

2004 Bachelor's Degree Recipients Alumni Survey

Technical Fluency

Background

On January 21, 2000 the Education Policy Committee recommended that the University System of Maryland Board of Regents adopt a draft resolution mandating that all USM graduates depart the university system demonstrating technical fluency.¹ Subsequently, on August 22, 2000, the committee outlined the elements of technical fluency that were borrowed from a report published by the National Research Council (NRC) entitled, "Being Fluent with Information Technology." Using NRC's three general competency areas (skills, concepts, and intellectual capabilities) as guidelines, the committee's working group established 17 competencies that USM graduates ought to demonstrate. In September 2000 each USM institution was advised to develop a report describing how the institution would ensure each student graduated with the core technological fluency competencies. On March 1, 2001 UMBC published its response outlining its proposed agenda to ensure technical fluency.² These initiatives prompted the UMBC IT Steering Committee, working with the Office of Institutional Research (OIR), to integrate technical fluency items into the One-Year Follow-up Survey of FY2001 bachelor's degree recipients. The IT Steering Committee subsequently revised the 2001 technical fluency survey items for the survey of CY2003 bachelor's degree recipients.³ The same items are used in the 2004 Bachelor's Degree Recipients Alumni Survey; thus results can be compared from year to year.

Data & Methods

In Spring and Summer 2005, the Office of Institutional Research conducted a one-year follow-up survey of the 1,673 alumni who received a bachelor's degree in fiscal year 2004. Three mailings of the survey resulted in a response rate of 24.3% and a final sample of 388 respondents.⁴ As part of this survey, alumni were asked to respond to a series of questions addressing UMBC's contribution to their acquisition of technical fluency.

The seven items used here represent technical fluency, as outlined by the committee's working group. Please refer to Table 1 for a listing of the 2005 technical fluency survey items and examples of each. Alumni were asked if and when they acquired certain computer skills and technical knowledge to gauge the extent to which UMBC contributed to their technical fluency. Respondents could reply that they learned a particular skill or developed certain technical knowledge (a) before attending UMBC, (b) during their time at UMBC, (c) after leaving UMBC, or that (d) they still did not know how to perform certain computer-related tasks or they did not possess particular technical knowledge.

Findings

Matriculation Type

Table 2, and two accompanying figures, display summary data regarding attainment of technical skills and knowledge from alumni's educational experiences at UMBC. To meet the technical fluency standards outlined by the University System of Maryland Board of Regents', UMBC academic and administration departments have drafted strategic plans to make progress towards goals outlined by USM, including (but not limited to) increasing access to technology for their students,⁵ organizing training and information sharing sessions for faculty in the use of technology in the classroom,⁶ providing courses on various topics through the Office of Information Technology,⁷ and

¹ <http://www.gl.umbc.edu/it/it-plans.shtml>. The link is displayed as "BOR Resolution on Student Technology Fluency" (January 21, 2000). Accessed on August 3, 2005.

² Reference "IT Strategic Plan" at <http://www.umbc.edu/provost/planning/index.html>.

³ Please note, the technical fluency items in the 2004 Questionnaire for CY2003 UMBC Recent Bachelor's Degree Recipients were revised to more accurately reflect the 17 competencies outlined in the August 2000 USM Board of Regents Education Policy Committee memo. Results from the 2004 Questionnaire for CY2003 UMBC Recent Bachelor's Degree Recipients are comparable to the 2005 Questionnaire for FY2004 UMBC Recent Bachelor's Degree Recipients.

⁴ An incentive was offered as a strategy to increase participation.

⁵ For more information please visit the Office of Technology's Web site describing its Assured Access campus initiative (www.umbc.edu/access).

⁶ Go to <http://asp1.umbc.edu/newmedia/oit/brownbag/present.cfm> for examples of UMBC's Teaching, Learning, and Technology Brown Bag series.

encouraging faculty to develop innovative ways to integrate technology in their courses with teaching, learning, and technology grants.⁸ Ultimately these structural components set the stage for a culture that facilitates integrating technology into courses and attaining technical skills and knowledge.

Four general patterns emerged from these data. First, alumni revealed they were much more likely to develop technical fluency prior to matriculating to UMBC or while attending UMBC, and much less likely to develop these skills and knowledge one-year out of college. Second, in some cases alumni have yet to acquire certain technical skills and knowledge. In the analysis of CY2003 alumni technical fluency,⁹ graduates of the Arts & Humanities or the Social Sciences were more likely than those in the science, technology, engineering, and mathematics (STEM) areas to have yet acquired certain skills. In this most recent survey there is a different trend. Virtually all Engineering, Computer & Information Science alumni reported that they were fluent in all measured areas, with almost no respondents indicating that they lacked particular skills or knowledge (Table 3).¹⁰ Third, alumni who transferred into UMBC generally were more likely than alumni who enrolled as new freshmen to report attaining technical skills and knowledge prior to enrolling at UMBC with two exceptions. Alumni who matriculated as new freshmen and new transfers were equally likely to report that they knew how to “develop and share documents and presentations” and “understand social and ethical implications of technology” prior to enrolling at UMBC (61% and 40%, respectively). Fourth, new transfers were as likely as new freshmen to attribute their development of technical fluencies emblematic of broad course-related objectives to their educational experiences at UMBC (i.e., develop and share documents and presentations, using a computer to analyze or display information, find and evaluate information on the internet, learn online, and understanding the social and ethical implications of technology).

The data in Table 2 show that at least half of all alumni commented that they learned how to (a) set up a computer, (b) find and evaluate information on the Internet, (c) develop and share documents and presentations, learn online, and secure a personal computer and personal privacy prior to matriculating to UMBC. Alumni were more likely to respond that they acquired those skills before attending UMBC regardless of matriculation type. Alumni also reported that UMBC contributed to the development of those skills. There were three areas where about 20% of alumni *did not* acquire particular technical skills and knowledge at UMBC: (a) using a computer to analyze or display information, (b) securing a computer and personal privacy, and (c) understanding the social and ethical implications of technology. While a small percentage of alumni learned these skills after leaving UMBC, a larger percentage had yet to acquire these skills. Consistent with results from the CY2003 alumni survey, one-fifth (20%) of all respondents confessed they still did not understand or know how to “use a computer to analyze or display information” (Table 2).¹¹

Program Area

Table 3 illustrates UMBC’s contribution to the development of alumni’s technical fluency by program area.¹² Although data for Interdisciplinary Studies alumni are shown, the small number of graduates (n = 10) in this program does not support their inclusion in these comparisons. Similar to results from the CY2003 alumni survey, Engineering, Computer & Information Sciences and Math & Sciences alumni were generally more likely than other alumni to report acquiring these technical skills and knowledge prior to coming to UMBC. Engineering, Computer & Information Sciences alumni were also more likely than all other alumni to report having acquired all of these skills, with virtually no Engineering, Computer & Information Sciences alumni claiming they did not possess any of the technical skills and knowledge to date (Table 3, EC&IS, 4th column). In part this is a result of their academic program.

⁷ You can peruse the Office of Information Technology’s Web site to understand how it serves students and faculty (<http://www.umbc.edu/oit/>).

⁸ For examples of how faculty have integrated technology into their classrooms visit this Web page (<http://www.umbc.edu/oit/tlffair/tltpanel.html>).

⁹ For a copy of this report please click on this link: <http://www.umbc.edu/oir/Reports/technical%20fluency.pdf>.

¹⁰ Plausibly, alumni who majored in Math & Sciences were as likely as Arts & Humanities and Social Science alumni to report not having acquired certain skills because a greater proportion of female alumni who majored in Math & Sciences responded to the survey than those in the population of 2004 bachelor degree recipients. Sixty percent of 2004 bachelor degree recipients majored in Math & Science and were female compared to seventy percent in the sample; thus Math & Science alumnae are over-represented in the sample.

¹¹ Admittedly, the examples of this technical fluency on the survey are discipline-specific and geared to alumni who majored in the science and technology areas. See Table 1 for a list of the examples for “using a computer to analyze or display information.” In the future this survey item should be revised to include a broader array of examples like analyzing data using a statistical program.

¹² The distribution of respondents by major area was similar to the distribution among all degree recipients, with those in Engineering, Computer & Information Sciences being somewhat under-represented and Social Science majors being over-represented. Plausibly this is a gender effect, as the response rate of females (32%) was higher than males (19%). Please see “2004 Bachelor’s Degree Recipients One-Year Follow-Up Alumni Survey” for more details.

As mentioned above, there were three areas where a notable percentage of alumni had yet to acquire certain technical skills and knowledge: (a) using a computer to analyze or display information, (b) securing a computer and personal privacy, and (c) understanding the social and ethical implications of technology. There was a significant relationship between program area and each of these items. Generally, Engineering, Computer & Information Sciences alumni were more likely than other alumni to acquire these skills while at UMBC, if they had not already acquired them prior to matriculation. Alumni who majored in the Arts & Humanities and the Social Sciences were more likely than alumni who majored in Math & Sciences to report they still *did not* know how to “use a computer to analyze or display information” (30.8%, 29.2%, 22.8%, respectively). Graduates of Arts & Humanities programs were least likely to attribute UMBC with acquiring that skill set. Regarding alumni’s ability to secure a computer and personal privacy, those who majored in the Social Sciences were almost twice as likely as both Arts & Humanities and Math & Sciences alumni to report that they *did not* know how to do this (19.2%, 10.6%, 10.5%, respectively). Finally, while over 50% of Math & Sciences alumni reported they “understood the social and ethical implications of technology” prior to matriculating to UMBC, there was still another 21% of alumni who had majored in the Math & Sciences and who *did not* understand these implications of technology, meaning that of all the disciplines graduates of Math & Science programs were the least likely to have acquired this knowledge while at UMBC.

Gender

In the analysis of CY2003 alumni’s technical fluency, the importance of understanding the relationships among gender, program area, and technical fluency was noted. Briefly, the “Interim Policy on Technology Fluency” (February 2002) charges UMBC with both facilitating the acquisition of general technical fluency and discipline-specific skills and knowledge for all students. Here, we examined if there was a gender gap in technical fluency and the extent to which program area could account for this.

Table 5 illustrates the relationship between gender and technical fluency. Three of the seven relationships were statistically significant between gender and technical fluency, including (1) setting up a computer, (2) securing a computer and personal privacy, and (3) using a computer to analyze or display information. These results were consistent with the analysis of CY2003 alumni technical fluency. Generally, males were more likely than females to have reported that they learned to do these tasks prior to matriculating to UMBC. Females were more likely than males to have reported having not yet acquired the competencies of securing a personal computer and using a computer to analyze or display information.

Table 6 shows the relationship among gender, program area, and technical fluency.¹³ Again, current results corroborate results from the technical fluency report from the CY2003 alumni survey. Knowing that females were more likely than males to have majored in the Arts & Humanities and Social Sciences and that alumni in those program areas were less likely to have acquired the aforementioned competencies, evidence suggests that alumni fell short of these standards, in part, because of curriculum differences in one’s program area. Specifically, male and female alumni in the Arts & Humanities and the Social Sciences were *both* likely to report *not* having attained these technical fluencies, while females tended to more frequently report this.

For Math & Science alumni there is a different pattern, and this departs from CY2003 alumni survey results. Of the three areas where a notable percentage of alumni had not yet acquired technical proficiency, 2004 alumni data revealed that female graduates from Math & Science programs were *more* likely than males to report acquiring these skills after graduating from UMBC; females were also more likely than males to report that they had yet to acquire those skills.

Finally, within the Engineering, Computer & Information Science area, male graduates were more likely than female graduates to have acquired these skills prior to matriculation, while female graduates made up for this while at UMBC. Generally the gendered patterns of skills acquisition from the CY2003 data are not supported with this data. No gender gap is apparent.¹⁴

¹³ Although a distinct pattern emerged among gender, program type, and technical fluency, Chi-square tests of significance could not be conducted to assess the significance of these relationships because greater than 20% of the cell sizes were less than 5. This violates one of the key assumptions of the Chi-square test.

¹⁴ See Table 6. Chi-square tests of significance could not be conducted due to too many small cell sizes.

Concluding Remarks

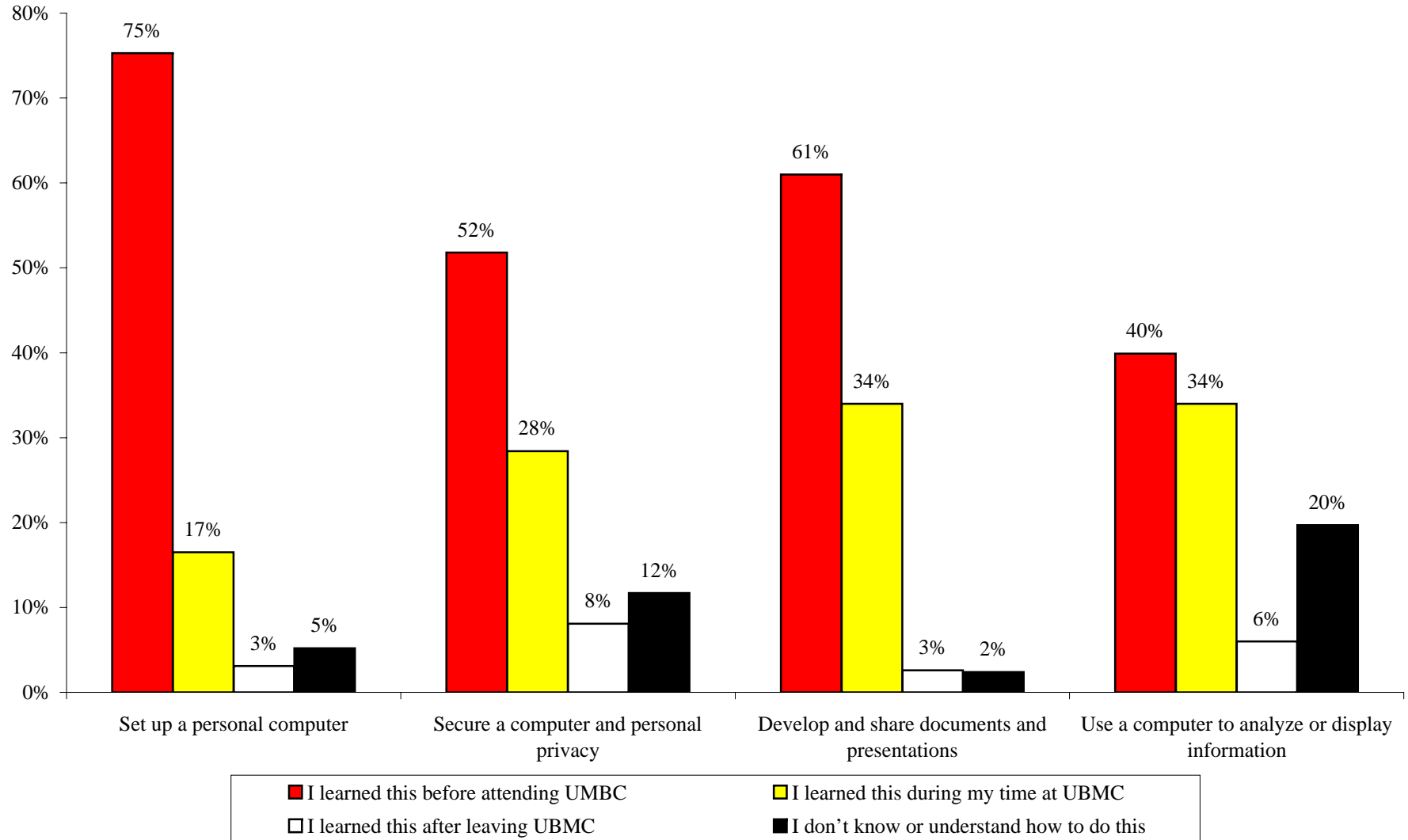
There have been numerous initiatives across campus to support the use of technology in the classroom as well as outside the classroom. Although these data do not allow us to draw a causal link between campus technology initiatives and alumni responses, it is evident that students are being exposed to technology and are learning a variety of technical skills and knowledge while at UMBC. In many ways these findings corroborate existing data on the state of technical fluency of UMBC's recent alumni. Generally, alumni reported that they acquired technical skills and knowledge before coming to UMBC or during their time at UMBC. In addition, all alumni credited UMBC with helping them develop technical fluency in the measured areas, with relatively equal proportions of alumni who enrolled as new freshmen and new transfers reporting that their experiences at UMBC helped them attain more specialized technical skills and knowledge. While the CY2003 alumni technical fluency report revealed some gendered patterns in skill acquisition, the current data support no substantive gender differences; instead data support the notion that discipline area helps to explain the relationship between gender and technical fluency.

Please contact Shannon Tinney, Research Analyst at the Office of Institutional Research with any questions. E-mail: tinney@umbc.edu. Phone: 401-455-2111.

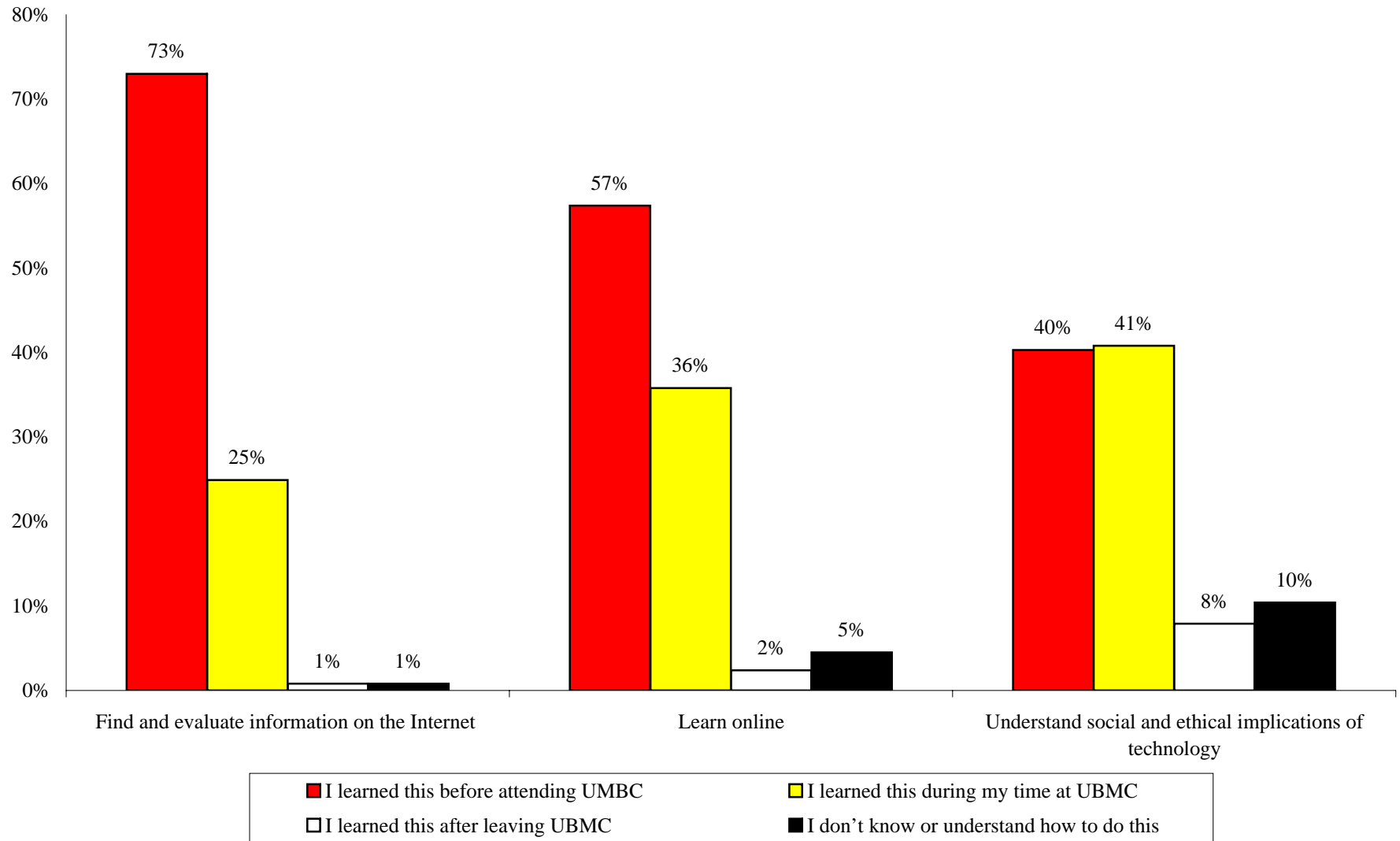
Table 1: Technical Fluency Items and Examples

Technical Fluency Survey Item	Examples
Set up a personal computer	<ul style="list-style-type: none">• Connect hardware• Install software• Connect to a network• Organize files• Print documents
Secure a computer and your personal privacy	<ul style="list-style-type: none">• Install or update anti-virus or e-mail spam software• Operating system updates, secure passwords, SSN and identifying information
Develop and share documents and presentations	<ul style="list-style-type: none">• Word processing• Add graphics to presentations• Deliver documents or presentations in person or share electronically
Use a computer to analyze or display information	<ul style="list-style-type: none">• Write a computer program, task or spreadsheet macro• Create/publish a Web page
Find and evaluate information on the Internet	<ul style="list-style-type: none">• Use search engines• Distinguish and cite reliable online sources for research
Learn online	<ul style="list-style-type: none">• Understand built-in software manuals• Self-paced tutorials• Query others via e-mail or discussion forums
Understand social and ethical implications of technology	<ul style="list-style-type: none">• Use of personal information, health records, ethnicity, gender, income, etc.

**UMBC Survey of Fiscal Year 2004 Bachelor's Degree Recipients:
Attainment of Technological Skills & Understanding**



**UMBC Survey of Fiscal Year 2004 Bachelor's Degree Recipients:
Attainment of Technological Skills & Understanding**



**Fiscal Year 2004 Bachelor's Degree Recipients Alumni Survey
TECHNICAL FLUENCY BY MATRICULATION TYPE**

TABLE 2: PLEASE INDICATE IF AND WHEN YOU ATTAINED THE FOLLOWING SKILLS AND UNDERSTANDING AS A RESULT OF YOUR FORMAL OR INFORMAL EDUCATIONAL EXPERIENCE AT UMBC (BY MATRICULATION TYPE)															
	I learned this before attending UMBC			I learned this during my time at UMBC			I learned this after leaving UMBC			I don't understand or know how to do this			Grand Totals		
	NF	NT	Total	NF	NT	Total	NF	NT	Total	NF	NT	Total	NF	NT	Total
Set up a personal computer	145	129	274	43	19	62	8	3	11	10	9	19	206	160	366
	<i>70%</i>	<i>81%</i>	75%	<i>21%</i>	<i>12%</i>	17%	<i>4%</i>	<i>2%</i>	3%	<i>5%</i>	<i>6%</i>	5%			100%
Secure a computer and personal privacy	98	92	190	69	34	103	18	12	30	21	22	43	206	160	366
	<i>48%</i>	<i>58%</i>	52%	<i>33%</i>	<i>21%</i>	28%	<i>9%</i>	<i>8%</i>	8%	<i>10%</i>	<i>14%</i>	12%			100%
Develop and share documents and presentations ^a	126	95	221	69	53	122	6	4	10	4	5	9	205	157	362
	<i>61%</i>	<i>61%</i>	61%	<i>34%</i>	<i>34%</i>	34%	<i>3%</i>	<i>3%</i>	3%	<i>2%</i>	<i>3%</i>	2%			100%
Use a computer to analyze or display information	79	66	145	71	53	124	12	8	20	42	32	74	204	159	363
	<i>39%</i>	<i>42%</i>	40%	<i>35%</i>	<i>33%</i>	34%	<i>6%</i>	<i>5%</i>	6%	<i>21%</i>	<i>20%</i>	20%			100%
Find and evaluate information on the Internet ^a	143	119	262	55	36	91	3	0	3	1	2	3	202	157	359
	<i>71%</i>	<i>76%</i>	73%	<i>27%</i>	<i>23%</i>	25%	<i>1%</i>	<i>0%</i>	1%	<i>0%</i>	<i>1%</i>	1%			100%
Learn online	110	96	206	76	54	130	7	2	9	10	7	17	203	159	362
	<i>54%</i>	<i>60%</i>	57%	<i>37%</i>	<i>34%</i>	36%	<i>3%</i>	<i>1%</i>	2%	<i>5%</i>	<i>4%</i>	5%			100%
Understand social and ethical implications of technology	81	65	146	83	67	150	16	14	30	23	15	38	203	161	364
	<i>40%</i>	<i>40%</i>	40%	<i>41%</i>	<i>42%</i>	41%	<i>8%</i>	<i>9%</i>	8%	<i>11%</i>	<i>9%</i>	10%			100%

Note: NF = New Freshmen; NT = New Transfers

Note: Percentages in *italic* represent the proportion of NF and NT who responded "learned before," "learned during," "learned after," or "do not know" for each item .

Note: Percentages in **bold** represent the proportion of alumni who responded "learned before," "learned during," "learned after," or "do not know" for each item.

^a Chi-square tests assessing the relationship between technical fluency and matriculation type could not be conducted

because the proportion of cell sizes less than 5 is > 20%. This violates one of the assumptions associated with the Chi-square test.

** p < .01; * p < .05. There is a significant relationship between technical fluency and matriculation type.

**Fiscal Year 2004 Bachelor's Degree Recipients Alumni Survey
TECHNICAL FLUENCY BY PROGRAM AREA**

**TABLE 3: PLEASE INDICATE IF AND WHEN YOU ATTAINED THE FOLLOWING SKILLS AND UNDERSTANDING
AS A RESULT OF YOUR FORMAL OR INFORMAL EDUCATIONAL EXPERIENCE AT UMBC
(PERCENT RESPONDING BY PROGRAM AREA)**

	Arts & Humanities (n = 66)				Engineering, Computer & Info. Sciences (n = 105)				Social Sciences (n = 150)				Math & Sciences (n = 57)				Interdisciplinary Studies (n = 10)			
	B	D	A	DK	B	D	A	DK	B	D	A	DK	B	D	A	DK	B	D	A	DK
Set up a personal computer ^a	74.2%	15.2%	4.5%	6.1%	80.0%	16.2%	3.8%	0.0%	68.7%	20.4%	2.0%	8.8%	83.9%	7.1%	3.6%	5.4%	80.0%	20.0%	0.0%	0.0%
Secure a computer and personal privacy *	54.5%	24.2%	10.6%	10.6%	58.1%	31.4%	7.6%	2.9%	44.5%	28.1%	8.2%	19.2%	54.4%	29.8%	5.3%	10.5%	60.0%	20.0%	10.0%	10.0%
Develop and share documents and presentations ^a	59.4%	28.1%	4.7%	7.8%	70.5%	28.6%	1.0%	0.0%	52.4%	44.1%	1.4%	2.1%	67.9%	25.0%	5.4%	1.8%	90.0%	0.0%	10.0%	0.0%
Use a computer to analyze or display information ***	36.9%	18.5%	13.8%	30.8%	49.5%	48.6%	1.9%	0.0%	30.6%	36.1%	4.2%	29.2%	45.6%	29.8%	1.8%	22.8%	60.0%	20.0%	20.0%	0.0%
Find and evaluate information on the Internet ^a	76.2%	22.2%	0.0%	1.6%	75.2%	23.8%	1.0%	0.0%	65.5%	32.4%	0.7%	1.4%	84.2%	15.8%	0.0%	0.0%	90.0%	0.0%	10.0%	0.0%
Learn online ^a	52.3%	33.8%	4.6%	9.2%	59.6%	36.5%	3.8%	0.0%	53.1%	40.0%	0.0%	6.9%	66.7%	29.8%	1.8%	1.8%	77.8%	11.1%	11.1%	0.0%
Understand social and ethical implications of technology *	36.9%	41.5%	7.7%	13.8%	38.1%	45.7%	9.5%	6.7%	37.2%	46.9%	6.2%	9.7%	52.6%	17.5%	8.8%	21.1%	60.0%	30.0%	10.0%	0.0%

** p < .01; * p < .05. There is a significant relationship between technical fluency and matriculation type.

Note: The n for each discipline varies slightly across items given the number of valid cases.

B= "I learned this before attending UMBC"; D= "I learned this during my time at UMBC"; A=" I learned this after leaving UMBC"; DK=" I don't understand or know how to do this"

^a Chi-square tests assessing the relationship between technical fluency and program area could not be conducted because the proportion of cell sizes with an expected count less than 5 is > 20%. This violates an assumption of the Chi-square test.

Fiscal Year 2004 Bachelor's Degree Recipients Alumni Survey
TECHNICAL FLUENCY BY PROGRAM AREA AND MATRICULATION TYPE

**TABLE 4: PLEASE INDICATE IF AND WHEN YOU ATTAINED THE FOLLOWING SKILLS AND UNDERSTANDING
AS A RESULT OF YOUR FORMAL OR INFORMAL EDUCATIONAL EXPERIENCE AT UMBC
(PERCENT RESPONDING BY PROGRAM AREA AND MATRICULATION TYPE)**

	Matriculation Type	Arts & Humanities (NF = 37; NT = 28)				Engineering, Computer & Info. Sciences (NF = 49; NT = 46)				Social Sciences (NF = 79; NT = 70)				Math & Sciences (NF = 35; NT = 17)				Interdisciplinary Studies (NF = 8; NT = 1)			
		B	D	A	DK	B	D	A	DK	B	D	A	DK	B	D	A	DK	B	D	A	DK
Set up a personal computer ^a	NF	73.0%	18.9%	0.0%	8.1%	71.4%	22.4%	6.1%	0.0%	63.6%	26.0%	3.9%	6.5%	80.0%	8.6%	5.7%	5.7%	75.0%	25.0%	0.0%	0.0%
	NT	78.6%	10.7%	7.1%	3.6%	84.8%	13.0%	2.2%	0.0%	75.4%	13.0%	0.0%	11.6%	93.8%	6.3%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
Secure a computer and personal privacy ^a	NF	48.6%	32.4%	10.8%	8.1%	46.9%	40.8%	10.2%	2.0%	42.9%	33.8%	7.8%	15.6%	57.1%	25.7%	5.7%	11.4%	50.0%	25.0%	12.5%	12.5%
	NT	64.3%	14.3%	7.1%	14.3%	67.4%	23.9%	6.5%	2.2%	47.1%	22.1%	8.8%	22.1%	58.8%	23.5%	5.9%	11.8%	100.0%	0.0%	0.0%	0.0%
Develop and share documents and presentations ^a	NF	61.1%	25.0%	5.6%	8.3%	69.4%	30.6%	0.0%	0.0%	48.1%	49.4%	2.6%	0.0%	74.3%	20.0%	2.9%	2.9%	87.5%	0.0%	12.5%	0.0%
	NT	59.3%	29.6%	3.7%	7.4%	67.4%	30.4%	2.2%	0.0%	56.7%	38.8%	0.0%	4.5%	56.3%	31.3%	12.5%	0.0%	100.0%	0.0%	0.0%	0.0%
Use a computer to analyze or display information ^a	NF	36.1%	19.4%	16.7%	27.8%	51.0%	46.9%	2.0%	0.0%	28.9%	38.2%	3.9%	28.9%	42.9%	28.6%	0.0%	28.6%	50.0%	25.0%	25.0%	0.0%
	NT	39.3%	14.3%	10.7%	35.7%	47.8%	50.0%	2.2%	0.0%	32.8%	32.8%	4.5%	29.9%	58.8%	23.5%	5.9%	11.8%	100.0%	0.0%	0.0%	0.0%
Find and evaluate information on the Internet ^a	NF	70.6%	26.5%	0.0%	2.9%	71.4%	26.5%	2.0%	0.0%	60.5%	38.2%	1.3%	0.0%	88.6%	11.4%	0.0%	0.0%	87.5%	0.0%	12.5%	0.0%
	NT	82.1%	17.9%	0.0%	0.0%	78.3%	21.7%	0.0%	0.0%	70.8%	26.2%	0.0%	3.1%	76.5%	23.5%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
Learn online ^a	NF	52.8%	30.6%	5.6%	11.1%	55.1%	38.8%	6.1%	0.0%	44.7%	48.7%	0.0%	6.6%	71.4%	22.9%	2.9%	2.9%	71.4%	14.3%	14.3%	0.0%
	NT	50.0%	39.3%	3.6%	7.1%	60.0%	37.8%	2.2%	0.0%	63.2%	29.4%	0.0%	7.4%	64.7%	35.3%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
Understand social and ethical implications of technology ^a	NF	30.6%	47.2%	8.3%	13.9%	40.8%	46.9%	6.1%	6.1%	33.3%	46.7%	8.0%	12.0%	60.0%	14.3%	8.6%	17.1%	50.0%	37.5%	12.5%	0.0%
	NT	42.9%	35.7%	7.1%	14.3%	32.6%	45.7%	15.2%	6.5%	42.0%	47.8%	4.3%	5.8%	47.1%	17.6%	11.8%	23.5%	100.0%	0.0%	0.0%	0.0%

Note: The n for matriculation type (NF, NT) varies minimally across items within discipline given the number of valid cases.

NF = New Freshmen; NT = New Transfer

B= "I learned this before attending UMBC"; D= "I learned this during my time at UMBC"; A= "I learned this after leaving UMBC"; DK=" I don't understand or know how to do this"

^a Chi-square tests assessing the relationship between technical fluency and program area could not be conducted because the proportion of cell sizes with an expected cell count less than 5 is > 20%.

This violates an assumption of the Chi-square test.

**Fiscal Year 2004 Bachelor's Degree Recipients Alumni Survey
TECHNICAL FLUENCY BY GENDER**

TABLE 5: PLEASE INDICATE IF AND WHEN YOU ATTAINED THE FOLLOWING SKILLS AND UNDERSTANDING AS A RESULT OF YOUR FORMAL OR INFORMAL EDUCATIONAL EXPERIENCE AT UMBC (BY GENDER)															
	I learned this before attending UMBC			I learned this during my time at UMBC			I learned this after leaving UMBC			I don't understand or know how to do this			Grand Totals		
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Set up a personal computer *	123	166	289	16	47	63	4	8	12	5	15	20	148	236	384
	<i>83%</i>	<i>70%</i>	75%	<i>11%</i>	<i>20%</i>	16%	<i>3%</i>	<i>3%</i>	3%	<i>3%</i>	<i>6%</i>	5%			100%
Secure a computer and personal privacy ***	94	105	199	37	72	109	12	19	31	5	40	45	148	236	384
	<i>64%</i>	<i>44%</i>	52%	<i>25%</i>	<i>31%</i>	28%	<i>8%</i>	<i>8%</i>	8%	<i>3%</i>	<i>17%</i>	12%			100%
Develop and share documents and presentations ^a	95	140	235	44	82	126	4	6	10	4	5	9	147	233	380
	<i>65%</i>	<i>60%</i>	62%	<i>30%</i>	<i>35%</i>	33%	<i>3%</i>	<i>3%</i>	3%	<i>3%</i>	<i>2%</i>	2%			100%
Use a computer to analyze or display information ***	76	76	152	50	84	134	3	17	20	18	57	75	147	234	381
	<i>52%</i>	<i>32%</i>	40%	<i>34%</i>	<i>36%</i>	35%	<i>2%</i>	<i>7%</i>	5%	<i>12%</i>	<i>24%</i>	20%			100%
Find and evaluate information on the Internet ^a	103	174	277	42	52	94	0	3	3	2	1	3	147	230	377
	<i>70%</i>	<i>76%</i>	73%	<i>29%</i>	<i>23%</i>	25%	<i>0%</i>	<i>1%</i>	1%	<i>1%</i>	<i>0%</i>	1%			100%
Learn online	89	129	218	48	88	136	4	5	9	5	12	17	146	234	380
	<i>61%</i>	<i>55%</i>	57%	<i>33%</i>	<i>38%</i>	70%	<i>3%</i>	<i>2%</i>	5%	<i>3%</i>	<i>5%</i>	9%			100%
Understand social and ethical implications of technology	62	92	154	60	96	156	12	18	30	13	29	42	147	235	382
	<i>42%</i>	<i>39%</i>	40%	<i>41%</i>	<i>41%</i>	41%	<i>8%</i>	<i>8%</i>	8%	<i>9%</i>	<i>12%</i>	11%			100%

*** p < .001; ** p < .01; * p < .05. There is a significant relationship between technical fluency and gender.

Note: M = Male, F = Female

Percentages in *italic* represent the proportion of M and F in each cell. Percentages in **bold** represent the proportion of alumni who responded "learned before," "learned during," "learned after," or "do not know" for each item.

^a Chi-square tests assessing the relationship between technical fluency and matriculation type could not be conducted

because the proportion of cell sizes with an expected count less than 5 is > 20%. This violates one of the assumptions associated with the Chi-square test.

**Fiscal Year 2004 Bachelor's Degree Recipients Alumni Survey
TECHNICAL FLUENCY BY PROGRAM AREA AND GENDER**

**TABLE 6: PLEASE INDICATE IF AND WHEN YOU ATTAINED THE FOLLOWING SKILLS AND UNDERSTANDING
AS A RESULT OF YOUR FORMAL OR INFORMAL EDUCATIONAL EXPERIENCE AT UMBC
(PERCENT RESPONDING BY PROGRAM AREA AND GENDER)**

	Gender	Arts & Humanities (M = 25; F = 41)				Engineering, Computer & Info. Sciences (M = 75; F = 30)				Social Sciences (M = 31; F = 116)				Math & Sciences (M = 17; F = 40)				Interdisciplinary Studies (M = 2; F = 8)			
		B	D	A	DK	B	D	A	DK	B	D	A	DK	B	D	A	DK	B	D	A	DK
Set up a personal computer ^a	M	84.0%	8.0%	0.0%	8.0%	85.3%	12.0%	2.7%	0.0%	65.5%	17.2%	6.9%	10.3%	100.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
	F	68.3%	19.5%	7.3%	4.9%	66.7%	26.7%	6.7%	0.0%	69.5%	21.2%	0.8%	8.5%	76.9%	10.3%	5.1%	7.7%	75.0%	25.0%	0.0%	0.0%
Secure a computer and personal privacy	M ^a	64.0%	20.0%	12.0%	4.0%	62.7%	29.3%	8.0%	0.0%	51.7%	24.1%	10.3%	13.8%	88.2%	11.8%	0.0%	0.0%	50.0%	50.0%	0.0%	0.0%
	F (<i>ns</i>)	48.8%	26.8%	9.8%	14.6%	46.7%	36.7%	6.7%	10.0%	42.7%	29.1%	7.7%	20.5%	40.0%	37.5%	7.5%	15.0%	62.5%	12.5%	12.5%	12.5%
Develop and share documents and presentations ^a	M	54.2%	25.0%	8.3%	12.5%	73.3%	25.3%	1.3%	0.0%	46.7%	50.0%	0.0%	3.3%	68.8%	25.0%	6.3%	0.0%	100.0%	0.0%	0.0%	0.0%
	F	62.5%	30.0%	2.5%	5.0%	63.3%	36.7%	0.0%	0.0%	53.9%	42.6%	1.7%	1.7%	67.5%	25.0%	5.0%	2.5%	87.5%	0.0%	12.5%	0.0%
Use a computer to analyze or display information	M ^a	50.0%	16.7%	8.3%	25.0%	56.0%	42.7%	1.3%	0.0%	34.5%	34.5%	0.0%	31.0%	64.7%	17.6%	0.0%	17.6%	50.0%	50.0%	0.0%	0.0%
	F ^{***}	29.3%	19.5%	17.1%	34.1%	33.3%	63.3%	3.3%	0.0%	29.6%	36.5%	5.2%	28.7%	37.5%	35.0%	2.5%	25.0%	62.5%	12.5%	25.0%	0.0%
Find and evaluate information on the Internet ^a	M	66.7%	29.2%	0.0%	4.2%	73.3%	26.7%	0.0%	0.0%	51.7%	44.8%	0.0%	3.4%	88.2%	11.8%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
	F	82.1%	17.9%	0.0%	0.0%	80.0%	16.7%	3.3%	0.0%	69.0%	29.2%	0.9%	0.9%	82.5%	17.5%	0.0%	0.0%	87.5%	0.0%	12.5%	0.0%
Learn online ^a	M	50.0%	29.2%	8.3%	12.5%	59.5%	37.8%	2.7%	0.0%	62.1%	31.0%	0.0%	6.9%	76.5%	23.5%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
	F	53.7%	36.6%	2.4%	7.3%	60.0%	33.3%	6.7%	0.0%	50.9%	42.2%	0.0%	6.9%	62.5%	32.5%	2.5%	2.5%	71.4%	14.3%	14.3%	0.0%
Understand social and ethical implications of technology ^a	M	45.8%	33.3%	12.5%	8.3%	41.3%	41.3%	9.3%	8.0%	27.6%	62.1%	3.4%	6.9%	64.7%	11.8%	5.9%	17.6%	50.0%	50.0%	0.0%	0.0%
	F	31.7%	46.3%	4.9%	17.1%	30.0%	56.7%	10.0%	3.3%	39.7%	43.1%	6.9%	10.3%	47.5%	20.0%	10.0%	22.5%	62.5%	25.0%	12.5%	0.0%

Note: The n for gender (M, F) varies minimally across items within discipline given the number of valid cases.

B= "I learned this before attending UMBC"; D= "I learned this during my time at UMBC"; A= "I learned this after leaving UMBC"

DK=" I don't understand or know how to do this"

^a Chi-square tests assessing the relationship between technical fluency and matriculation type could not be conducted because the proportion of cell sizes less than 5 is > 20%.

This violates an assumption of the Chi-square test.