniqueness and diversity of the individual."** Most of the comments grouped in this category contain the words "individual", "unique", "diverse" and words with similar meanings. The mayor concern illustrated by this comments are about loosing the qualities that make a person what he is and differs him from everyone else. 20.25% of the comments that were left in this kiosk are contained in this category making it the strongest.
2. **"Clones are not as good or important as the original."** Mainly, two types of comments fit in this category. The first are those that argue that clones will not be

treated with the same rights as "natural" humans because they will mainly be used for experimentation, and simply because of the fact that they are a product of science and not of nature. The other type of comments are those that regard cloning as an unimportant issue and believe that the money being spent on developing this new technology should be devoted to current medical practices and existing human beings, rather than on ones that still do not exist. 5.5% of the comments agree with this category.

3. **"Nature should be left alone."** "God" and "Nature" seem to be the dominating nouns in the comments fitting into this category that accounts for 15.75% of the total comments left on this kiosk. The predicates in sentences found here all uphold the previously mentioned nouns as the creators of life and unanimously agree that they are the only ones allowed to modify their creation. Comments found here do not necessarily forecast tragic events arising from cloning but rather condemn the actions for being unethical.
4. **"There is currently no indication of the dangers brought about with cloning (physical, emotional or social)."** "We don't know" and "danger" both seem to clog up 8.5% of the comments left on the Tell System that could be put into this category. Most of the comments here seem to agree that there is still a lot to find out about consequences of cloning before it can be done. It is important to note that the unforeseen dangers range from psychological (e.g. sense of not belonging because of being a clone) to social (e.g. not regarding the clone as a member of the family even if it is replacing him and it looks and does exactly the same), but

none of them really suggest any course of action although some agree with the concept of cloning.

5. **"Good for science or medical reasons, but cloning might have bad social consequences."** The second highest percentage (16%) of people that left comments agreed that scientific and medical purposes of cloning would be acceptable and to some point strongly advisable. However, most of the comments contain two phrases linked with "however" or "but", where the second phrase illustrates a negative social issue that cloning might bring about. These issues include determining the rights of clones, providing them with a sense of identity and determining how humane it is to conduct experiments on creatures with similar responses as ours.
6. **"Cloning is good if used with specific limitations to prevent misuse."** Many of the people that left comments on this kiosk agree that cloning is very useful. However, in order to fit into this category, the comments left by such people must show a desire for limiting this technology. Reasons for putting limits are varied and include very diverse criteria such as "what if it falls in the wrong hands", "what if the original specimen is faulty" or "limits on number of times someone could be cloned". A high 10% of the comments fall into this category showing the interest people have with due precautions provided.
7. **"It's the way of the future - good idea."** Comments that strongly agree with cloning but do not provide information why are placed in this category. Phrases found among these comments include "great, I would love to be cloned", "I think cloning is the way of the future" and "I would love the world to have many more

of me". The younger visitors of the museum left most of these comments but still account for 12% of the comments left in this kiosk.

8. **"Overpopulation would occur from all of the clones."** 2% of the comments left on Tell system with regards to cloning seem to agree in the fact that cloning people will bring about overpopulation which consists mainly of not enough living space or resources to support an exponentially growing society. Sentences containing the words "overpopulation" or "resources" are those most common in this category.
9. **"Good idea for replacing loved ones who have passed away."** 3% of the people leaving comments in this kiosk thought that cloning was great for replacing members of the family that have passed away or are terminally ill. Comments that agree with cloning solely for this reason and do not disagree in any way were put into this category.
10. "**Good if used for reasons other than scientific ones."** There are those individuals that condemn scientific uses (mainly experimentation) of cloning but agree with every other use. Their comments are placed in this category and they account for 2% of all the comments left in this station.
11. Comments that cannot be grouped made up 6% of the total comments left.

**Huntington's Disease**

This kiosk was somewhat different from the others in that rather than posing a controversial question, it displayed a fictional situation and asked visitors what they think the characters should do. The main character, Mark, is asked whether he should take a

test to see if he has Huntington's disease. His grandmother did have the disease, so the chances are greater than minimal. There is no cure, so the test would simply be for the knowledge and for medical benefit. If he does have it, his father probably does as well, and so Mark's mother does not want him to take the test, because it would signal that Mark's father only has a few more years to live. Mark wants to know if he has the disease in order to plan out his life.

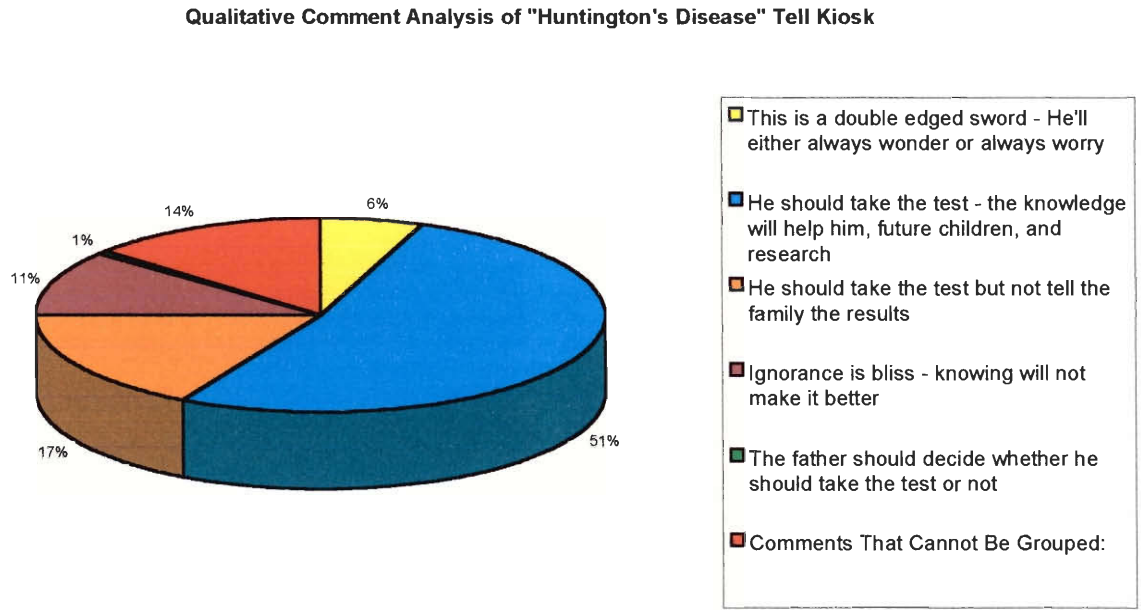


Figure C.6 – Content Analysis Graph for the "Huntington's Disease" Tell Kiosk

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1. **"This is a double edged sword - He'll either always wonder or always worry."** Respondents in this category were unsure what Mark should do. The phrase "double-edged sword" or "two sides" are what labelled a comment as belonging in this group. These comments offered no real suggestions. 5.86% of comments were grouped here.

2. **"He should take the test - the knowledge will help him, future children, and research."** These comments were identified by the words "Mark should" referring to his taking the test. Most wanted Mark to plan out his life on his own terms, while others were concerned that he knows whether he can have a family safely, and others hoped that study resulting from the test could enhance medical knowledge. A majority of 52.16% felt this way.
3. **"He should take the test but not tell the family the results."** These comments were similar to the ones from the previous category but they went a step further and suggested that Mark did not have to tell his family the results of his test. The phrase "doesn't have to tell" or some variation identified a comment as falling into this category. 16.98% of respondents felt this way.
4. **"Ignorance is bliss - knowing will not make it better."** This group of comments felt that Mark should not take the test, because the knowledge won't help in avoiding the disease. "Depressed" and "useless" were the main words that put a comment into this group. The percentage of comments that fell into this group was 10.80%.
5. **"The father should decide whether he should take the test or not."** A few visitors felt that Mark's father should decide about the testing issue, mainly because he would find out just as if he had taken the test, and his life was more at stake. The deciding phrase was "father should decide" in this case. 0.62% of comments were in this vein of thought.
6. 13.58% of comments could not be grouped.

**Intelligent Homes**

This Tell question asked visitors to comment on the possibilities of an intelligent home, one that could anticipate the owners' whims and make things happen before asked.

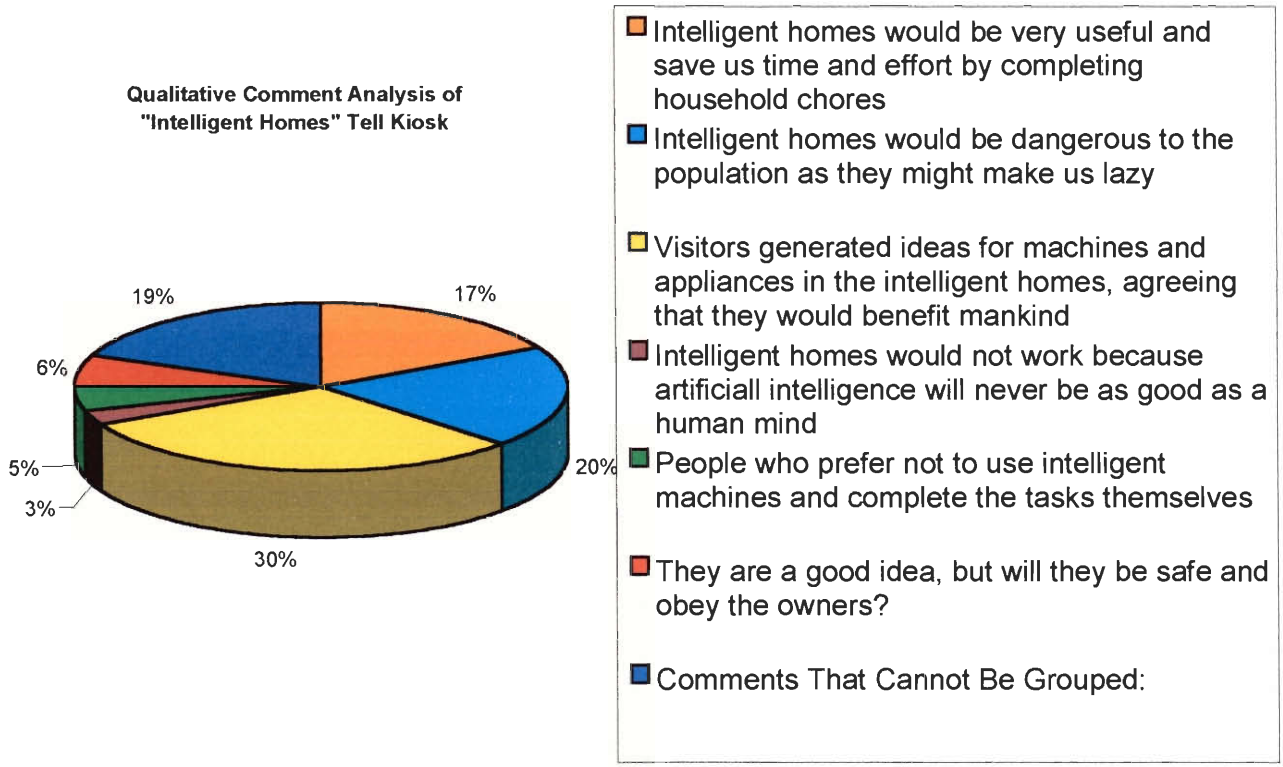


Figure C.7 – Content Analysis Graph for the "Intelligent Homes" Tell Station

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1. **"Intelligent homes would be very useful and save us time and effort by completing household chores."** 20.83% of museum guests thought that intelligent homes were a good idea. Phrases such as "good idea", "sounds great", and "marvellous", without any qualifiers, are what led a comment to this section.
2. **"Intelligent homes would be dangerous to the population as they might make us lazy."** The main word to look for in this section is "lazy". Comments in this section were very adamant about the idea that an intelligent home would not be

useful to the human race, because it would make everyone lazy and not willing to work to maintain the house. 23.86% of comments fell into this group.

3. **"Visitors generated ideas for machines and appliances in the intelligent homes, agreeing that they would benefit mankind."** This set of comments consisted of ideas that visitors thought would be useful if implemented in an intelligent home. The key phrase was "I would like" or a similar variant, followed by the idea that the visitor thought would be useful. 36.74% of the comments were of this nature.
4. **"Intelligent homes would not work because artificial intelligence will never be as good as a human mind."** Words such as "inflexible", "not adaptable", and "not equal", when comparing machine and human intelligence, were what marked a comment as belonging in this category. These comments expressed doubt that an intelligent home could ever replace the human mind. The percentage of comments here was 3.41%.
5. **"People who prefer not to use intelligent machines and complete the tasks themselves."** This set of comments was marked by the phrase "would rather", referring to the visitors' unwillingness to hand over household tasks to an artificial intelligence. This group made up 5.68% of the total comments.
6. **"They are a good idea, but will they be safe and obey the owners?"** The main concerns in this group are that intelligent homes will not obey their owners, and that they will "not be safe" from computer "viruses" and "bugs". They thought that if the homes had undergone "sufficient testing" and were "proven safe" that

they would be a good idea, but had some doubts as to the actual "reliability" of this technology. 7.58% of comments belonged in this category.

7. Comments that could not be grouped made up 1.89% of the total comments.

**Male Pregnancy**

In a kiosk looking towards the future, this kiosk supposes that men could carry babies to term. The comments here were many and varied.

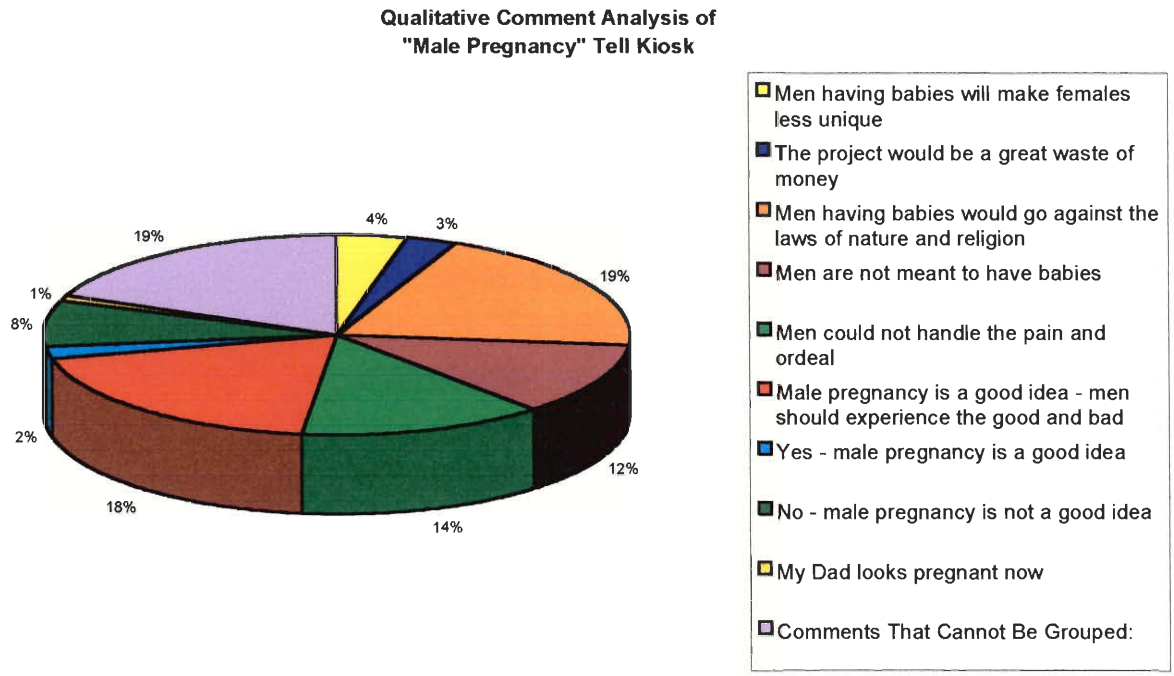


Figure C.8 – Content Analysis Chart for the "Male Pregnancy" Tell Kiosk

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1. **"Men having babies will make females less unique."** These comments felt that if men began to have babies, the woman's role would be less and less important and the difference between genders would lessen. Phrases such as "wouldn't

need" or "no longer unique" modifying women branded a comment as belonging in this category. A small 4.00% of comments reflected this point of view.

2. **"The project would be a great waste of money."** These visitors felt that research in this direction was a waste of money that could be spent in a more responsible fashion. The word to look for was "waste" modifying money, or possibly "useless" or even "more important" as regards to research. 2.8% of comments belonged in this category.
3. **"Men having babies would go against the laws of nature and religion."** 19.8% of visitors felt that men having babies was either immoral or unnatural. Comments containing the words "unnatural" or "against nature" were relegated to this category. Also present are the words "religious reasons" and "immoral".
4. "**Men are not meant to have babies."** Simply enough, many comments consisted of the above sentence. They were placed in this section along with those that elaborated a bit, saying that if men were meant to have babies, they would have come with the correct organs. The percentage of comments that fell into this category was 11.6%
5. **"Men could not handle the pain and ordeal."** This category was reserved for those that thought men were incapable of handling the pain described as both "physical" and "mental anguish". Also in this group are those who felt that men were "emotionally unable" to form the correct bond with the child. 13.8% of visitors responded in this fashion.
6. **"Male pregnancy is a good idea - men should experience the good and bad."** This group, made up predominantly of women, believed that equality should be

carried to the extreme and men should experience the "joy of childbirth" as well as the pain involved. Words like "about time" and "turnabout" expressed sentiment that men should go through what women had to. 19.2% of people felt this way, most of them women.

7. **"Yes - male pregnancy is a good idea."** Some respondents simply answered, "yes" to the question. Some expanded the answer to the form given above. These simple answers make up 1.8% of the total comments.
8. **"No - male pregnancy is not a good idea."** As above, some visitors responded concisely in the negative. These make up 7.6% of the comments.
9. **"My Dad looks pregnant now."** Surprisingly, 0.8% of visitors felt that this area of research was not necessary for the reason above.
10. 18.6% of comments could not be grouped.

**Performance Enhancing Drugs**

The Tell kiosk analysed here dealt with the use of performance enhancing drugs in sport. It addressed the issues of athletes who use drugs to increase their abilities in sporting events, especially the Olympic games. Visitors heard comments from Olympic athletes both supporting and condemning drug-enhanced athletics.

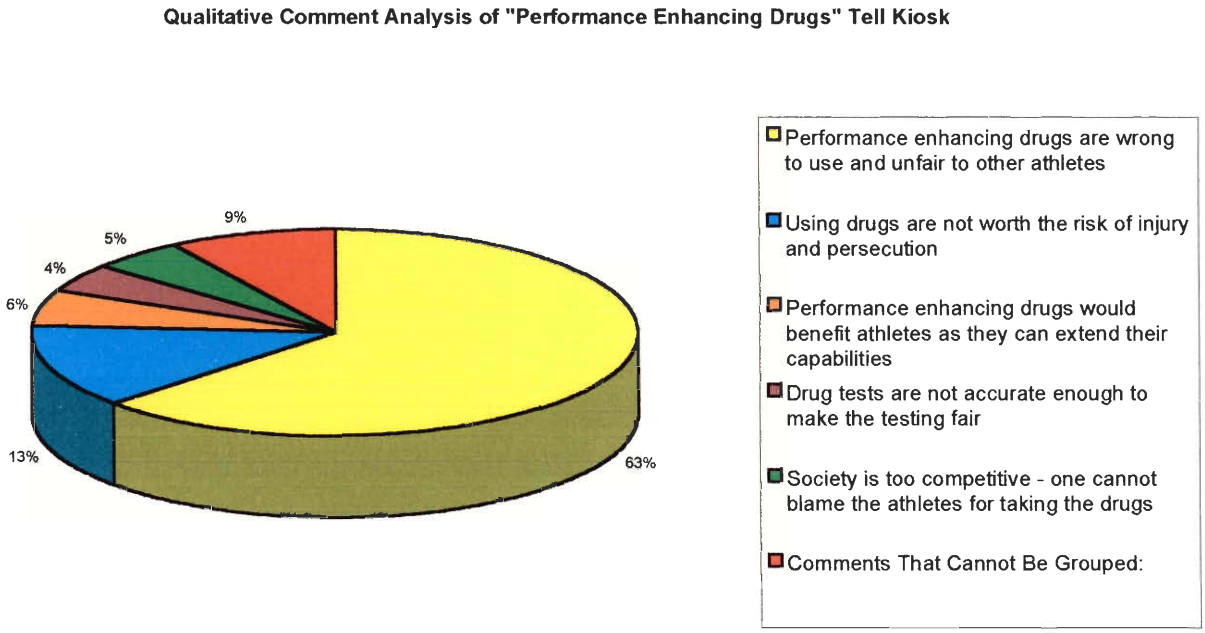


Figure C.9 – Content Analysis Chart for the "Performance Enhancing Drugs In Sports" Tell Kiosk

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1. **"Performance enhancing drugs are wrong to use and unfair to other athletes."** An overwhelming majority of 62.96% of visitors left comments that fit into this category. Loaded words such as "unfair", "wrong", "cheating", and "not real" vehemently placed comments into this category.
2. **"Using drugs are not worth the risk of injury and persecution."** The main feature of comments that fell into this section was the phrase "not worth it". This referred to either physical health risks associated with the drugs, or the lack of true unassisted achievement when drugs are used. 13.15% of comments were of this nature.

3. **"Performance enhancing drugs would benefit athletes as they can extend their capabilities."** Some comments were positive about the use of performance enhancing drugs. These included such phrases as "see how far we can go", "break the limits", and "good idea". Such comments were in the minority, however, with only 5.56%.
4. **"Drug tests are not accurate enough to make the testing fair."** One of the issues attached to this question is the mistaken accusation of athletes who did not use this type of drug. Certain legitimate drugs taken for health reasons can make tests for drug use in competition come out positive. Respondents in this category felt that until such tests were perfected, drug tests were unfair to conduct. Words such as "unfair" and phrases like "incorrectly accused" and "not accurate enough" labelled a comment as belonging to this group. 4.44% of comments belonged here.
5. **"Society is too competitive - one cannot blame the athletes for taking the drugs."** This set of comments voiced the opinion that society today places too much value on winning, and thus the use of drugs that assist athletes in reaching that goal are to be expected. "Win at all costs", "society", and "it's no wonder" are all words that are common to this set of comments. 5.00% of comments expressed this point of view.
6. 8.89% of comments were unable to be grouped.

## Self-Driving Cars

This Tell question asks the visitor to ponder the idea of self-driving cars.

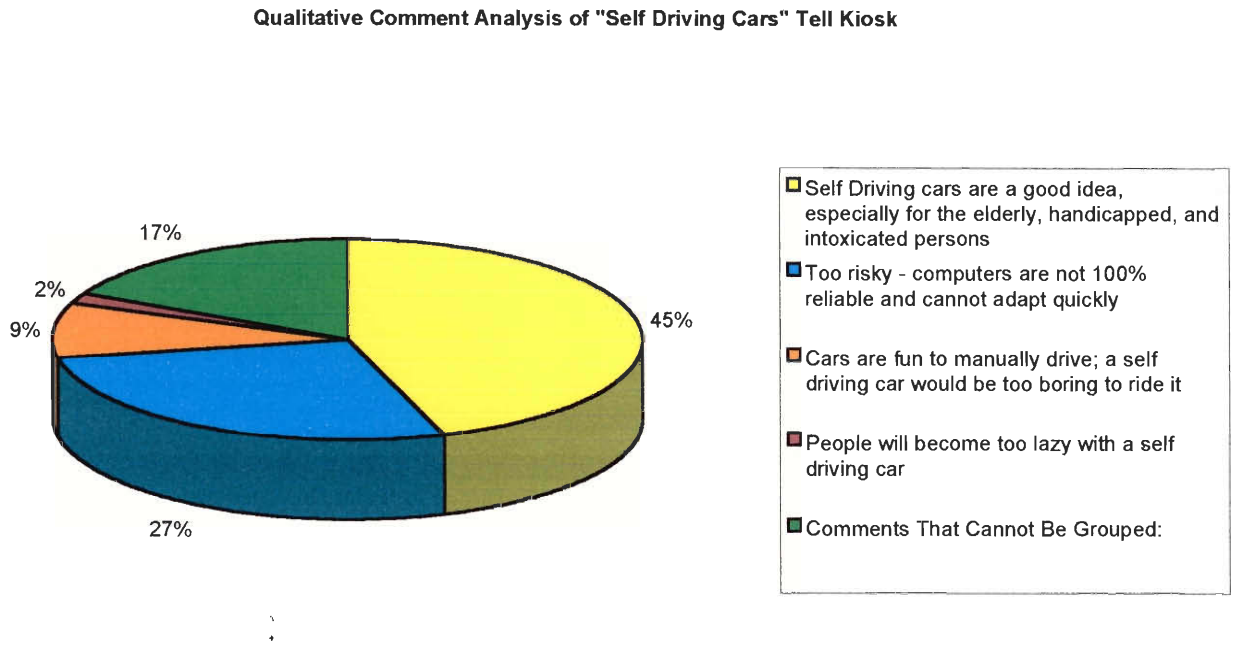


Figure C.10 – Content Analysis Graph for the "Self Driving Cars" Tell Kiosk

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1. **"Self driving cars are a good idea, especially for the elderly, handicapped, and intoxicated persons."** Words such as "useful", "good idea", and "safer" were what identified 44.84% of comments as belonging to this category. These comments thought that self-driving cars would be useful for the elderly, distracted, or intoxicated driver, and many offered hope that car trips would be more entertaining without having to focus on the actual driving.
2. **"Too risky - computers are not 100% reliable and cannot adapt quickly."** "Risky", "viruses", "failure", and "unreliable" were characteristic words that marked comments as falling into this category. 27.05% of visitors were concerned

about the inflexibility and corruptibility of computer programs, and unwilling to trust such a system to driving a car.

3. **"Cars are fun to manually drive; a self driving car would be too boring to ride in."** Visitors who left comments in this vein used phrases such as "love driving" and "enjoy driving" to indicate that they were unwilling to give up the pleasures of driving to a computer. This group of comments made up 8.90% of the total comments on this topic.
4. **"People will become too lazy with a self driving car."** The main word to look for in this group of 1.78% was "lazy". These comments were all very close to the category label.
5. 17.44% of comments could not be grouped.

**Sex Selection**

The Sex Selection Tell station addressed the issue of couples being able to determine the gender of their baby.

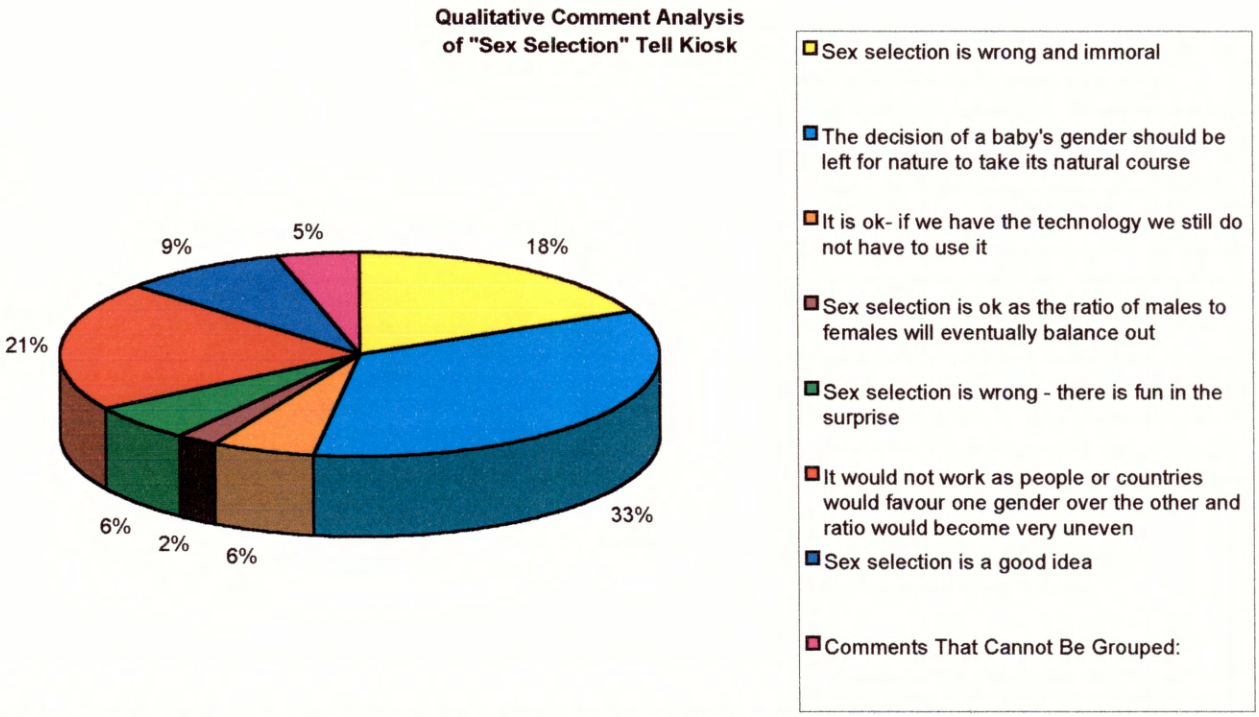


Figure C.11 – Content Analysis Chart for the "Sex Selection" Tell Kiosk

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1. **"Sex selection is wrong and immoral."** This set of comments felt very strongly that gender selection is a horrible idea. "Wrong", "immoral", "interfering", and "God's decision" were the main words and phrases that can be found among comments of this type. 18.18% of visitors left comments of this nature.
2. **"The decision of a baby's gender should be left for nature to take its natural course."** The words "nature" and "natural" are the determining factors in placing a comment into this category. "Unnatural" is also found as a descriptor for gender selection. 34.27% of comments belonged in this group.
3. **"It is ok- if we have the technology we still do not have to use it."** This set of comments is sprinkled with words like "choice", "choose", and "don't need to" in referring to deciding whether to select the gender of a baby. This group made the

point that those who had a problem with using the technology could choose not to, and those who wanted to use it, could. 5.59% of comments fell into this category.

4. **"Sex selection is ok as the ratio of males to females will eventually balance out."** Visitors who felt that there wouldn't be a problem with gender selection as far as uneven distribution of males and females left this type of comment. Phrases such as "balance out" and "even out naturally" are found in this category. The percentage of comments in this group was 2.10%.
5. **"Sex selection is wrong - there is fun in the surprise."** These visitors felt that if sex selection was put into practice, it would take the surprise out of having a baby. Words like "surprise" and "fun" modifying surprise are prevalent here. 5.94% of visitors felt this way.
6. **"It would not work as people or countries would favour one gender over the other and ratio would become very uneven."** Some visitors were concerned about the ratio of males to females becoming uneven. Words like "culture", "male-centred", and "reject" are the main clues that mark a comment as belonging here. These comments drew attention to the fact that in some societies, male babies were valued higher than female babies, and if sex selection was implemented in those areas, the ratio would become terribly uneven. This worry characterised 20.63% of visitors.
7. **"Sex selection is a good idea."** Again we see a simply positive response. This set of comments gave a "yes" to sex selection without any further elaboration. These comments made up 8.74% of the totality.

8. Comments that could not be grouped made up 4.55% of the total.

## Tracking Children

This Tell station addressed the issue of tracking children with implanted microchips via satellite.

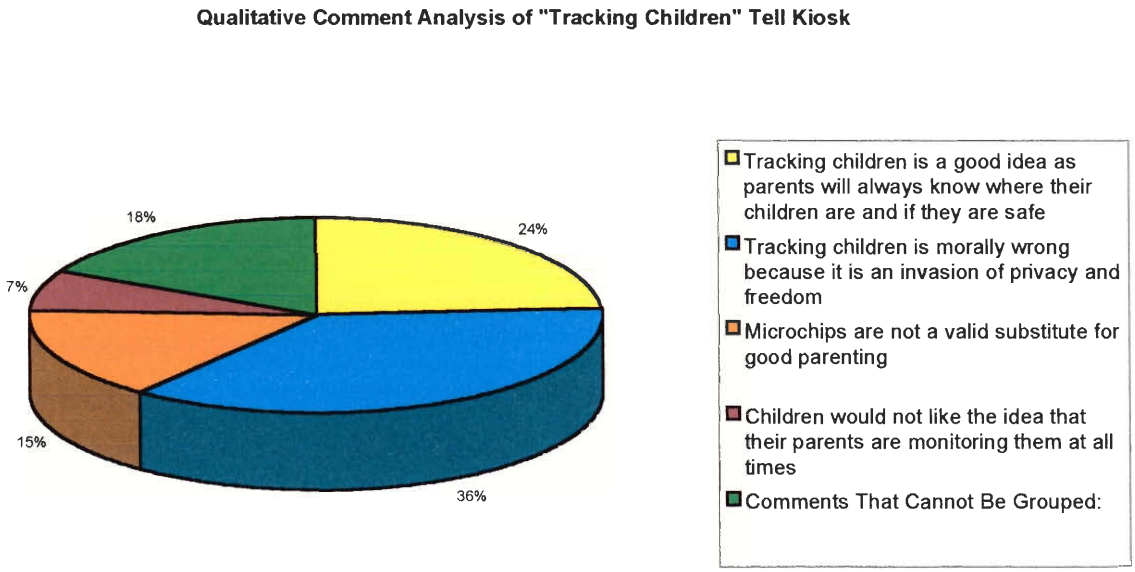


Figure C.12 – Content Analysis for the "Tracking Children" Tell Kiosk

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1. **"Tracking children is a good idea as parents will always know where their children are and if they are safe."** Safety first was the call of these visitors who felt that keeping track of children was a fabulous idea. Words and phrases such as "safety", "prevention", "protection", and "protect the children" were found in this set of comments. 23.94% of comments were of this nature.
2. **"Tracking children is morally wrong because it is an invasion of privacy and freedom."** "Morally wrong", "not right", "invasion of privacy", and "children's

rights" were the phrases that identified a comment as belonging to this group. While some of these comments did allow that there were some benefits to the idea as far as safety goes, they felt that the invasion of privacy that resulted outweighed the benefits. The percentage of comments that fit into this group was 36.62%.

3. **"Microchips are not a valid substitute for good parenting."** These visitors felt that parental guidance was enough and that just having a location on one's child is not a good substitute for good parenting. "Should do" was found often in this group of comments in relation to teaching children rather than controlling them completely. 15.14% of the comments in this group fell into this category.
4. **"Children would not like the idea that their parents are monitoring them at all times."** This final group of visitors felt that children would never accept the idea of being monitored constantly by their parents. "Hate the idea", "wouldn't accept", and "no way" were the main phrases modifying the idea of tracking children for this set of comments, which made up 6.69% of the total comments.
5. 17.61% of comments could not be grouped.

# Appendix D – NMSI Tell Scripts for Original Sites

All material contained in this Appendix was produced and implemented by the National Museum of Science and Industry for the Tell system in the Wellcome Wing.

## Feedback point content document: Use of drugs in sports

**Top level question:** Tell us what you think about the use of drugs in sports.

**Videos:**

We'd like you to tell us what you think about the use of drugs in sport. Listen to these Olympic athletes and their coaches, and then type your comment. Footage courtesy of BBC Panorama.

Dianne Williams, former Olympic athlete

> "I was able to run faster than I ever dreamed possible through the enhancement of drugs"

Ben Johnson, disqualified Olympic athlete

> "I didn't like the idea but I guess if those guys are cheating, might as well join them."

Pat Conolly, former Olympic coach

> "I know a lot of athletes who, if you told them they could take a pill today and they would be the greatest athlete in the world and they would set the world record, but they would die tomorrow, that wouldn't matter..."

Gail Devers, Olympic athlete

"When I'm 60 years old and I'm looking back on my career and I'm telling my grandkids look at what grandma did, I can say that I did it of my natural God-given ability."

Angella Issajenko, former Olympic athlete

"It should be left up to an individual to do what ever they what to do."

**Further information:**

**Caught Cheating**

Athletes are stripped of their medals if they get caught cheating with drugs. They will also be banned for two years.

**Drug Tests**

Current drug tests show that only one percent of athletes are cheats. But there may be many more avoiding detection by using banned drugs the authorities can't detect.

**Health Risks**

Drug cheats are risking health problems and even death by taking drugs in dangerously high doses.

**Why do athletes take drugs?**

Athletes are under pressure to perform well and break records. Drugs can help athletes build muscle, improve their stamina or give them bursts of energy.

## Feedback point content document: Robot Submarines

**Top level question:** Tell us what you think about robot submarines.

**Videos:**

There may be some benefits. There may be some risks. We'd like you to tell us how you think robot submarines affect the underwater environment. Please listen to these videos, then type your comment.

Clare Perry, Environmental Investigation Agency

We are very concerned about putting more noise into the marine environment because we believe they may interfere with the navigation of the whales and dolphins and cause them to strand.

Dr Cliff Funnell, Editor, Jane's Underwater Technology

Robot submarines have proven to be less disruptive to marine life than existing methods using ships… if we want to protect the oceans we need to use tools like robot submarines.

**Further information:**

**What are robot submarines?**

Robot submarines need no driver or remote control. They are computer-programmed to navigate alone in the ocean.

**What can they do?**

Robot submarines can explore places that humans have never seen. They can count fish stocks in shark-infested water, and hunt for treasure at the bottom of the sea.

**How do they navigate?**

Like dolphins and whales, robot submarines use sonar to navigate. They use sound to find their way around by sending out chirping noises and listening for the distinctive echoes.

**Environmental Concerns**

A problem could be that there are too many sonar signals bouncing around the oceans confusing marine animals, especially creatures that depend on sonar for survival. Sonar pollution has been blamed for some whales beaching themselves in the United States.

**Overcrowding?**

Some environmental groups believe we are over-crowding our oceans with marine technology like robot submarines.

## Feedback point content document: Animals for Research

**Top level question:** Tell us what you think about using animals in medical research.

**Videos:**

We'd like you to tell us what you think about using animals in medical research. Think about what these people say, then type your comment.

What gives us the right to cause suffering in another animal just so we can stop suffering in ourselves?

If your child was dying, would you worry about the rights of a rat?

Animals are nothing like humans. It's a complete waste of time doing research on them. You'll never find out anything useful.

Without experiments on animals no significant advances in science would ever have been made.

It's OK to use animals for medical research, but if scientists are just using them to find out about things they're interested in, and that isn't right.

For heaven's sake, they're only animals!

**Further information:**

**Do Animals Have Rights?**

It is difficult to decide what kinds of rights animals have. Some people believe that animals have the same right not to be killed or made to suffer as humans do.

**Helping Research?**

The vast majority of scientists would agree that without animal experiments, most medical procedures and drugs would never have been developed. However, animals are not the same as humans (or each other) in every way. Sometimes testing on animals doesn't show up the problems that might occur in humans.

**Are There Any Alternatives?**

Some people say that there is no need to use animals now that there are alternatives such as human cells grown in labs. These are useful, but can't tell you everything. It is impossible at present to measure things like blood pressure, pain or memory in cell cultures. Whole animals are much more complicated than cells.

**Where Do We Draw the Line?**

Many people support the use of animals in medical research. Yet a lot of animal research does not lead directly to any medical benefit, but instead just increases our knowledge of biology. Is this kind of work just satisfying our curiosity, or is it essential as a basis for medical research?

## Feedback point content document: Genetic Testing for Huntington disease

**Top level question:** Tell us what you think about genetic testing for Huntington disease.

**Videos:**

We want you to tell us what you think about genetic testing for Huntington disease. Watch this short film then type your comment.

Interviewer: Huntington disease is an incurable genetic condition which kills anyone who has the gene, usually in middle age. If the gene is in your family, you can now take a test to see if you have inherited it.

Mark, 23: My Grandmother died of Huntington's when she was only 40. I didn't know her, but I know I could've inherited the gene. I want to take the test. I don't spend my life worrying about it. If I have got the gene I need to plan for it.

Linda, 45: If Mark takes the test and turns out positive we'll know my husband Geoff has it too. Now, we've lived all these years without knowing, what good will it do for us to know now?

Interviewer: What should Mark do? What would you do? Would you want to know? Tell us what you think.

**Further information:**

**What is Huntington Disease?**

Huntington disease is a genetic condition that affects about one in 10,000 people. Those who inherit the gene always develop Huntington disease, usually between the ages of 30

and 50. Cells in the brain are gradually damaged, eventually leading to the patient's death some years later.

### A genetic test

People who have seen family members die of Huntington disease can now take a test that will tell them whether or not they have the gene. Since there is no prevention and no cure, many people who are at risk see no point in being tested. Others decide that they would rather know, either to put their minds at rest or so they can make plans for the future.

### Difficult Issues

At present only around 1 in 5 people who might be affected choose to be tested. The disease cannot 'skip a generation'. If you have inherited the gene, your Mum or Dad must also have it. This can cause conflicts within families. Genetic clinics are generally very reluctant to test someone if the parent has not been tested, but will usually do so if the child insists.

### Want to know more?

If you want more information on Huntington disease call the Huntington's Disease Association on 020 7223 7000, or visit their Website at www.hda.org.uk

## Feedback point content document: Drugs for depression

**Top level question:** Tell us what you think about treating depression with drugs.

**Videos:**

We want you to tell us what you think about treating depression with drugs. Think about what these people say, then write your comment.

Antidepressants saved my life. Without them I honestly believe I would be dead.

My son took his life two weeks after he started on antidepressants. He would never do a thing like that. Those drugs are to blame.

It's all gone too far. Everyone gets down, and people should deal with their problems, not try to mask them with chemicals.

Depression is more than just being down, it's an illness, and it should really be treated like one. If you broke your leg, for instance you wouldn't just wait for it to set itself, would you?

Depression isn't necessarily an illness, and making it a medical problem isn't always useful. You can get help without resorting to drugs. I know counseling helped me a lot.

**Further information:**

**What is depression?**

Everyone feels down from time to time, and depression is hard to define. Sadness exists on a scale from just feeling down to being seriously depressed and crippled by feelings of despair and hopelessness. At its most serious, depression can be fatal.

**How common is it?**

It is thought that up to 1 in 4 people suffer from depression at some point in their lives.

**How is it treated?**

The most common treatments for depression are talking therapy and antidepressant drugs. Arguments rage over the use of these drugs.

**Who needs antidepressants?**

Some people believe that antidepressants are being over-prescribed, and given to people who don't really need them. Where do you draw the line? When is medication appropriate?

**Are there any side effects?**

Most sufferers respond well to antidepressants, but some experience serious side effects, and a minority even claim that they can actually increase the risk of suicide.

**Where can I find out more?**

Call the Mind info Line on 020 8522 1728, or visit their Website at www.mind.org.uk for more information on depression or any other aspect of mental health.

## Feedback point content document: Human Cloning

**Top level question:** Tell us what you think about Human Cloning.

**Videos:**

We'd like you to tell us what you think about human cloning. Think about these questions, then type your comment.

Why shouldn't I be allowed to clone myself? Who are you to stop me if it doesn't hurt you?

If my baby dies, why shouldn't I be allowed to replace her with her clone?

If cures for diseases could be found using cloned embryos, should we allow it?

I'd be horrified if I found out I was a clone. Just imagine what that would feel like. I'd need counseling for sure.

**Further information:**

**What is cloning?**

Cloning is the creation of genetically identical copies of a living thing. Humans have not yet been cloned, but they might be one day. A cloned human would have to be born and grow up just like any other baby. You can't clone an adult to instantly get another identical adult.

**Nature or nurture?**

Clones would not grow up to be exact copies of the people being cloned. We are influenced by our environment as well as by our genes. Clones would be more like younger twins.

**Medical uses of cloning**

Embryos grown up to a certain stage (up to 14 days in the UK) are currently used in medical research. It would sometimes be useful if these embryos were clones. Cloned embryos might help scientists find out about genetic diseases, or could be used as a source of cells for vital transplants.

## Feedback point content document: Computer Games

**Top level question:** Tell us what you think about Computer Games.

**Videos:**

We'd like you to tell us what you think about computer games. Listen to these people, then type your comment.

I never see my son any more. At least with the telly we used to watch it together. He never does anything else, and his school work is really suffering. He won't even go to his gran's without the console.

Games are much better than TV, because you get to join in instead of just watching. And you can play with your mates too.

People blame these things for violence, but I reckon kids know fact from fiction.

How many girls are interested in computer games? It's no wonder when the only female characters are obviously just male fantasies!

**Further information:**

**Computer Games**

There are over 5.5 million of the latest games consoles in this country. Many of the games feature realistic animated violence, with players battling brain munching zombies, machine gunning endangered species or striving to become drug overlords.

**Regulating Computer Games**

Computer games are subject to regulation just like films are, and some of the most violent have 15 or even 18 certificates. Children can still quite easily get hold of them, just as they can rent out 18 certificate videos.

**For Good or Evil?**

Many people would argue that these games are certainly no worse than anything children can see on TV, and could even be good for children, improving co-ordination and developing familiarity with technology. Many games, including non-violent sports simulations are multi-player, and so encourage social interaction in a way that TV can't.

## Feedback point content document: Censorship on the Internet

**Top level question:** Tell us what you think about Censorship on the Internet.

**Videos:**

We'd like you to tell us what you think about censorship on the Internet. Listen to these people, then type your comment.

The Internet is the last place on earth where there's still true freedom of speech. Let's keep it that way.

I care a lot more about my kids than I do about free speech, and I don't want them seeing porn and goodness knows what else.

Nobody should be allowed to ban any Internet content. It's the start of a slippery slope to complete control. Its up to you as parent to make sure what your children see or don't see on the Internet.

Criminals like pedophiles and football hooligans can get in touch with each other on the net. We need to keep them off.

**Further information:**

**An Amazing new tool**

The Internet is changing the way we learn, shop and communicate. The international and unregulated nature of the net means that there is an unrivalled potential for creativity, freedom of expression and exchange of ideas.

**Potential problems**

Because of the absence of regulation, anyone can publish pretty much anything they like on the net, including violent and pornographic material. Many people argue that everyone has a right to look at whatever they like, but on the Internet this material is readily available to children.

**Is regulation the answer?**

Anything which is illegal in print is still illegal on the Internet. But the Internet makes it easier to distribute such material. Should the Internet be regulated, or should parents be responsible for what they and their children access?

## Feedback point content document: Intelligent Homes

**Top level question:** Tell us what you want intelligent homes to be able to do.

**Videos:**

> Some time in the future your household appliances might get more and more 'intelligent'. Tell us what you want them to do. Listen to what these people say, then type your suggestion.
>
> I want my freezer to notice when I'm out of pies and automatically order some more over the Internet.

I expect my toilet to perform a quick analysis when I'm done, and tell me if I need to go to the doctor's.

I'd like my video to know when I'm out and automatically tape 'Eastenders', because I always forget to set it.

**Further information:**

**Intelligent Computers**

Computers are nowhere near being as intelligent as we are, but they can be programmed to carry out some quite complex tasks.

**Computers in our homes**

We already have many computers in our homes, in washing machines, video recorders and fridges. You can buy integrated systems which turn lights on when you enter rooms, switch on heating as soon as you drive up to the house, or direct music to automatically follow you as you move around. Do you really need a stereo in every room?

**Future technology**

As this technology develops and begins to interface with the Internet, our homes may become truly automated.

## Feedback point content document: Holidays in space

**Top level question:** Tell us what you think about holidays in space.

**Videos:**

In 2020 you may be able to buy a holiday in outer space. How much would you be willing to pay for it? What would you like to do when you got there? Tell us what you think.

**Further information:**

**Out of this world**

Can you imagine yourself weightless in orbit or bouncing high into the air in a hotel on the Moon? To most people, a holiday in space would be an amazing experience: exciting and memorable. Yet there are many factors holding back space tourism at present. The main one is cost.

**Making it cheaper**

Future spacecraft will be fully reusable, and will not need a major overhaul between flights, dramatically reducing the cost of a launch. NASA is already designing reusable spacecraft, and so are private companies. There is a $10 million prize - called the X-prize - for the first company that can develop a reusable passenger vehicle for space travel.

**Up, up and away**

The first space tourism will probably involve brief pleasure flights into orbit. There are also plans for Earth-orbiting space hotels. Further into the future, hotels and even whole tourist cities - may appear on the Moon. Nobody knows when, but many space experts believe that it will happen.

**Making money**

If space tourism takes off, it will be big business. Whoever offers the first holidays in space will probably make huge profits. Some of this money could be used to fund space-based scientific research. So, a scientific base on the Moon might be paid for by the profits of a hotel - also on the Moon.

**Watch this space?**

Launching a rocket into space requires huge amounts of energy, which is very costly. Getting services and supplies to holidaymakers in space or on the Moon would be very expensive, too. Just how many people would be prepared - or able - to pay will decide the future of space tourism. How much do you want a holiday in space?

## Feedback point content document: Self Driving Cars

**Top level question:** Tell us what you think about self driving cars.

**Videos:**

> In 20 years' time you could own a computer-controlled car that'll drive itself on busy roads. This might get rid of dangerous drivers but would you trust a self-driving car? Tell us what you think.

**Further information:**

**The ultimate in 'hands-free'**

Many transport experts believe that 'intelligent', self-driving cars may appear on major roads within twenty years. The main aim is to allow more traffic to flow more safely along a given road. In a self-driving car, the driver would be free to eat, work and even sleep, while the car drives safely, reducing the chance of collisions.

**How will it work?**

The idea is simple enough: various devices attached to the car collected information about the road and about the other road users. The information passes to an on-board

computer, which activates motors that control the accelerator, steering and brakes. It would be like a sophisticated auto pilot - for a car.

**Reading the road**

[or Super information highways]

In some proposed schemes, devices called magnetometers - attached under the cars' bumpers - detect magnets embedded every meter or so in the middle of each lane of the road. The magnets are arranged in patterns that carry information such as 'motorway junction ahead' or ' road bends to the left'.

**Driving in formation**

Self-driving cars could be 'platooned' so that they operate in closely coordinated groups, with only a few meters of space between them. They would exchange information with each other about what they are doing and any obstacles ahead. This would be a bit like a train, but the platoon could split and reform as cars wanted to join and leave.

**The road ahead?**

Researchers in several countries are already working on these 'smart cars', and prototypes have already been produced and demonstrated. However, there are many people who think that it is an alternative to the car itself - not simply an alternative way to drive - that's needed for the future.

## Feedback point content document: Tracking children

**Top level question:** Tell us what you think about tracking children.

**Videos:**

In 2020 parents may be able to keep track of their children using computer chip implants. Surgeons could put a chip underneath the skin of every child. Will parents feel more at ease? And what about the children? Tell us what you think.

**Further information:**

**Keeping track**

In 2020 you may be able to keep an electronic eye on your loved ones, by using a tracking system developed from military satellite technology. Parents would be able to find out where their children are at all times. The technology would make use of GPS - the Global Positioning System.

**Finding the way**

People have used the stars for navigation for thousands of years. The Global Positioning System is like a constellation across the whole sky, but consists of satellites in Earth-orbit rather than stars. It can help you work out your location to the nearest meter or even less, wherever you are in the world.

**Good timing**

Each of the 24 satellites that make up the Global Positioning System carries an extremely accurate clock and constantly transmits a precise signal down to Earth. A GPS unit - typically carried abroad ships or hand-held - works out its position by analysing the signals from four of the satellites. Now GPS, units are available on microchips.

**Phone home**

[or silicon implant]

A GPS microchip implanted in a child's body, perhaps at birth, would always know where it - and therefore the child - is. The chip would communicate its position to local

receivers, working much more like a mobile telephone. The receivers could send details of the child's whereabouts to parents.

**Will it happen?**

It really is possible to implant microchips inside the body: some dogs carry microchip implants as hi-tech identity badges. And researchers in Japan are investigating GPS tracking systems for people with dementia. But would it be right to put one of these microchips into children before they are old enough to decide for themselves?

## Feedback point content document: Sex selection

**Top level question:** Tell us what you think about selecting the sex of your baby

**Videos:**

> In the next 20 years, people may be able to easily buy a pill to choose the sex of their baby. Would you like to have that choice? Or would it be immoral? How would the world change as a result? Tell us what you think.

**Further information:**

**Do you want a girl or boy?**

In twenty years time people may be able to choose the sex of their baby in advance, by buying a pill at a chemist's. A baby begins when an egg is fertilised by a sperm. There

are two types of sperm: one type produces a boy and one produces a girl. So to choose the sex of a baby, you have to allow only one type of sperm to fertilise an egg.

**Chromosomes count**

The sex of a baby is determined by chromosomes, which are lengths of DNA (deoxyribonucleic acid) found inside cells. Most human cells contain 23 pairs of chromosomes, including one pair of 'sex chromosomes'. The sex chromosomes are labelled 'X' and 'Y'. A female's cells carry to X chromosomes, while a male's cells carry both an X and a Y.

**Making babies**

Unlike most human cells, eggs and sperm carry only one of each chromosome pair. Eggs carry a single X chromosome, while sperms may carry a single X or a single Y. So, if an X-carrying sperm fertilises an egg, the resulting baby will be a girl (XX) and if a Y carrying sperm fertilises an egg, it will be a boy (XY).

**It's already here**

At present, some prospective parents already use laboratory-based techniques to sort the two types of sperm. The procedure is not completely accurate, and is costly. A pill that worked by killing or immobilising all of one particular type of sperm could potentially offer one hundred per cent accuracy.

**Why choose?**

There are many reasons why people might want to choose the sex of their baby. Carriers of diseases that affect only boys could choose to ensure that they only have girls. A family with two girls may want to have a baby boy as their third child. Some people may simply prefer one sex over another, while others may be influenced by religious teachings.

## Feedback point content document: The future

**Top level question:** Tell us what you think about the future

**Videos:**

> Our lives are certainly going to be affected by new science and technology. But no one can ever be sure what the future holds. What new technology would you like to see in the future? Are you looking forward to your life changing? Tell us what you think.

**Further information:**

**Looking ahead**

What do you see when you conjure up a picture of life twenty years from now? Robots doing household chores? Amazing new medical cures. Videophones in every home and cars that hover? Some of your predictions may well be right, but no one can be sure.

**A changing world**

Over the past hundred years, many new technologies, such as antibiotics, television, cars and nuclear power, have made a huge difference in the way we live. Each of these technologies was made possible by advances in scientific understanding; each one has brought with it many choices, for individuals and for the world.

**Into the unknown**

Looking forward one hundred years of more is impossible - who could have predicted the huge impact of the World Wide Web a century ago, for example? But looking just twenty years into the future, we can make educated guesses about how life will be.

**Making a prediction**

Futurologists - people who try to work out what the future might be like - make their predictions by studying trends in society and finding out what scientists are working on now. But they have to be cautious: no one can predict the future with certainty.

**Map of the future?**

One recent achievement in science is the complete mapping of the human genome. With the map, we have a chance to understand ourselves better. And, like all scientific advances, this one is making new technologies possible. It will probably change our lives forever. But then, you never know.

## Feedback point content document: Male pregnancy

**Top level question:** Tell us what you think about male pregnancy

**Videos:**

> In 20 years time, men might be able to have babies. It may be risky. If you're a man, would you want to have a baby? What if you're a woman? How would this affect the world we live in? What if your dad was pregnant? Tell us what you think.

**Further information:**

**Men having babies**

It sounds like science fiction, but many medical scientists believe that men really could become pregnant. Every baby develops from an embryo, which grows from a fertilised

egg. But an embryo normally implants inside a woman's womb, so how could men - so how could men - who do not have wombs - become pregnant?

**Misguided embryos**

Pregnancies normally occur in a certain part of the womb. Any pregnancy that occurs somewhere else is called ectopic. In most ectopic pregnancies, the embryo implants inside the fallopian tubes, which connect directly to the womb. Sometimes, however, embryos implant elsewhere in the abdomen.

**Males have abdomens**

Abdominal pregnancies are extremely rare, but in some cases they have produced healthy babies. So, for a man to become pregnant, doctors would produce a fertilised egg outside the body, by in vitro fertilisation (IVF), and then transfer it into his abdomen. The embryo would attach to say, the intestines, which are well supplied of blood.

**Risky business**

Abdominal pregnancies are not only rare, they are also extremely dangerous. Most are terminated to save the life of the pregnant woman. In future, medical scientists may work out ways to safeguard the health of women - and men - who have abdominal pregnancies.

**Will it happen?**

To sustain his embryo, a pregnant man would need doses of female sex hormones, which would make him grow breasts. Doctors would deliver the baby surgically, and probably several weeks premature. Male pregnancy will never be commonplace, but in 2020 the necessary technology may be, and there could be hundreds or even thousands of pregnant men.

## Feedback point content document: Growing Younger

**Top level question:** Tell us what you think about growing younger

**Videos:**

In 2020 old people might be able to take drugs to make them look younger and feel fitter? How would this change the world? Will granny steal your boyfriend? What if granddad went clubbing with your mates? Tell us what you think.

**Further information:**

**Holding back the years**

We've all heard claims from cosmetics manufacturers that their products can keep you looking and feeling young. Are these claims true? What changes take place as we age, and how might people try to fight off the signs of ageing in 2020?

**Skin deep**

Pinch the skin on the back of your hand, and it pulls itself back. Skin owes this elasticity to a network of fine fibres. Skin becomes less elastic with age: the fibres degenerate due to wear-and-tear and through exposure to sunlight. They also become rigid,- as a result of 'cross-links' - bonds between the molecules that make up the fibres.

**Future skin-care**

At present, there is little that can be done to protect the fibres, other than staying out of sunlight. However, some anti-ageing researchers believe that in the future there may be some way of promoting their regrowth or reversing the cross-linking. This really could keep skin young-looking and banish wrinkles forever.

**Topping up**

Another area of ageing research concerns hormones. Levels of certain hormones decrease with age. Researchers have provided 'top-up' doses, with interesting results. They have caused increases in bone density, muscles weight and the elasticity of skin - reversing some of the signs of ageing.

**A young future**

Most anti-ageing technology aims to improve the quality of life, not to increase life-span. In the future, there may be cures for age-related diseases, such as Alzheimer's disease. Soon, a new wave of anti- ageing products may be available for testing. But some of these may have harmful side effects or simply not work at all. Would you be willing to try them?

# Appendix E – National Museum of Science and Industry's Tell Comment Editing Policy and Editorial Background Document

All material in this Appendix was produced for the National Museum of Science and Industry for the Tell system in the Wellcome Wing.

**Policy document for selection and editing of visitor comments**
National Museum of Science and Industry. (2001).

**Summary**

- Use your common sense
- You should not exclude every comment that could possibly offend anyone

You should exclude comments that:

- Are irrelevant to the question
- Needlessly repeat comments which have already been left by many other visitors
- Are likely to put the Museum in a difficult legal position
- Are clearly offensive to a vast majority of people, or to minority groups who may not be able to speak up for themselves

You should edit comments for:

- Certain types of bad language
- Spelling and grammar, where the comment would otherwise be difficult to read

If in doubt, refer to your Line Manager

These guidelines should allow most visitor comments to be selected and edited in a sensible and consistent way. If there is any doubt about a comment, you should consult your line manager.

The golden rule is use your common sense.

The Wellcome Wing should give as many people as possible the chance to have their say, and we should ensure that the majority of comments which relate to the topics are displayed. You should not exclude out of hand every comment that could possibly offend people.

## Detailed guidelines

### 1. Relevance

Many of the comments will have nothing to do with the subject in question. Irrelevant comments include:

- Strings of random characters
- Visitors' names and nothing else
- Comments which have nothing at all to do with the question e.g. "My boyfriend is from Denmark"
- Comments on the museum in general rather than on a particular aspect of the gallery relating to the topic in question e.g. "I love the Science Museum"
- Random insults e.g. "Naomi smells of cheese"
- General swearing with no other content

### 2. Non-specific and repetitive comments

Many comments will be short and not specific to the question asked: e.g. "I think it's a great idea" or "I think it shouldn't be allowed". Some comments will be longer but will be repetitive of earlier comments. The following guidelines should be used with both types of comment:

- The number of very short comments included should depend on how many longer comments are left. If there are a lot of longer comments, more shorter ones should be included. No more than 5% of the comments should be short and non-specific.
- The balance of positive and negative comments of this type should roughly reflect the ratio in which they were left.
- Comments that might refer to either the question or the Museum in general, such as "I think it's brilliant" should be used only where there are not enough short comments which relate to the question.
- Unless the exhibit is in danger of being overrun by a single type of comment, longer comments repeating more or less the same thing as earlier comments should still be included.

**3. Legal considerations**

The laws which relate to publishing are complex, and full details are given in a separate document written by the Museum lawyer. The following is just a brief summary of the most important points, which are most likely to concern us. It is unlikely that you will ever come across anything which is likely to lead to a problem, but if in doubt always consult your line manager.

***Libel***

The museum has a legal responsibility not to publish any views that are potentially libellous. Comments that could damage the reputation of (defame) a named (or clearly identifiable) person or organisation should not be included, unless we are absolutely confident that we could prove any accusation is true, or we are sure that the person or organisation will not sue.

For example comments which are potentially libellous, such as "We could have two Tony Blairs and that would be terrible" are highly unlikely to cause problems, but "I know Tony Blair takes heroin" might.

The three questions to consider before including something potentially libellous are:

- Is the statement true?
- Can the statement be proved?
- Is the subject of the statement likely to sue?

***Obscenity***

Obscenity is legally defined as material which has a 'tendency to deprave and corrupt'.

We must be careful not to publish anything which could be considered obscene in this sense, especially as we have an audience which includes children. Note that the legal definition of obscenity is very different to the commonly used definition. In this sense obscenity is likely to include things such as advocacy of drug taking. However, context is important here. If we ran a feedback point on the legalisation of drugs, those kinds of views might be allowable.

***Public order and racial discrimination***

Legally we must screen out comments which:

- Are threatening, abusive or insulting
- Incite or advocate violence or hatred against a group of persons in Great Britain defined by reference to their colour, race, nationality or ethnic origins.

**4. Offensive comments**

Comments may be racist, sexist, blasphemous, incite violence, or be offensive to minority groups. We should screen out comments which would be clearly offensive to most people, or to minority groups which may not feel empowered to argue against views which offend them. This should include sexists comments about both men and women, as well as other kinds of comments which are offensive to other groups not normally considered.

Comments which uphold potentially dangerous and extreme views should not be dismissed out of hand, but should always be considered very carefully and discussed with your Line Manager.

Comments insulting a religion can potentially be racist, given the close association between race and some religions. In other respects, a comment which attacks a religious belief should be treated no differently from one which attacks any other strongly held belief. No special status should be given to any one religion. A rule of thumb would be to screen out comments which are offensive where people of a religion are being treated as a group, but allow comments which argue against the *beliefs* of that religion. So for example "Christians are crazy" would not be acceptable, but "The idea of someone being resurrected is crazy" is acceptable.

Comments which some people might find offensive should still be included - screening out all such comments would deprive us of a much needed source of humour on the galleries. The basic rule to follow is that you should exclude comments which are insulting to any specific *group* of people, but include comments which could be mildly offensive to people on other grounds. This is a tricky area, and you should consult your line manager in borderline cases.

Examples of comments which we would not include would be:

"I think that tests on animals are bad, we have Asians to test on!" *[Clearly racist]*

"I would like the Government to pass a law so that there are more women born as we know they are the supreme race" *[Sexist - certainly would not be acceptable if reversed, so is not acceptable as is]*

"[Holidays in space] will never catch on as long as we have Blackpool, its already full of alien life forms". *[Racist in a different way - would not be acceptable if about say Brixton]*

Examples of comments that we would include would be:

"Robot subs are so sexual...think about it...big floating mechanical phalluses...c'mon people, you know what I'm talking about..." *[Not offensive to any specific group]*

"I don't think we should censor the Internet. At the end of the day, do we want to be like the Chinese, only being allowed to watch what somebody else allows us to?" *[Not insulting Chinese people as a race, but making a comment on Chinese politics]*

"Why can't we use convicted criminals instead of using rats or mice for experiments" *[A distasteful view, but not quite the same as targeting a racial group, and opens up a potentially interesting discussion]*

In borderline cases such as the comment immediately above, it may be worth using the discussion comment facility to allow people who could be offended, or have strong views on the subject to directly answer the comment.

**5. Bad language**

The majority of comments that include bad language will be rejected for other reasons. For those comments which are otherwise suitable, we aim to operate a comparable selection process to the BBC's guidelines for family audiences, or U-certificate films, recognising that the written word can often have more impact than the spoken word.

To this end we are allowing the use of mild swearwords whilst screening out any stronger swearing. The currently allowable list of words is:

Damn, hell, God, sod, bloody, piss, bugger, crap, arse

Where comments which we wish to use contain bad language that is not allowed, the words should simply be deleted. If this affects the meaning of the comment, the comment should be rejected. Bad language should never be 'starred out'. Comments from which swearwords have been deleted should not be attributed, even where the visitor has left their name.

**6. Strange comments**

A number of comments which will appear are really weird. These should be included as long as they conform to the guidelines given so far. Particularly important here is that of relevance. Odd comments which nonetheless are in some way related to the question should be included, whereas strange comments which have no connection to the question should be excluded.

**7. Editing comments for spelling and punctuation**

Comments may be edited for in order to make them more readable:

- Where it is unambiguous what the visitor meant to say, comments may be edited for spelling, punctuation (including adding commas to break up long sentences) and use of capital letters, to improve readability.
- No changes should be made which alter the meaning of a comment.
- No changes to grammar should be made except where the comment is unreadable in its original form.
- Where there is any ambiguity, and incorrect spelling makes a comment very difficult to read, the comment should be rejected.

- Comments which have been edited for spelling and punctuation can still be attributed where the visitor has left details.

Editing every comment for spelling and grammar can be very time consuming, especially where the visitor has left the entire comment in capital letters. The inclusion of some spelling and punctuation errors adds to the impression that these are real comments being left by real visitors, and it is acceptable to leave many of them in. The primary concern should be readability. Comments which are chosen as discussion comments should always be fully edited for readability however.

# Editorial background document

National Museum of Science and Industry. (2001).

This document should eventually be written as a series of answers – why feedback, Why use computers, why not use audio feedback, why not star out swear words etc. It should be the represent the accumulated knowledge of the feedback team.

## 1. Background

'Tell us what you think', a family of twelve computer exhibits in the Wellcome Wing, enables visitors to voice their opinions on issues in contemporary science and technology. In each exhibit visitors are given a subject or scenario to consider, then can type a comment of their own or read comments which have been left by other visitors.

The twelve computer points are linked to a Microsoft Access database which enables the museum to read all the comments which have been left by visitors, then select and edit them for uploading onto the exhibits for others to read.

This document explains why we need to edit comments, and how we arrived at the editorial policy we did. Separate documents detail how to use the database, the editorial guidelines, legal implications and guidelines on creating new topics.

## 2. Why do we need to select and edit comments?

We need carefully to select and edit the comments we include in the exhibits.

- Many comments left consist of little more than graffiti, often including obscene language. The number of such comments is far less than when using pen and paper feedback or when there are no introductory videos, but is still significant.
- Even where they are not just graffiti, there may be comments which we will not wish to put up, if they

contain excessive bad language, racism, sexism or defamation for which the museum might be held legally responsible, or which contradicts Museum or government guidelines.

- The keyboards on the exhibits are not particularly easy to use when standing in a gallery, and this will lead to typographic errors, poor spellings and bad punctuation. In order that the comments are easily readable by other visitors, we will need to correct some of these errors.
- Many of the comments which visitors leave are extremely short, and often repeat what other visitors have already said. A long list of identical comments will be boring for other visitors to read.

**3. Why do we select out non-specific and short comments**

Many comments will be short and not specific to the question asked: e.g. "I think it's a great idea" or "I think it shouldn't be allowed". These are valid comments, but are not very interesting to read and do not add much to the discussion. Previous evaluation has shown that one of the main motivations for visitors to use feedback is that they like reading the comments that other visitors have left. Therefore, we believe that the Museum is justified in trying to ensure that few of these comments appear on the 'Tell us what you think' exhibits.

Some comments will be longer than just "I think it's a great idea", but will still be repetitive of earlier comments, and guidelines on how to deal with these comments are included in the main policy document.

**4. Comments that may be racist, sexist or offensive for other reasons**

Comments may be racist, sexist, blasphemous, incite violence, or be offensive to a minority of people. There is a very fine line as to what is and is not acceptable. Legally speaking the Museum is the publisher of any comments which appear, and we can be held responsible for them. The Museum strives for a middle ground which allows some risks but which is also responsible. Exactly where this middle ground lies is open to debate, and will be

reviewed as we gain more experience of the kinds of comments visitors are leaving.

We need to take the law into account, but in fact there is very little that we cannot legally publish. The main decisions have to be based on what we feel it is appropriate to present to our particular audience.

We do not wish to remove all humour from the exhibits or prevent people having their say just because their views are unpopular. We would neuter the feedback stations were we to remove everything that anyone might find offensive.

We should think carefully about comments that are offensive to minority groups, as this could go against the Museum's access policy. People in some minority groups may not feel empowered to argue against the views that offend them. This may mean that we would not be aware of offending minority religious, ethnic or social groups.