The Second Installment of the ITEA/Gallup Poll and What It Reveals as to How Americans Think About Technology

A Report of the Second Survey Conducted by the Gallup Organization for the International Technology Education Association

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The first poll in what has become a two-part series was commissioned by the International Technology Education Association (ITEA) in the spring of 2001 with the intent of finding out how Americans viewed technological literacy. Funding for this second survey was provided by the National Science Foundation (NSF) and the National Aeronautics and Space Administration (NASA). Although it was not anticipated at the time, the opportunity has been provided just three years later to revisit this question in a manner designed to either validate or bring into question the findings in that first survey and to build on and extend what those findings told us.

With that in mind, it is important to cite and acknowledge the three major conclusions reached in 2001. They were:

- The American public is virtually unanimous in regarding the development of technological literacy as an important goal for people at all levels.
- Many Americans view technology narrowly as mostly being computers and the Internet.
- There is near total consensus in the public sampled that schools should include the study of technology in the curriculum.

Technology, as viewed by experts in the fields of technology, engineering, and science, has been with us since the beginning of time. These experts view technology as "anything people do to modify the natural world to meet human needs." By that definition, the earliest inhabitants of this planet, in whatever means they used to carve out caves, create tools from stones, or gather wood for fires, were using technology. To many, however, the word technology has a newer meaning tied more to the modern apparatus, machines, and gadgets people have developed. The first poll was designed to explore the public's view of technology, what it is, and its continuing impact on society.

The International Technology Education Association (ITEA), given its focus on education, has a keen interest, not only in exploring technology, what it is, what it does, and its impact, but also in the ability people have to design and innovate. That interest extends to how prepared people feel they are to interact with technology and the role they see for themselves in decisions regarding the use of technology in our everyday lives. For the purposes of these two surveys, technological literacy is defined as "one's ability to use, manage, assess, and understand technology." The ability to "use, manage, assess, and understand" is, of course, tied to attitude and interest, and these matters have been addressed in both surveys.

Finally, ITEA believes that technological literacy is, as are so many things that we do, dependent on what we know and the skills, interest, and expertise we develop. Since schools are the places where young people develop the initial databases that they will build on through life, the importance the public places on developing technological literacy in the schools becomes the key to promoting that literacy. These surveys address that topic at length.

This is a good point to insert a caution that needs to accompany every survey that is taken and reported. Surveys are not about fact; they are, instead, about what people think. A survey is about public reactions, what the public thinks, and what it is prepared to support and not support. It is also a snapshot taken in time. Opinions can and do change as events take place and new ideas and understandings come forth. With that in mind, those planning this second survey chose to repeat several questions from the initial survey to establish whether those responses have continued validity.

Complete reporting of the repeat questions is integrated into the report. Suffice it to say, at this point, that the public's view on the matters dealt with in 2001 have changed little.

- Approximately three-fourths of those questioned in 2001 expressed the belief that having people develop the ability to understand and use technology was important. That number remains the same.
- Two-thirds of the respondents to the earlier survey indicated that the first thing that came to mind when they heard the word "technology" was computers. Two-thirds say that in the current poll.
- And, percentages that fall in the 90th percentile in both polls expressed a preference for reacting to shortages in technology experts by taking steps to train them in our own schools. That preference remains in the same percentile range.

The findings just cited validate and support the decision to use responses from both surveys to build a more comprehensive picture of public attitudes and views. With that point made, let's turn to the survey results and what they tell us.

The Public's Concept of Technology

Following the release of the first survey in 2001, there was much discussion of the fact that the public, while surrounded on all sides by examples of technology at work, associates the word "technology" most closely with computers. This survey repeated the earlier open-ended question, and the results indicate the situation has not changed. The data in Table 1 indicate that 68% think first of computers when the word "technology" is mentioned. The percentage in 2001 was 67%, and the highest percentage reached for any other of the mentions is 5%. Computers have no rival in the public's mind as emblematic of "technology."

Table 1.
When you hear the word "technology," what first comes to mind?

	% Mentioned	
List of Mentions	2004	2001
Computers	68	67
Electronics	5	4
Advancement	2	—
Internet	2	1
Education	1	2
New Inventions	1	2
Science	1	1
Television	1	—
Future	1	—
Space	1	1
Job/work	1	1
Cell phones	1	—
Health	1	—

Given that so many people associate technology with computers, while those in the field use a broader definition, it is reasonable to question the context in which people are responding when they react to questions that use the word "technology" without defining it. This is mentioned at this point so that the reader can keep it in mind as the rest of the data are reported. That said, the authors of this report have come to believe that the definitional problem is of little significance. Given the growing daily exposure to computers, it is little surprise that this is what people think of first when the word is mentioned. That does not mean that they are incapable of, and do not embrace the broader definition of technology. The responses to the questions and the importance the public assigns to technological literacy would, in fact, suggest that that is the case. With this in mind, let's move to those responses.

The Importance Assigned to Being Knowledgeable about Technology

A number of questions in the current survey delved into the importance people place on developing and having a knowledge of technology. This is, of course, what the idea of technological literacy is all about. The findings are clear in that, regardless of the perspective from which the question is asked, the responses reflect the view that being able to understand, assess, and manage technology are highly valued attributes.

- When queried directly about the importance of being able to understand and use technology, people are nearly unanimous in assigning importance to these factors.
- The importance that is assigned to this type of technological literacy is reflected in the large numbers that say that it is important to know how the various technologies work.
- And, when the question is translated into being able to perform daily tasks related to technology, people reflect a strong desire to be able to do so.

The preceding findings are based on responses to three questions from the survey. The questions and responses are reported in Tables 2, 3, and 4. The survey started with a repeat question from 2001, asking the respondents

Table 2.
Just your opinion, how important is it for people at all levels to develop some ability to understand and use technology? Would you say it is:

	% Selecting	
Importance	2004	2001
Very important	74	76
Somewhat important	24	23
Not very important	—	1
Not at all important	1	—
Don't know/refused	1	—

Table 3.
How important is it to you to know how various technologies work? Is it very important, somewhat important, not very important, or not important at all?

Importance	Total Group %	18-29 Year Olds %	Age 50 and Older %
Very important	38	52	32
Somewhat important	48	43	48
Not very important	11	5	15
Not at all important	3	—	5
Don't know/refused	—	—	—

how important they feel it is to develop the ability to understand and use technology. When the top two responses are combined, 98% of the respondents see developing technological literacy as important. The comparable percentage in 2001 was 99%. Anticipating that there would be little difference in the percentages, the developers of this year's poll focused in on the extent to which the need to be technologically literate applied to them. The question queried the extent to which they feel it is important for them to know how various technologies work.

The percentages seeing this as important are not as high as the question dealing with the more detached question relating to the overall importance of technology for all people. They are, however, impressive, with 38% seeing it as very important that they know the workings of the technologies and 48% seeing it as somewhat important. Only 14% feel having this understanding is unimportant. The third question in the series explored how the desire to understand how technologies work plays out in relation to the types of decisions people make on a daily basis.

Clearly most people want to be able to fix things around the house, make decisions about the continued usefulness of products, and even seek out the answers to technological problems. Among the choices offered, they show the least interest in knowing how a paper stapler works. To know exactly why this was the case, one would have to know the type of stapler the respondent was envisioning. A large production-type stapling machine would have little relevance, while the typical household stapler requires little understanding. This item, in retrospect, lacked clarity.

The Impact of Technology on Our Daily Lives and on the World Around Us

Given the importance people place on technological literacy, it is important to see how this translates into how they feel about the effect of technology on their daily lives and the overall impact it has on the world about them. The first of the questions reported in Table 5 deals with the first of these issues. The second, reported in Table 6, asks for a value judgment

Table 4.
How important is it to you, personally, to know each of the following? Is this very important, somewhat important, not very important, or not important at all?

	Importance						
	(1) Very	(2) Somewhat	(3) **1+2**	(4) Not Very	(5) Not at All	(6) **4+5**	(7) DK/R
Knowing whether it's better to repair products or better to throw them away	64	29	**93**	4	3	**7**	—
Diagnosing why something doesn't work so it can be fixed	62	30	**92**	5	3	**8**	—
How to program a VCR or use other "thinking" products	54	35	**89**	8	3	**11**	—
Being able to develop solutions to a practical technological problem	50	39	**89**	8	3	**11**	—
How to fix a light switch or other household product that stops working	53	33	**86**	11	3	**14**	—
Knowing how products such as a paper stapler work	28	36	**64**	26	10	**36**	—

Table 5.
Now, tell me whether you strongly agree, mostly agree, mostly disagree, or strongly disagree with each of the following statements.

	Strongly Agree %		Mostly Agree %		Mostly Disagree %		Strongly Disagree %		Don't Know/ Refused %	
	'04	'01	'04	'01	'04	'01	'04	'01	'04	'01
Technology is a small factor in your everyday life	20	17	23	24	21	25	36	34	—	—
Engineering and technology are basically one and the same thing	20	21	43	40	23	27	13	9	1	3
The results of the use of technology can be good or bad	59	59	35	35	3	3	2	2	1	1
Science and technology are basically one and the same thing	16	20	46	39	25	27	12	12	1	2

Related Responses Combined	Strongly + Mostly Agree		Mostly + Strongly Disagree	
	2004	2001	2004	2001
Technology is a small factor in your everyday life	43	41	57	59
Engineering and technology are basically one and the same thing	63	61	36	36
The results of the use of technology can be good or bad	94	94	5	5
Science and technology are basically one and the same thing	62	59	37	39

on the overall effects of technology. The questions deal with why technologies are developed, the impact of technology on environmental problems, and the function of design as one of the technological processes. The findings follow:

- People see technology as having limited importance in their daily lives.
- The public believes strongly that the results of technology can be either good or bad.
- There is a general belief that new technologies are often developed to improve upon previous technologies.
- The public, although lacking concurrence from one-third of those surveyed, believes technology can be used to solve environmental problems.
- It is generally understood that "design" is a step in the development of products.

Fifty-seven percent of respondents either strongly or mostly disagree with the statement that technology is a small factor in their everyday lives, while forty-three percent either strongly or mostly agree. These percentages are somewhat surprising given that examples of technology surround us in our everyday lives. They also seem inconsistent with the importance people place on technological literacy. Nevertheless, these results vary little from the 2001 survey, when 41% fell into the two categories constituting agreement. There is no definition or disagreement as to whether the effects of technology can be either good or bad.

Fifty-nine percent agree with this statement and 35% strongly agree. These percentages were identical in the 2001 survey.

The responses to the question relating to the extent to which environmental problems can be solved using technology are interesting given the debate that surrounds environmental issues in general. Two-thirds in agreement with one-third disagreeing is a typical response on many items. It could be argued, however, that the two-thirds in agreement is higher than would have been expected, given that issues related to the environment often generate controversy. There are some, possibly many, who would be likely to associate technology with the creation of environmental problems. Regarding the linking of design and

Table 6.
Please tell me to what extent you agree or disagree with the following statements about technology. Do you strongly agree, mostly agree, mostly disagree, or strongly disagree?

	Strongly Agree %	Mostly Agree %	**1+2 %**	Mostly Disagree %	Strongly Disagree %	**4+5 %**	DK/R %
Humans often develop new technologies to improve upon previous technologies	69	28	**97**	1	2	**3**	—
Most environmental problems can be solved using technology	24	42	**66**	23	10	**33**	1
Design is a process that can be used to turn ideas into products	68	29	**97**	2	1	**3**	—

the development of products, the high level of agreement is not surprising.

What People Want to Know and What They Know About Technology

In planning the original survey in 2001, a good-natured debate developed over the extent to which people really want to know how technologies work. One of the participants avowed strongly that he did not care how they worked. He went on to say that he just wanted them to work. Respondents were given the choice in that survey of choosing between, "You don't care how it works as long as it works" or "You would like to know something about how it works." They put the issue to rest, with 75% choosing the last of the two responses.

The responses already reported in Tables 3 and 4 touched again on the extent to which people want to know about technology. Again, people indicate they want to know how the various technologies work, and that desire translates into being able to do repairs, use technology, and make decisions about the technology needed around the home.

Two responses from the earlier Table 5 begin to touch on the understanding people have of technology. Sixty-three percent believe engineering and technology are basically one and the same thing while 36% believe they are not. Sixty-two percent see science and technology as basically one and the same, while 37% do not. The comparable percentages in 2001 for the link between engineering and technology were 61% and 36% for engineering and technology, while they were 59% and 39% for the link to science. Given that experts in the field link engineering and technology but are not inclined to link science and technology, the lack of discrimination on the part of the public, to the extent that the distinction is important, is another example of the need to build technological literacy.

The 2001 survey also sought to determine how prepared people feel they are to understand and use technology. The respondents gave themselves high marks on preparedness, with 28% saying they were able to understand and use technology to a great extent and another 47% saying they could do so to some extent. Age was a factor here, with 90% of 18-29 year olds choosing great extent or some extent as compared to 57% of those 50 and older.

The 2001 survey also included a question testing knowledge with true-false questions relating to specific day-to-day applications of technology. The results generated lively debate that extended to the accuracy of the consensus that guided the true-false determinations. Given the interest generated in 2001, a similar question was asked in the current survey, with a series of new choices plus a repeat of one item from 2001 with a single word changed to see if it would alter the responses.

The responses are reported in Tables 7 and 8. Taken together, they suggest that people are reasonably well informed as to how cars and microwaves work. They are also correct in their understanding of the Internet. They do not, however, demonstrate a high level of understanding in the other areas queried.

The findings follow:

- Both surveys included a question about how cars operate. Eighty-two percent were correct in 2001 in saying that cars operate through a series of explosions. Seventy-seven percent are correct in the current poll in saying that fuel cells are being used with gasoline or diesel engines to power cars.
- Regarding cyberspace, 72% understand that the Internet and the World Wide Web are the same.
- In the earlier poll, respondents were asked if the statement that a microwave heats food from the outside to the inside was true or false. Seventy-two percent,

Table 7.
(Asked in 2001) Just based on your understanding, tell me if each of the following statements is true or false. How about:

Explanation Requested	True %	False %	DK/Refused %
Using a portable phone while in the bathtub creates the possibility of being electrocuted	46	51	3
FM radios operate free of static	26	72	2
A car operates through a series of explosions	82	15	3
A microwave heats food from the outside to the inside	37	62	1

possibly those who had tried to toast bread in a microwave, correctly identified the statement as false.

- Both of the polls have dealt with the possibility that phones and bathtubs, when mixed, produce the possibility of being electrocuted. In the 2001 poll, respondents were asked if that was true with a portable phone. Forty-six percent responded incorrectly, saying it was true. The reactions to the report of this finding were numerous, with many arguing that electrocution was a possibility. This year the description of the phone is changed from portable to cordless. Forty-nine percent indicate, incorrectly, that electrocution is a possibility.
- In the 2001 poll, respondents were asked if the statement that FM radios are free of static was true or false. It is, of course, true. Seventy-two percent responded that it is false.
- Moving into the medical field, 48% say that a statement to the effect that antibiotics kill viruses as well as bacteria is either absolutely or probably true; 51% say that it is either probably or absolutely false. It is, of course, false.

Decision Making Regarding Technology and Technological Literacy

Four questions in this year's survey seek to determine how much people want to be involved in the decisions related to the use of technology. The first looks at the level of interest people have in four specific areas that are representative of the applications of technology. The second uses the same four areas to determine how informed people believe they are. The remaining two questions return to areas explored in the 2001 poll to determine how much influence the public believes it has on decisions related to technology, and the extent to which they are willing to leave decisions in these areas to the experts.

The responses to the four questions are reported in Tables 9 through 12. The findings are summarized as follows:

- The public has a strong interest in topics such as modification of plants to supply food, the use of robotics in manufacturing, construction of homes, and space exploration.
- The public's interest in the given topics appears to be directly related to the extent to which their lives are affected.
- The public is almost equally divided regarding the extent to which it is relatively informed or relatively uninformed on the four topics.
- The public leans in the direction of believing that it does not have much influence in decisions related to the use of technology in the four areas.
- The public is reasonably comfortable in leaving to the experts decisions in the four areas

Table 8.
Please tell me if you think the following statements are absolutely true, probably true, probably false, or absolutely false.

Statement	Absolutely True %	Probably True %	**1+2 %**	Probably False %	Absolutely False %	**4+5 %**	DK/R %
Antibiotics kill viruses as well as bacteria	19	29	**48**	16	35	**51**	1
Using a cordless phone while in the bathtub creates the possibility of being electrocuted	22	27	**49**	23	26	**49**	2
The Internet and World Wide Web are the same thing	30	42	**72**	13	11	**24**	4
Fuel cells are now being used with gasoline or diesel engines to power cars	27	50	**77**	11	5	**16**	7

that will impact the communities in which they live.

The data in Table 9 support the public's strong interest in each of the four applications of the use of technology. The level of interest ranges from a high of 74% saying they are either very or somewhat interested in new construction methods to a low of 60% saying the same for robotics in manufacturing. The other two applications fall in the middle, with 69% giving one of the two responses relative to the modification of plants and 64% for space exploration. Given that the top two choices relate to home construction and modification of plants, it is reasonable to conclude that respondents have the greatest interest in areas that impact their daily lives. Robotics in manufacturing and space exploration, while interesting, are more removed.

While very interested in the four areas, the public is, according to the data in Table 10, conflicted in the extent to which it feels informed in these areas. A visual scan of responses to other questions in the survey verifies that the percentages of people saying they are "very" informed are low. The public feels it is most informed on new construction methods. However, even here, 41% say they feel not very informed or not informed at all.

The responses reported in Table 10 are somewhat of a surprise. The question was included as a follow-up to one in 2001 in which percentages ranging from 78% to 88% indicated they felt they should have some or a great deal of influence in where to locate roads in the community, the fuel efficiency of cars, and the development of genetically modified foods. It was decided to use that question as a springboard and ask in this survey how much influence they believe they have. The responses are reported in Table 11.

Only 9% believe they have a great deal of influence in these decisions, and 32% say they have some. A combined 59% say they have little or no influence. Here, again, there is an age difference, with 49% of 18-29-year-olds saying they believe they have at least some influence as compared to 38% of those 50 and older. The surprising thing is that, although high percentages said in 2001 they wanted a voice in these decisions, this year's

Table 9.
How much of an interest do you, yourself, have in the following topic? Are you very interested, somewhat interested, not very interested, or not interested at all?

Statement	Very Interested %	Somewhat Interested %	**1+2 %**	Not Very Interested %	Not Interested At All %	**4+5 %**	DK/R %
Modification of plants and animals to supply food	28	41	**69**	17	14	**31**	—
Robotics and other technologies in manufacturing	19	41	**60**	25	15	**40**	—
New construction methods or homes and buildings	35	39	**74**	16	10	**26**	—
Space exploration	27	37	**64**	19	17	**36**	—

Table 10.
Now, as I read these topics again, please tell me how informed you feel you are about each. Would you say you are very informed, somewhat informed, not very informed, or not informed at all?

Statement	Very Informed %	Somewhat Informed %	**1+2 %**	Not Very Informed %	Not at All Informed %	**4+5 %**	DK/R %
Modification of plants and animals to supply food	8	43	**51**	32	17	**49**	—
Robotics and other technologies in manufacturing	7	38	**45**	36	19	**55**	—
New construction methods for homes and buildings	14	45	**59**	28	13	**41**	—
Space exploration	9	51	**60**	26	14	**40**	—

Table 11.
How much influence do you think people like yourself have on decisions about such things as the fuel efficiency of cars, the construction of roads in your community, and genetically modified foods? Would you say a great deal, some, very little, or no influence?

Amount of Influence	Total Group %	18-29 Year-Olds %	Age 50 and Older %
A great deal	9	12	9
Some	32	37	29
Very little	40	39	40
No influence	19	12	22
Don't know/refused	—	—	—

Table 12.
Thinking about things such as fuel efficiency of cars, the construction of roads in your community, and genetically modified foods, how much confidence do you have in experts in these fields to make the right decisions for your community?

Level of Confidence	Total Group %	18-29 Year-Olds %	Age 50 and Older %
A great deal	12	15	12
Some	54	56	56
Very little	27	27	24
No influence	6	2	8
Don't know/refused	1	—	—

respondents seem comfortable with leaving these decisions to others. Two-thirds say they have some or a great deal of confidence in leaving these decisions to the experts. The question and responses are provided in Table 12.

Differences Based on Gender

Reference has been made throughout this report to differences in attitude related to the age of those surveyed. These differences can be explained by the fact that the younger among those surveyed have grown up in a world dominated by technology to an extent that was simply not characteristic of the formative years of those 50 and older. There is, however, another set of similarities and differences that would appear to have a base related to gender. These differences probably grow out of societal differences, differences that are, in many respects, changing. While the differences do not appear to be as great as some stereotypes might suggest, they offer insights that will be useful as we consider technology and education.

Drawing from various questions throughout the survey and looking at similarities first, the following findings are offered:

- 73% of men and 75% of women say it is very important to understand and use technology.
- 20% of men and 20% of women strongly agree that technology is a small factor in their everyday lives.
- 41% of men and 35% of women say it is very important to know how various technologies work.
- 37% of men and 42% of women say they have very little influence in decisions relating to construction of roads, new construction, and genetically-modified foods.
- Regarding the same three issues, 67% of men and 64% of women have either a great deal or some confidence in the ability of experts to make the decisions.
- 97% of men and 99% of women believe, given the broad definition of technology, that its study should be part of the schools' curriculum.
- 88% of men and 88% of women believe questions designed to determine how much students are able to understand and use technology should be included in federally-mandated tests.

Areas in which there seem to be differences based on gender in relation to technology are reflected in questions related to the type of knowledge desired and its application:

- 61% of men but only 45% of women say it is very important to be able to fix a light switch or other household product if it stops working.
- 67% of men but only 58% of women say it is important to be able to diagnose why something doesn't work so that it can be fixed.
- 67% of women and 62% of men believe it is very important to know whether it is better to repair products or better to throw them away.
- 61% of women and only 47% of men say it is important to be able to program a VCR.

Turning to the question designed to find out what people actually know about technology in their daily lives, men appear to have the edge:

- 32% of men and 38% of women are correct in saying that the statement that antibiotics kill both viruses and bacteria is absolutely false; however,

- 37% of men as compared to 18% of women are correct that a statement that a cordless phone in a bathtub creates the possibility of being electrocuted is absolutely false;
- 37% of men as compared to 24% of women are correct in absolutely agreeing with a statement saying that the Internet and the World Wide Web are the same thing; and
- 36% of men as compared to 19% of women are correct in absolutely agreeing with a statement that fuel cells are used with gasoline and diesel engines to power cars.

It may be that similarities and differences are related to differing interests. Several survey responses touched on that matter:

- 29% of women and 24% of men are very interested in knowing about the modification of plants and animals to supply food.
- 39% of women and 35% of men are very interested in knowing about space exploration.
- 27% of men as compared to 11% of women are very interested in the use of robotics and other technologies in engineering.
- 40% of men as compared to 30% of women are very interested in new construction of homes and buildings.

This survey was not specifically intended to explore gender differences in relation to technology, its importance, and its uses. However, the data support the following findings:

- Men and women are in agreement on the importance of understanding and being able to use technology.
- There is general agreement among men and women that they have little influence on major decisions related to technology, and both men and women express confidence in the experts who make those decisions.
- Men have a greater interest in being able to fix things than do women.
- Women have a somewhat greater interest in being able to make decisions and utilize technology around the home.
- Men are somewhat more informed than women about the way common technologies work.

Technology and Education

The final series of questions focus on the place of the study of technology and technological literacy in the K-12 school curriculum. This area, which is a major interest of ITEA, has taken on added significance as the dominance of No Child Left Behind (NCLB) is placing pressure on the school curriculum. The emphasis on English and mathematics is forcing a reevaluation of all aspects of the various school offerings. Given that the repeat questions have established that there has been little change since 2001, the responses from the two surveys are mixed freely in the following findings:

- Asked to respond in terms of a broad definition of technology, the public is virtually unanimous in believing that the study of technology should be included in the school curriculum.
- Just short of two-thirds of the respondents say the study of technological literacy should be integrated into other subjects in lieu of being taught as a separate subject.
- Those believing that technological literacy should be taught as a separate subject are equally divided on the issue of whether the subject should be optional or required.
- There is broad agreement as to what students should know, understand, and be able to do in relation to technology.
- Given a choice between responding to a national shortage of technology experts, there is near consensus that the preferable option is to meet the shortage through our own schools. This is as compared to bringing in experts from other countries.
- Close to two-thirds agree that technological literacy should be required as part of high school graduation requirements, and an even higher percentage believe questions designed to determine how much students understand and know about technology should be included in testing programs mandated by the federal government.

The data in Table 13 report on the question related to the inclusion of the study of technology in the school curriculum. Ninety-eight percent say it should be included; the 2001 percentage was 97. The footnote to Table 13 provides data from the 2001 survey showing that 63% of respondents called for the integration of technology into other subjects, as

Table 13.
Using a broad definition of technology as "modifying our natural world to meet human needs," do you believe the study of technology should or should not be included in the school curriculum?

Choice	% Selecting	
	2004	2001
Yes, should be included	98	97
No, should not be included	2	3
Don't know/refused	—	—

Note: In response to a follow-up question in 2001, 63% of those saying it should be included chose integration into other subjects in lieu of being taught as a separate subject. Of those choosing "a separate subject," 51% said the offering should be required, while 49% said it should be optional.

Table 14.
I am going to read a number of things that high school graduates might or might not know or be able to do. As I read each, tell me how important it is that high school students understand and are able to do each.

	1 Very Important %	2 Somewhat Important %	**3 1+2 %**	4 Not Very Important %	5 Not at All Important %	6 %
The relationship between technology, mathematics, and science (2001)	79	19	**98**	2	—	—
Have the knowledge and skills to apply technology (2004)	76	22	**98**	1	1	—
The role of people in the development and use of technology (2001)	72	24	**96**	3	1	—
Understand the overall effect of technology on our society (2004)	71	27	**98**	2	—	—
Understand the relationship between technology and the environment (2004)	68	29	**97**	2	1	—
Understand the relationship between technology and the economy (2004)	67	30	**97**	2	1	—
An understanding of the advances and innovations in technology (2001)	66	30	**96**	4	—	—
The ability to select and use products (2001)	66	27	**93**	5	2	—
Evaluate the pros and cons of specific technology uses (2004)	58	38	**96**	4	—	—
Know something about how products are designed (2001)	41	45	**86**	12	—	—

Table 15.
When a national shortage of qualified people occurs in a particular area of technology, which of the following solutions would you feel is the most appropriate course of action for the US to take?

Selections	% Selecting 2004	2001
Bring in technologically literate people from other countries	5	6
Take steps through our schools to increase the number of technologically literate people in this country	94	93
Don't know/refused	1	1

compared to 36% saying it should be taught as a separate subject. Of the 36% choosing separate subject, 51% said the subject should be required and 49% said it should be optional.

Regarding what should be included in the curriculum, the 2001 study asked what schools should prepare students for in terms of technology. The 2004 survey approached the matter differently, with five different items mentioned as the possible focus of what students should know or should or should not be able to do. The 10 items are reported collectively in Table 14.

Both surveys sought to determine how we should react to a national shortage of technology experts. The results are reported in Table 15. In 2001, 93% expressed a preference for solving the problem through our own schools. The percentage is 94% in this survey. While the preference is clear, it should not be taken as reflecting an aversion to importing technology experts from other countries.

Finally, Table 16 includes the data related to the inclusion of questions related to technology in the tests mandated by the federal No Child Left Behind legislation. The 88% saying they should be included adds to and builds on the 61% saying in 2001 that technological literacy should be evaluated as part of high school graduation requirements.

Summary and Conclusions

This survey and the earlier one on which it builds were designed to

Table 16.
The federal government requires that students be tested in science, mathematics, and reading. In your opinion, should these tests include or not include questions to help determine how much these students understand and know about technology?

Choice	% Selecting
Yes, should be included	88
No, should not be included	11
Don't know/refused	1

determine how the public views technological literacy and the importance of technology in their daily lives. The opportunity to do a second study so closely following the first has resulted in adding to, reinforcing, and augmenting the understandings gained in the earlier study. Given the accumulation of data, conclusions can be drawn with confidence.

The three conclusions drawn in the earlier study are both reinforced and extended by the additional data reported herein. They are repeated and slightly revised in the following:

- The public understands the importance of technology in our everyday lives and understands and supports the need for maximizing technological literacy.
- There is a definitional difference in which the public thinks first of computers when technology is mentioned, while experts in the field assign the word a meaning that encompasses almost everything we do in our everyday lives.
- The public wants and expects the development of technological literacy to be a priority for K-12 schools.
- Men and women are in general agreement on the importance of being able to understand and use technology and on the need to include technological literacy as part of the schools' curriculum.

The cumulative weight of the two studies justifies additional conclusions that add to our understanding.

- People translate their feelings regarding the importance of technology into a desire to know how technologies work, with emphasis on those technologies that impact their daily lives.
- Attitudes toward technology and technological applications are directly related to age. In general, younger people assign a greater importance to knowing how technologies work and feel they have more influence in decisions related to technological applications.

The two studies also leave open a number of questions for further study. This is not surprising, given the rapid pace of change involving technology and its applications. Questions worthy of study include:

- Are the definitional differences that have surfaced in each of the two studies significant? Those conducting the studies were concerned, at the beginning, about the extent to which the public associates technology with computers. As the studies have progressed, we have begun to wonder whether the definitional difference is anything more than an artifact associated with the field.
- The importance the public places on technology seems inconsistent with the fact that less than half of those queried see technology as important in their everyday lives. This is important since it impacts directly on the need for universal technological literacy.
- The surveys leave unanswered the question of how informed people really are about technology and its applications. This matter is also related to the need to build technological literacy.
- How much influence do people really want in relation to decisions relating to the application of technology? The 2001 survey suggested they wanted the opportunity to provide input. The current survey suggests a willingness to leave these decisions to the experts. This inconsistency is significant to those shaping policy and merits further exploration.

These surveys provide valuable insight into the attitudes and perspectives people have regarding technology. That is important because the inevitability is that natural processes will see technology playing an ever increasing part in our daily lives. The survey results tell us that the public understands this and is aware that the results of the application of technology can be both good and bad. Maximizing the good and minimizing the bad is, of course, the challenge. It is a challenge that those in technology education welcome since they believe that the understandings and abilities needed to meet the challenge will come through building technological literacy. It is in that context that the finding that the public wants the building of such literacy to be firmly embedded in K-12 education may be this effort's most significant outcome and the foundation on which future educational efforts can build.

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Methodology Statement for ITEA Survey

The survey results are based on 800 telephone interviews, with a national general population sample of adult men and women age 18 and over residing in telephone households. Interviewing was conducted by the Gallup Organization's full-time interviewing staff during the period of March 11, 2004 through March 31, 2004.

The sample used for this survey was a random digit telephone sample drawn from telephone exchanges serving the continental United States. The design of the sample ensures representation of both listed and unlisted numbers by random generation of the last two digits of telephone numbers selected on the basis of their area code, telephone exchange, and bank number.

A three-call design was used; that is one initial call and up to two additional calls were made to a household to reach an eligible respondent. Only one interview within each household was conducted. For results based on samples of this size, one can say with 95% confidence that the error attributable to sampling and other random effects could be plus or minus four percentage points. In addition to sampling error, question wording and practical difficulties in conducting surveys can introduce error or bias in the findings of opinion polls.

Sample Composition

	%
Total	100.0
Gender	
Male	48.6
Female	51.4
	100.0
Age	
18-29	17.7
30-49	41.7
50-64	23.9
65+	15.8
Undesignated	0.9
	100.0
Education	
Less than high school graduate	9.3
High school graduate	27.9
Trade/technical/vocation training	6.8
College (incomplete)	26.3
College graduate	18.6
Postgraduate work/ degree	11.0
Undesignated	0.1
	100.0
Race	
White	80.4
African-American/Black	10.3
All other	7.6
Undesignated	1.7
	100.0
Region	
East	22.7
Midwest	24.0
South	31.8
West	21.5
	100.0

Reprints

For persons who would like reprints of this ITEA/Gallup Poll Report, the price is $15.00 for 25 copies. Additional copies are 50 cents each. This price includes postage at the library rate. (Institutional purchase orders, checks, Master Card, Visa, or Discover number required.) Address orders to ITEA, 1914 Association Drive, Suite 201, Reston, Virginia 20191-1539, (703) 860-2100, fax: (703) 860-0353, e-mail: iteaordr@iris.org.

Replicating this Research

ITEA encourages additional research based on this ITEA/Gallup Poll. The complete set of data tables, which were generated from this survey, are available on the association's Web site, www.iteawww.org. The sixteen questions used in the survey are also available on ITEA's Web site.

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