AC 2007-2055: THE EFFECTS OF GENDER ON ELEMENTARY-AGED STUDENTS' INTEREST IN TECHNOLOGY: A PRELIMINARY REPORT

Carol Stwalley, Purdue University

Dr. Carol S. Stwalley earned her BS, MS, and Ph.D. degrees from the School of Agricultural and Biological Engineering at Purdue University and is a registered professional engineer in Indiana. She performed the described research while the Assistant Director for the Purdue Women in Engineering Program. Currently, she performs assessment for the Purdue Minority Engineering Program. Dr. Stwalley also is the President of Paradocs Enterprises, Inc. which is a consulting engineering firm specializing in renewable energy projects and property transfer issues.

THE EFFECTS OF GENDER ON ELEMENTARY-AGED STUDENTS' INTEREST IN TECHNOLOGY: A PRELIMINARY REPORT

Abstract

A research program was proposed to the National Science Foundation to determine how gender affected the learning of and interest in technical topics. It was desired to find a consumer product that was of high interest to girls and one that was of high interest to boys, but neither product should be of high interest to the opposite gendered child. A survey was designed to determine what items were of interest to children in the third and sixth grades.

This survey chose 80 common items that most children would be familiar with and would use an engineer in the design or production of the item. General areas of interest included: Computers, Electronics, Food, Household, Medical, Sports, Transportation, and a Miscellaneous category. The food area was the largest with 16 items included within the study, and the Medical was the smallest with three representative items.

The randomization process to design the instrument included splitting the 80 items into two groups of 40. Each general area of interest had an even representation between the two groups. The randomization of the order of each item on the page was also done twice for each group of 40. This resulted in four base surveys that could be taken. The surveys consisted of two pages, and they were further randomized by giving some children the survey with page A first and some got it as the second sheet. This discouraged children sitting together from giving answers similar to their neighbors. This survey was taken by children (126 girls and 112 boys) in the three school systems in Tippecanoe County, Indiana.

The survey listed the 40 items and showed a little picture to be sure they were thinking about the intended item. These pictures also added visual interest to the survey. The children were asked to rank on a scale from zero to five how interested they would be in finding out how each item in the survey was manufactured. They could also state that they did not know what the item was. In addition, they were asked their opinion in who would be more interested in this product: girls, boys, or if there was no difference between genders. No difference could either mean both would be interested or neither would be interested.

The preliminary results of the survey showed that there really is not a large difference between boys and girls in what they would be interested in learning more about. The items were ranked by their average rating given in the interest scale. Six of the ten items of most interest to girls and boys were the same, though in different order. Similarly, six of the ten items of least interest were the same. Additionally, there was no product in the top ten of one gender that was ranked in the bottom ten of the other.

Introduction

A research program was developed for a National Science Foundation proposal initiative to study how the gender of the presenter of technical information affects the response of pre-adolescent girls and boys who watch the presentation as a video clip. It was proposed that the gender of the presenter would not affect interest and retention of information for items of high interest to the child. However, items of low interest would result in the interest and retention of material presented in the video clip increasing when the presenter was of a similar gender to the child viewer. Knowing what items were of interest to elementary aged children became necessary to determine what consumer items should be highlighted as high-interest and low-interest items for these presentations. It was originally presumed that one item could be found that was high interest to girls and low interest to boys and another item that was the opposite.

A survey was developed to determine the interest level of third through sixth graders in the development and manufacturing process of various consumer items. The preliminary study presented here is from local Tippecanoe County, Indiana data that has been collected. A further analysis of children's interest across the country would need to be completed before these conclusions could be stated as definitive. However, it is felt that this data would be a good representation of the average interest across the country, since this area is transitional between a rural and an urban setting. With the university setting, there are many children who come from a high income, high educational backgrounds. There are also children within the community who come from local farms, families of blue collar workers, and families of immigrants.

The purpose of the report is to discuss the relative interest levels of elementary-aged students in learning about the development of various consumer items. Those beginning to design a survey might also benefit from the discussion of the survey and how it can be improved for further testing. The material presented in this paper is clearly preliminary in nature and limited to local, specific school systems.

This paper will present a summary of current research on interest of children in technology as well as the slant taken by marketers of toys. A discussion of the design of the interest survey, how it was administered, and how IRB issues were addressed to keep records that consent forms were completed by the children and their families follows. The current data are presented and discussed, followed by the conclusions generated for the items of highest and lowest interest. Finally, recommendations on how this study could proceed to procure data from children across the United States by using the web are presented. This paper will present findings that might surprise some readers who have the common notion that there are many "boy" items and "girl" items.

Background

The pipeline for increasing the number of women engineers has remained stagnant. American engineering colleges had just 20.1-20.6% women graduates for the last five years, while overall graduation rates have declined.[1] The Commission on Professionals in Science and Technology state that there must be attention paid to the domestic degree production of the science and engineering (S&E) workforce to replenish the retiring segment and allow for a slight growth

industry.[2] The Bureau of Labor Statistics concurs and states that even with a stagnant industry, the number of retiring engineers will keep the demand strong for American engineers through the next 10 to 15 years.[3] The National Science Board states that science and technology industry spurs the U.S. economic growth and heightens national security. They see two trends endangering the long-term health of the S&E domestic workforce. One is that there is more global competition for S&E talent, so the U.S. cannot continue to fill their needs for these workers with internationals. The second disturbing trend is that native-born S&E graduates are declining.[4] This domestic demand will not be met, unless more of the underrepresented population can be encouraged to pursue engineering.

Previously, a deterrent to women entering engineering studies was a lower enrollment in math and science courses. However, the National Center for Education Statistics has found that girls are now taking mathematics through calculus in equal numbers to boys, and the difference between their relative general mathematics achievements has become insignificant.[5] The concern now is how to motivate girls to enter technological professions, such as engineering, which rely heavily on mathematics and computers, when they seem to have a "we can, but I don't want to" attitude to such career choices.[6] Fortunately, if a girl has an intention in high school to major in engineering, then she is more likely to act on her intention than is her male counterpart.[7] When asked why they chose their field, most women in computing careers gave several reasons which included: a perceived talent to do the tasks necessary in the field, family or friend support, and being introduced to computers in a comfortable setting.[8] These findings emphasize why it is imperative to give girls an exposure to engineering before they make career decisions. Although this might imply that there is no one best time to reach girls, the reality is that the earlier the girl can be enthused about technology, the more interventions she might participate in. The more technical experiences a girl is introduced to, the more likely she is to be comfortable choosing a technical career. The critical need for the education of females regarding engineering can best be summarized by the Latin phrase *Cogito Nullo Cupido*, which translates to, "You will not love that which you know nothing about". This is the catch-phrase for the Pre-College Program in the Purdue University Women in Engineering Program and the motivation for this research.

A bright horizon for an improvement in this gender dichotomy might be in store. Toy manufacturers are discovering that boys and girls are moving toward enjoying many of the same toys. *Consumer Reports* provided 2100 elementary aged students with a lineup of 32 toys to market test. They concluded that 12 of the toys were highly desired by both boys and girls, while there were only two toys for each gender that were highly gender specific.[9] This sentiment that girls were becoming frequent users of high tech toys was echoed in a plastic injection molder's trade magazine.[10] If educators can find a way to continue this interest for girls in technology through their teenage years, perhaps the future will be more positive for recruiting more young women into SMET fields.

Experimental Design

The Interest Survey was designed to allow children aged nine to twelve to convey to researchers how interested they were in finding out how various consumer goods are created and manufactured. The children were also to address whether they felt more girls or boys would be

interested in an item, or whether they felt that there wouldn't be a difference in interest levels between genders. The entire study of elementary students' interest in consumer item production was designed to include urban, rural, and transition area schools. Target schools were researched on the web to produce a population taking the survey to mirror the ethnicity of the United States. It was desired to find urban schools willing to give the survey in Chicago, Los Angeles, and New York. The rural schools were targeted for areas of Virginia/West Virginia, Texas, and Washington. The transition area schools were to be from the three Tippecanoe County, Indiana School Districts. Students from third and sixth grade were recruited to take the survey. The preliminary study was focused on the local schools due to the ease of access and demographics of the students. The Purdue Internal Review Board approved this survey for 1800 subjects. The Future Directions section will discuss methods that could be used to receive a better access to the study from other populations.

The survey was randomized to produce eight different instrument documents. A sample section of a survey is shown in Figure 1. While there was a desire to compare eighty different items, it was felt that this would produce too large an instrument for the target students. Therefore, forty items were set for each survey. The eighty items were split into eight different categories, shown in Table 1, and as even a split within these categories was made between the two different surveys. The placement into either survey group 1 or 2 is shown in Table 1. Each group of forty items was then randomized twice as to the order the items were placed on the survey. The survey was split onto two pages, and the final randomization method was to change which page of the survey was on the top when presented. A table showing these eight survey forms is shown in Table 2. This randomization was completed to reduce the chance that neighboring children would copy their results, as well as reduce placement effects of items within the survey.

1A		I don't know what this is.	How interested are you in finding out how the item is made? **Not Interested** (Fill in the box) **Very Interested**						Would you consider this item more interesting to girls, boys, or no difference? (Fill in the box)		
Consumer Item			**0**	**1**	**2**	**3**	**4**	**5**	**Girls**	**Boys**	**No Difference**
Laser Printers		❑	❑	❑	❑	❑	❑	❑	❑	❑	❑
Virtual Reality Games		❑	❑	❑	❑	❑	❑	❑	❑	❑	❑
DVD Players		❑	❑	❑	❑	❑	❑	❑	❑	❑	❑
Helicopters		❑	❑	❑	❑	❑	❑	❑	❑	❑	❑
Stoves		❑	❑	❑	❑	❑	❑	❑	❑	❑	❑

Figure 1- Sample Section of the 1A Survey.

Table 1 – The eighty items placed in the Interest Survey including group number for each item.

COMPUTERS		**FOOD (Cont.)**		**SPORTS / LEISURE**
Computer Memory - 2		Ice Cream - 1		Baseball Bats - 1
Computer Mouse - 1		Juice Boxes - 2		Baseballs - 2
Computer CPU - 1		Ketchup - 2		Canoes - 1
Flat Screen Monitor - 2		M&M's - 1		Footballs - 1
Gaming Software - 2		Mac & Cheese Dinner - 2		Golf balls - 2
Ink Jet Printer - 2		Pringle's chips - 2		Golf clubs - 1
Laptop Computer -1		TV Dinners - 1		Soccer Balls - 2
Laser Printer -1		Yogurt - 2		Sport Shoe - 2
Scanner - 2		**HOUSEHOLD**		Tennis balls - 1
Virtual Reality Games - 1		Corelle$_{TM}$ dishes - 1		Tennis Rackets - 2
ELECTRONICS		Dishwashers - 1		Treadmills - 2
Big Screen Television - 2		Glass - 2		Volleyball - 2
Boom Box - 1		Lawnmower - 2		**TRANSPORTATION**
Camcorders - 1		Light Bulbs - 1		Air Bags - 2
Digital Cameras - 2		Microwave Ovens - 2		Airplanes - 2
DVD Player - 1		Modular Homes - 2		Bicycles - 2
GPS Device - 2		Refrigerators - 2		Ships - 1
High Definition Television - 1		Stoves - 1		Bridges - 1
Music CD's - 2		**MEDICAL**		Cars - 2
Surround Sound System - 1		Artificial Arms or Legs - 2		Engines - 1
Television - 2		Artificial Heart - 1		Helicopters - 1
FOOD		Artificial Joints - 1		In-Line Skates - 1
Cheese - 2		**MISC**		Motorcycles - 1
Chewing Gum - 2		Cell Phones - 1		Roads - 1
Chips - 1		Diapers - 1		School Buses - 1
Chocolate - 1		Electric Guitar - 2		Skateboards - 2
Combos - 1		Night Vision Glasses - 2		Tires - 2
DrumSticks$_{TM}$ - 2		Roller Coaster - 2		
Fruit Roll-ups - 1		Production Robot - 1		
Hot Dogs - 1				

Table 2 - Form randomization schemes.

1A – First randomization of Group 1 items with Page A first in order	**2A** – First randomization of Group 2 items with Page A first in order
1B – First randomization of Group 1 items with Page B first in order	**2B** – First randomization of Group 2 items with Page B first in order
3A – Second randomization of Group 1 items with Page A first in order	**4A** – Second randomization of Group 2 items with Page A first in order
3B – Second randomization of Group 1 items with Page B first in order	**4B** – Second randomization of Group 2 items with Page B first in order

A code was developed for identifying each survey that was taken. The coding took the form of: Gender – Form – Area – School – Grade – Person. The boys received green forms, and the girls received yellow forms to allow a quick separation between genders. The form number denoted which set of items was being analyzed and which randomization was being used. Table 2 summarizes the eight form codes. The area code was denoted U for urban, R for rural, and T for the Lafayette area transitional schools. The coding was designed to allow different schools to be listed for third and sixth graders. Finally, the person taking the survey was coded. An example of a preliminary study survey might be: G-2A-T-1-3-4. This would denote a girl taking a survey with the 2nd set of 40 items with page A presented first. She was in the third grade at Earhart Elementary and was the fourth student to take that specific instrument at that school. This code was on both pages of the survey and added after completion to the Parental Consent Form and Student Assent Form. This allowed anonymity of the survey participant, yet permitted the confirmation of the completed IRB forms.

The appropriate consent forms were given to teachers about a month before the survey was to be administered. Those children that returned consent forms were grouped together to receive the survey. The consent forms were returned to the students as they received a survey and pencil in a manila envelope. After completion of the survey, the survey and consent forms were placed back into the envelope and turned in. All surveys were given during school time, but each school decided as to when worked best for their schedule. Some were given during lunch period, some during class time, and one was administered prior to a convocation. Originally, the survey code was printed on each page of the survey and labeled on the outside of the envelope. The survey code was then manually written on the consent forms. Since all surveys created for a school were generally not used, it was decided to just print the form number on the survey and envelope, so as to allow the unused surveys to be reused at another school. Complete coding numbers were then printed in duplicate on small labels that could be attached to the survey and consent form to keep them linked together. This stream-lined the data entry portion for the undergraduate student who helped with the survey.

Results and Discussion

Two hundred-forty surveys were collected from five schools. Of these, two were third grade classes with 68 surveys completed, and three were sixth grade classrooms with 144 surveys completed. The final school of third graders declined to administer the survey. Table 3 breaks down the surveys into gender, grade distribution, and survey group number of the completed surveys. For all survey takers, 112 boys and 128 girls completed the survey by finishing both page 1 and 2 as well as including their consent forms in the packet. There were differences between numbers of reviewers for each item. Some children mistakenly skipped some of the items, and the children that said that they did not recognize the item were also not analyzed for that item.

Table 3 - Gender and Grade Distribution of Survey Participants.

Gender	3rd Grade	6th Grade
Boys	20 Group 1 Surveys	36 Group 1 Surveys
	16 Group 2 Surveys	40 Group 2 Surveys
Girls	17 Group 1 Surveys	49 Group 1 Surveys
	15 Group 2 Surveys	47 Group 2 Surveys

The combined results for both grades split between genders are shown in Tables 4 for the Top 10 and Bottom 10 Interest Items. The complete results can be found in the Appendix, with Table A1 presenting the Top 40 items of interest to boys and girls, and Table A2 presenting the Bottom 40. The rest of this discussion will just consider those items that were included in either the girls' or boys' Top 10 or Bottom 10 List. There were six items in common in both the most and least popular lists, resulting in comparing 14 items for each analysis. Figure 2 graphically compares the interest shown by the boys and girls in the most popular items. Figure 3 is a similar representation for the least popular items.

Table 4 - Top and Bottom 10 Items of Interest.

ALL GRADES - Interest Quotient				
Boys' List	**Boys**	**Girls**	**Girls' List**	**RANK**
Gaming Software	4.19	4.05	Music CD's	1
Roller Coasters	4.13	4.02	Roller Coasters	2
Laptop Computer	4.04	3.83	Cell Phones	3
Cars	4.02	3.81	Laptop Computer	4
Flat Screen Monitor	3.95	3.74	Chocolate	5
Global Positioning (GPS)	3.94	3.65	Ice Cream	6
Music CD's	3.89	3.62	High Definition TV	7
High Definition TV	3.87	3.53	Flat Screen Monitor	8
Virtual Reality Games	3.87	3.52	Digital Cameras	9
Cell Phones	3.75	3.42	Boom Box	10
School Buses	1.75	1.37	Ketchup	71
Hot Dogs	1.68	1.36	Roads	72
Cheese	1.62	1.35	Stoves	73
Tires	1.56	1.33	TV Dinners	74
Juice Boxes or Pouches	1.44	1.32	School Buses	75
Dishwashers	1.36	1.29	Golf clubs	76
TV Dinners	1.30	1.17	Dishwashers	77
Ketchup	1.24	1.16	Lawnmower	78
Corelle$_{TM}$ dishes	0.98	1.08	Tires	79
Diapers	0.80	0.97	Diapers	80

Electronics
Computer
Food
Transportation
Sports / Leisure
Household
Medical
Misc.

Assuming a normal distribution of responses of the survey participants, a two-tailed t-test could be performed to determine if these average Interest Quotients (IQ) were statistically equivalent between boys and girls using a confidence level of 95%. The Interest Quotients tended to be higher on average for the boys than the girls. The discussion within this paper does not normalize the averages between boys' and girls' Interest Quotients, so all IQ's are the computed average values for each gender. It was found that of the fourteen items of most interest, eight items had comparable average interest shown between boys and girls. The Interest Quotient was found to be statistically larger with boys for Cars, Gaming Software, Global Positioning Devices, and Virtual Reality Games. The girls showed significantly more interest in Chocolate and Ice Cream. The means for the lower interest items proved to be more homogenous. Eleven averages for the fourteen items proved to be similar between boys and girls. The boys showed more interest in Golf Clubs and Lawnmowers, while the girls were only more interested in Corelle$_{TM}$ Dishes.

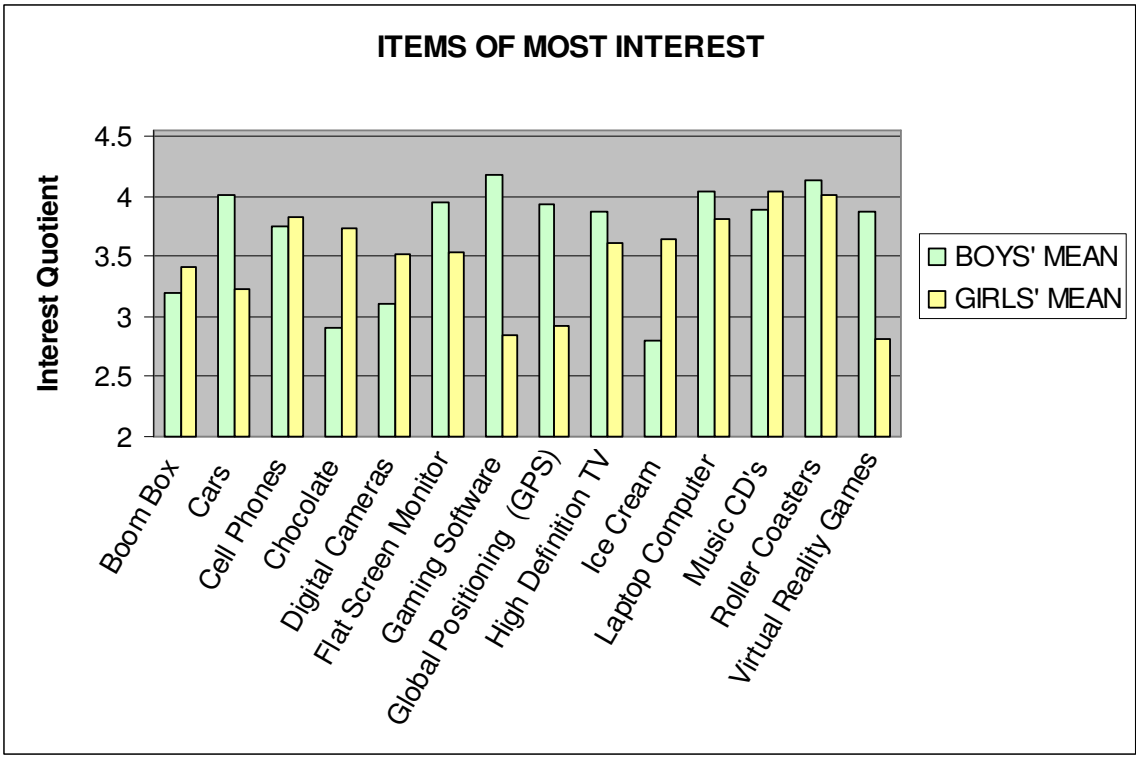

Figure 2 - Interest Quotient for Items of Lowest Interest.

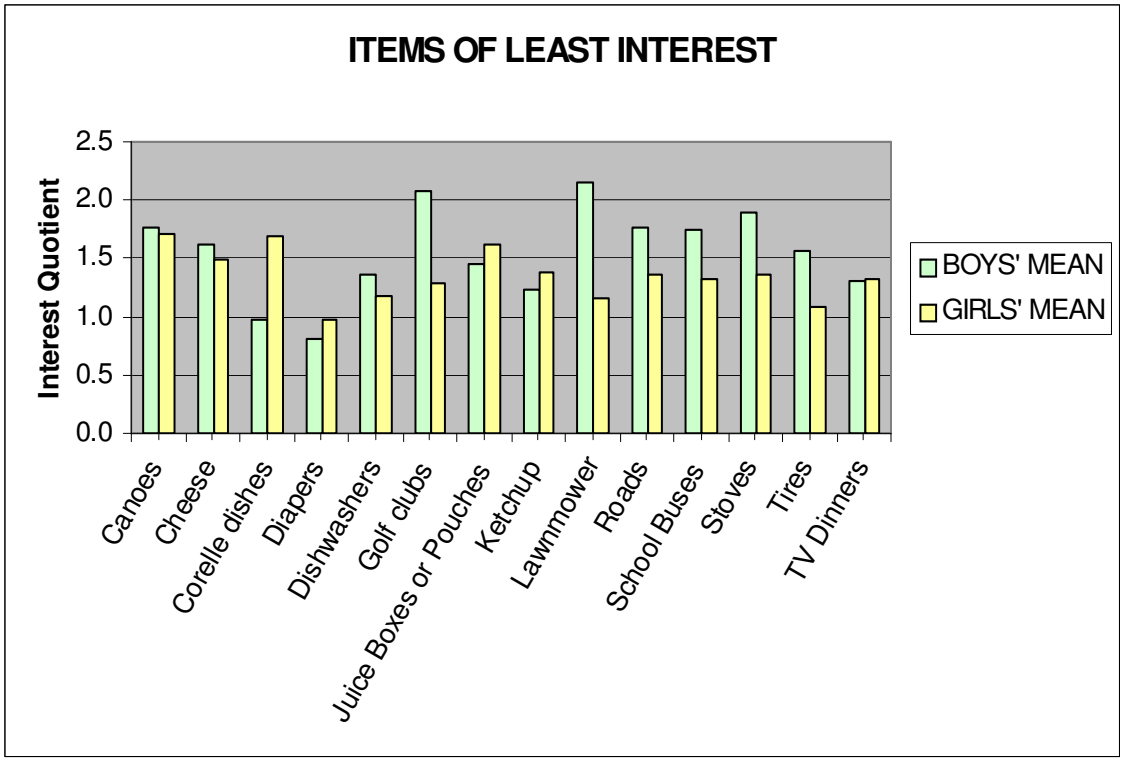

Figure 3 - Interest Quotient for Items of Highest Interest.

The data can be disaggregated between grade levels to compare changes of interest as both boys and girls mature. As would be expected with the larger representation of 6th grade students, both the 6th grade boys and girls' items of high and low interest were the closest to the orders found when combining grade levels. When comparing 3rd and 6th grade boys, it seems that the younger boys were more highly interested in computer items. Electronics have increased in popularity with the older boys. Also, the younger boy's Interest Quotients were highest between all groups. The girls were more stable with their high interest in electronics at both the 3rd and 6th grades levels. The boys were more consistent in their items of least interest, and they tended to have little interest in how food products are manufactured. The girls conversely had more difference between the older and younger set for the items of least interest.

Table 5 - Grade and Gender Specific Interest Quotients for Top and Bottom 10 Items of Interest.

3rd Grade Boys		6th Grade Boys		3rd Grade Girls		6th Grade Girls	
Flat Screen Monitor	4.81	Gaming Software	4.10	High Definition TV	4.31	Music CD's	4.18
Computer Memory	4.69	Roller Coasters	4.05	Boom Box	4.23	Roller Coasters	3.98
Virtual Reality Games	4.65	Cars	3.87	Roller Coasters	4.13	Cell Phones	3.82
Laptop Computer	4.50	Music CD's	3.87	Soccer Balls	4.00	Laptop Computer	3.81
Surround Sound Systems	4.42	High Definition TV	3.81	Cell Phones	3.88	Chocolate	3.77
Gaming Software	4.40	Laptop Computer	3.78	Laptop Computer	3.82	Ice Cream	3.67
Cars	4.38	Global Positioning (GPS	3.76	Digital Cameras	3.80	Flat Screen Monitor	3.52
Global Positioning (GPS	4.33	Cell Phones	3.72	Music CD's	3.67	Big Screen TV	3.44
Roller Coasters	4.31	Flat Screen Monitor	3.59	Chocolate	3.65	Digital Cameras	3.43
Motorcycles	4.16	Big Screen TV	3.58	Surround Sound System	3.64	High Definition TV	3.38
Combos	1.89	Cheese	1.47	Hot Dogs	1.29	Cheese	1.50
Tires	1.81	Tires	1.46	Roads	1.19	Golf clubs	1.46
M&M's	1.74	Hot Dogs	1.44	Baseball Bats	1.18	School Buses	1.43
TV Dinners	1.60	Juice Boxes or Pouches	1.39	Diapers	1.06	Roads	1.42
Juice Boxes or Pouches	1.56	School Buses	1.28	School Buses	1.00	Stoves	1.35
Dishwashers	1.55	Dishwashers	1.25	Helicopters	0.88	Corelle dishes	1.34
Ketchup	1.44	Ketchup	1.15	Dishwashers	0.81	Dishwashers	1.29
Chips	1.29	TV Dinners	1.14	Lawnmower	0.80	Lawnmower	1.28
Diapers	1.05	Corelle dishes	0.96	Ketchup	0.79	Tires	1.00
Corelle dishes	1.00	Diapers	0.67	TV Dinners	0.64	Diapers	0.94

Both male and female children did slightly better than average when predicting what interested their peers. Reviewing the survey in Figure 1, it can be seen that the instrument presented the question with the scale: Girls (1), Boys (2), or No Difference (3). It was felt this would not give a good continuum of data realistically presenting their viewpoints. The scale was changed to: Boys (-1), No Difference (0), or Girls (1). This allowed the data to be quickly analyzed, with a value of <= -0.4 generating an outlook of an item of high interest to boys. A value of >= 0.4 would signify an item of high interest to girls, and anything in between would denote no difference. When comparing the high and low interest items, both genders forecasted an interest similar to the results 71% of the time. A sample result would be that both girls and boys correctly identified Gaming Software as an item of high interest to boys.

Finally the survey was able to demonstrate what items are not fully understood by elementary-aged students. This data is shown in Table 6. The boys seem to have paid little attention to biomedical devices that help improve the quality of life of many older individuals, while girls of

this age had a bit more idea of what these items were. The girls seemed to be a bit more unsure of the processing unit of a computer and the new GPS systems.

Table 6 - Items Least Recognized by Survey Participants – percentage of children that could not comment on the given item.

	BOYS			GIRLS
Artificial Heart	22.70%		CPU	19.70%
Corelle$_{TM}$ Dishes	17.60%		Corelle$_{TM}$ Dishes	16.70%
Artificial Joint	16.40%		Artificial Joints	15.20%
Modular Home	12.70%		GPS	14.80%
Artificial Arm	11.30%		Artificial Arms	14.80%

Recommendations and Conclusions

This survey would be ideally suited to administer over the web. A survey site could more completely randomize the consumer items that are being rated. There would be a high confidence that errors were not made in transcribing the data from the survey sheets. It might also be easier to give the child a better illustration of the consumer item, so that there is less confusion as to what the researcher is depicting. Recruitment could be done by sending out information about the survey web site to various schools across the country. It is felt that this method would be superior to just posting the link on sites where kids congregate. This gives the potential of having a narrower age segment of survey participants, though it might be interesting to see if the presented trends change as the children get older. The major challenge of this method is providing consent from the parent and child.

A significant difference of the presented results between now and what would have been seen a decade ago, is that boys and girls are both most interested in the major category of electronics and are consistently not interested in household items. This should help individuals plan for what technical information can be highlighted in the elementary arena which will excite girls and still hold interest to the boys within the classroom.

Acknowledgments

The author would like to acknowledge the Flour Corporation for funding this research. Many thanks also go to Samia Twainy, an undergraduate in the School of Mechanical Engineering, for transferring all the data from the surveys into a usable format in MS Excel. Special thanks also go to the 3rd and 6th grade students, teachers, and administrators from Earhart Elementary, Tecumseh Middle, Klondike Elementary, Klondike Middle, and Happy Hollow Elementary Schools.

Bibliography

[1] Engineering Workforce Commission, 2005, "Bachelor Degrees in Engineering by Gender, Minority Group and Citizenship, 1990-2003" Engineering & Technology Degrees, 2004, American Association of Engineering Societies, Washington, D.C.

[2] Commission on Professionals in Science and Technology, 2004, *The Changing Nature of Work and workers in Science and Engineering*, Proceedings of an NSF/CPST/ Professional Societies Workshop, Washington, D.C. Downloaded from: www.cpst.org/ NSFWorkshop/ChgNature.pdf.

[3] Bureau of Labor Statistics, 2005, "Employment Status of the Civilian Population by Sex and Age, Seasonally Adjusted", Data downloaded 1/7/05 from: www.bls.gov/ news.release/pdf/empsit.pdf.

[4] National Science Board, 2004, *Science and Engineering Indicators, 2004*, Two volumes, Arlington. National Science Foundation (volume 1, NSB04-1; volume 2, NSB 04-1A).

[5] National Center for Education Statistics, 1997, *No. 11 – Women in Mathematics and Science*, Bulletin NCES 97-982.

[6] American Association of University Women Educational Foundation, 2000, *Tech Savvy: Educating Girls in the New Computer Age*, Washington, D.C.

[7] Blaisdell, Stephanie, 2000, "Students' Decisions to Enter Engineering: How Men and Women Differ", *Proceedings of WEPAN 2000 National Conference*, pp. 243-51.

[8] Teague, Joy. (2002). "Women in Computing: What Brings Them to It, What Keeps Them in It?", *SIGCSE Bulletin*, vol.34, No. 2: 147-158.

[9] Consumer Reports. (1994). "Toys", December, pp.759-762.

[10] Thedinger, Bart. 2004, "Injection Molded Toys: A Rough Playing Field", *Plastics Technology,* Nov; 50, 11; pg. 68.

APPENDIX

Table A1 - Items of Most Interest to Boys and Girls.

ALL GRADES - Interest Quotient				
Boys' List	**Boys**	**Girls**	**Girls' List**	RANK
Gaming Software	4.19	4.05	Music CD's	1
Roller Coasters	4.13	4.02	Roller Coasters	2
Laptop Computer	4.04	3.83	Cell Phones	3
Cars	4.02	3.81	Laptop Computer	4
Flat Screen Monitor	3.95	3.74	Chocolate	5
Global Positioning (GPS)	3.94	3.65	Ice Cream	6
Music CD's	3.89	3.62	High Definition TV	7
High Definition TV	3.87	3.53	Flat Screen Monitor	8
Virtual Reality Games	3.87	3.52	Digital Cameras	9
Cell Phones	3.75	3.42	Boom Box	10
Night Vision Glasses	3.74	3.37	Big Screen TV	11
DVD Player	3.57	3.35	Chewing Gum	12
Electric Guitar	3.56	3.35	M&M's	13
Big Screen TV	3.56	3.33	Camcorders	14
Surround Sound Systems	3.56	3.23	Electric Guitar	15
Motorcycles	3.51	3.23	DVD Player	16
Television	3.51	3.23	Cars	17
Computer Memory	3.45	3.21	DrumSticks	18
Camcorders	3.44	3.08	Volleyballs	19
Airplanes	3.42	3.08	Fruit Roll-ups	20
Boom Box	3.22	3.07	Television	21
Digital Cameras	3.13	2.95	Surround Sound Systems	22
Production Robot	3.10	2.93	Pringle's chips	23
Engines	3.07	2.92	Global Positioning (GPS)	24
CPU	2.98	2.84	Gaming Software	25
Chocolate	2.95	2.81	Virtual Reality Games	26
Chewing Gum	2.87	2.71	Chips	27
Skateboards	2.84	2.71	Macaroni & Cheese Dinner	28
Ice Cream	2.82	2.68	Night Vision Glasses	29
Soccer Balls	2.78	2.64	Bicycles	30
Pringle's chips	2.74	2.60	Artificial Joints	31
Bicycles	2.65	2.59	Soccer Balls	32
Fruit Roll-ups	2.65	2.55	Tennis Balls	33
Helicopters	2.64	2.42	Baseballs	34
Footballs	2.59	2.39	Motorcycles	35
Laser Printer	2.57	2.38	In-Line Skates	36
Sport Shoe	2.57	2.36	Artificial Heart	37
DrumSticks	2.56	2.33	Sport Shoe	38
Ink Jet Printer	2.55	2.31	Airplanes	39
Ships	2.54	2.27	Production Robot	40

	Electronics
	Computer
	Food
	Transportation
	Sports / Leisure
	Household
	Medical
	Misc.

Table A2 – Items of Least Interest to Boys and Girls.

ALL GRADES - Interest Quotient				
Boys' List	**Boys**	**Girls**	**Girls' List**	RANK
Scanner	2.48	2.24	Laser Printer	41
Baseballs	2.46	2.24	Modular Homes	42
M&M's	2.44	2.23	Treadmills	43
Artificial Arms or Legs	2.38	2.23	Artificial Arms or Legs	44
Artificial Joints	2.35	2.21	CPU	45
Microwave Ovens	2.33	2.14	Computer Memory	46
Artificial Heart	2.30	2.14	Computer Mouse	47
Computer Mouse	2.25	2.13	Skateboards	48
In-Line Skates	2.22	2.11	Combos	49
Macaroni & Cheese Dinner	2.19	2.11	Footballs	50
Light Bulbs	2.19	2.06	Light Bulbs	51
Lawnmower	2.15	2.05	Engines	52
Modular Homes	2.10	1.96	Scanner	53
Treadmills	2.08	1.95	Tennis Rackets	54
Combos	2.08	1.93	Ink Jet Printer	55
Bridges	2.07	1.92	Microwave Ovens	56
Golf clubs	2.07	1.90	Refrigerators	57
airbags	2.04	1.89	Yogurt	58
Baseball Bats	2.04	1.88	Bridges	59
Glass	2.04	1.86	Ships	60
Volleyballs	2.04	1.77	Hot Dogs	61
Tennis Rackets	2.00	1.75	Baseball Bats	62
Refrigerators	1.98	1.70	Canoes	63
Stoves	1.89	1.69	Helicopters	64
Yogurt	1.80	1.69	Corelle dishes	65
Chips	1.79	1.68	Air Bags	66
Golf balls	1.78	1.68	Golf balls	67
Tennis Balls	1.78	1.62	Juice Boxes or Pouches	68
Roads	1.77	1.61	Glass	69
Canoes	1.76	1.48	Cheese	70
School Buses	1.75	1.37	Ketchup	71
Hot Dogs	1.68	1.36	Roads	72
Cheese	1.62	1.35	Stoves	73
Tires	1.56	1.33	TV Dinners	74
Juice Boxes or Pouches	1.44	1.32	School Buses	75
Dishwashers	1.36	1.29	Golf clubs	76
TV Dinners	1.30	1.17	Dishwashers	77
Ketchup	1.24	1.16	Lawnmower	78
Corelle dishes	0.98	1.08	Tires	79
Diapers	0.80	0.97	Diapers	80

	Electronics
	Computer
	Food
	Transportation
	Sports / Leisure
	Household
	Medical
	Misc.