LEADING THE MANUFACTURING TALENT REVOLUTION

360 Youth Outreach Events 2017

Survey of Youth Participants

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Summary

An important aspect of the 360 Manufacturing and Applied Engineering ATE Regional Center of Excellence (360) mission is to expose students to science, technology, engineering, and math (STEM) and increase enthusiasm for manufacturing careers. To this end, 360 and its partners host a variety of youth outreach events that emphasize STEM and manufacturing fields.

This section outlines key findings from the survey.

- Nearly all youth said they liked their camp, and two-thirds (68%) said they liked it a lot.
- Half of the participants said that the best thing about camp was building robots or doing other hands-on work.
- When asked how camp could be improved, about one in five respondents said more classes, projects, activities, or resources (20%) and more time to build, more hands-on experiences, more detail, or more information (17%); one-fifth also said nothing could be done to improve it (18%).
- Awareness of manufacturing careers increased, and perceptions of manufacturing careers improved substantially.
- Youth most often described manufacturing careers as fun and creative; fewer used negative adjectives, such as hard or noisy.
- Along with awareness and perceptions of manufacturing careers, interest in manufacturing careers also rose.
- During camp, both girls' and boys' interest and knowledge of STEM and manufacturing careers increased at similar levels. However, boys began and ended camp with greater interest and confidence in STEM and manufacturing than girls; camp did not close the interest gap for girls.

Findings

An important aspect of the 360 Manufacturing and Applied Engineering ATE Regional Center of Excellence (360)'s mission is to expose students to science, technology, engineering, and math (STEM) and increase enthusiasm for manufacturing careers. To this end, 360 and its partners host a variety of youth outreach events that emphasize STEM and manufacturing fields. These events – which we generally refer to as "camps" – range from hands-on robotics camps to career exploration events.

At the end of camp, youth participants completed a satisfaction survey. This survey has remained fairly consistent since 360 and Wilder Research developed the tool in 2012. This report highlights findings from the surveys; complete data tables are available in the Appendix.

Demographics

Boys made up a slightly larger proportion of camp participants than girls (57% boys, 43% girls). The average age of youth who completed the survey was 15 years old, and students ranged from grades 5 through 12. Survey participants primarily identified themselves as white (79%). Participants were also asked whether their parents had attended college – about half of youth (55%) said both of their parents completed college, and nearly one in five (18%) said that neither parent had attended college.

Satisfaction

When asked about their overall opinion of the camp they attended, nearly all youth (98%) said they liked it at least a little bit, and 68 percent liked it a lot.

The survey asked participants to explain why they initially wanted to attend their camp, and the most common answer was to learn about career options or a specific career (29%). Other top answers were because of an interest in some aspect of the camp (e.g. building robots, hands-on learning) (19%), to learn something new (15%), or because it sounded fun or interesting (12%).

After attending, half of the youth said that the best thing about camp was building robots or doing other hands-on work. The next most common responses were shared by less than 10 percent of respondents (Figure 1).

1. Best thing about camp (N=682)

	N	%
Doing hands-on work (e.g., building robots)	341	50%
Other camp things (e.g. lake, swimming, food, teachers/ counselors, fieldtrips, tours)	64	9%
Using the finalized product/competing (e.g. demolition derby, dump buckets, wrestling)	62	9%
Meeting people/ making new friends/working with new people	56	8%
Learning something new	54	8%
Learning about, applying, or preparing for jobs/careers	42	6%
It was fun (unspecified)	23	3%
Trying different classes/ projects/ things	19	3%
Being with my friend/my team/teamwork	19	3%
Being creative/ designing/ problem solving	11	2%
Staying in the dorms/going to college	11	2%
Everything	10	1%
Teacher/instructors	9	1%
Not being in school	8	1%
Dissecting	1	<1%
Other	6	1%

Note. Percentages may equal more than 100% as respondents were able to give multiple reasons. Open-ended responses to the questions were coded into the above categories.

When asked if they would refer their friends to the summer camp they attended, 51 percent of youth participants said "yes, definitely," and another 39 percent said "yes, maybe." Four percent would not recommend their camp, and 6 percent were unsure if they would.

Youth were asked to offer suggestions for improving camp. About one in five respondents suggested more classes, projects, activities, or resources (20%); nothing (18%); or more time to build, more hands-on experiences, more detail, or more information (17%).

Learning

When asked about what they learned at their respective camps, youth were most likely to say they learned a lot about finding solutions to problems (40%), manufacturing and making things (39%), and working together in teams (37%) (Figure 2). Girls were less likely than boys to report learning "a lot" about all but one of the topics listed: girls and boys were equally likely to say they learned "a lot" about finding solutions to problems.

2. How much did you learn about the following at camp?

	A lot	Some	Very little	Not at all
Finding solutions to problems (N=682)	40%	38%	16%	6%
Manufacturing and making things (N=683)	39%	37%	12%	12%
Working together in teams (N=685)	37%	41%	14%	8%
Careers in manufacturing (N=682)	29%	35%	21%	15%
Science, technology, engineering, and math (N=684)	28%	49%	14%	10%

Note. Totals may not add up to 100% due to rounding.

Interest and confidence in STEM

In general, the 360 summer camps did a lot to increase interest and confidence in science, technology, engineering, and math (STEM) for youth participants. Both interest and confidence show the same pattern when these increases are examined by gender. Boys started camp with more interest and confidence than girls, but interest and confidence in STEM increased by the same amount for both genders.

About one-third of all participants entered camp with a strong **interest in STEM** (36% said they had a lot of interest), and this interest rose by 12 percentage points, to 48 percent, by the end of camp.

This increase in interest was about the same for boys and girls (+11-12 percentage points), though boys arrived at the events with more interest in STEM (Figure 3). The last time Wilder Research conducted this study, in 2015, boys and girls began with similar levels of interest in STEM, but boys had a greater increase in interest between the beginning and end of camp.

3. Interest in STEM (pre- and post-camp)

Girls' interest	**Before camp (N=284)**	**After camp (N=284)**	**Change**
A lot	25%	36%	+11%
Some	37%	43%	+6%
Very little	22%	12%	-10%
Not at all	16%	8%	-8%
Boys' interest	**(N=371)**	**(N=371)**	
A lot	45%	57%	+12%
Some	36%	31%	-5%
Very little	14%	9%	-5%
Not at all	5%	4%	-1%

Note. Totals may not add up to 100% due to rounding.

Similarly, youth **confidence in STEM abilities** rose during their camp attendance. Twenty-seven percent of youth said they had "a lot" of confidence in their STEM skills before camp, which increased to 39 percent after camp – an increase of 12 percentage points.

Boys were more confident at the beginning and end of camp than girls, but confidence for both genders increased by a similar margin (+12-13 percentage points) (Figure 4). Only 15 percent of girls started camp with "a lot" of confidence in STEM, compared to 37 percent of boys. After camp, the share of participants who had "a lot" of confidence in STEM increased to 28 percent for girls and 49 percent for boys.

4. Confidence in STEM abilities (pre- and post-camp)

Girls' confidence	Before camp (N=284)	After camp (N=284)	Change
A lot	15%	28%	+13%
Some	49%	53%	+4%
Very little	25%	12%	-13%
Not at all	11%	7%	-4%
Boys' confidence	**(N=371)**	**(N=3171)**	
A lot	37%	49%	+12%
Some	43%	40%	-3%
Very little	16%	8%	-8%
Not at all	4%	3%	-1%

Note. Totals may not add up to 100% due to rounding.

Awareness and perceptions of manufacturing careers

In addition to increasing interest and confidence in STEM, the survey measured the impact on participants' awareness of manufacturing careers and perceptions of manufacturing careers.

With respect to **awareness of manufacturing careers**, 22 percent of youth had "a lot" of awareness before camp, which increased to 36 percent after camp (+14 percentage points). The increase in awareness was the same for boys and girls (+14 percentage points), but girls arrived at camp with a lower level of awareness (12%) than boys (31%) (Figure 5).

5. Awareness of manufacturing careers (pre- and post-camp)

Girls' awareness	Before camp (N=281)	After camp (N=283)	Change
A lot	12%	26%	+14%
Some	39%	39%	0%
Very little	33%	21%	-12%
Not at all	16%	14%	-2%
Boys' awareness	**(N=370)**	**(N=373)**	
A lot	31%	45%	+14%
Some	44%	42%	-2%
Very little	20%	10%	-10%
Not at all	5%	4%	-1%

Note. Totals may not add up to 100% due to rounding.

Regarding **perceptions of manufacturing careers**, only 28 percent of youth reported they thought of manufacturing careers as good before camp, while 53 percent said the same after attending camp. Again, a smaller proportion of girls came to camp with positive perceptions of manufacturing (19% of girls vs. 35% of boys thought they were "good"), but both boys and girls increased their positive perceptions of manufacturing at the same rate (+24-26 percentage points) (Figure 6).

6. Perceptions of manufacturing careers (pre- and post-camp)

Girls' perceptions	Before camp (N=285)	After camp (N=284)	Change
I thought/think they were/are good	19%	43%	+24%
I thought/think they were/are just OK	42%	33%	-9%
I didn't/don't think they were/are good	9%	3%	-6%
I didn't/don't think about them	14%	6%	-8%
I am not sure	15%	15%	0%
Boys' perceptions	**(N=373)**	**(N=369)**	
I thought/think they were/are good	35%	61%	+26%
I thought/think they were/are just OK	41%	28%	-13%
I didn't/don't think they were/are good	6%	2%	-4%
I didn't/don't think about them	13%	4%	-9%
I am not sure	5%	5%	0%

Note. Totals may not add up to 100% due to rounding.

Youth were also asked to consider adjectives that describe manufacturing careers. In a structured question that provided 10 adjectives (5 positive and 5 negative), the most common responses were that manufacturing careers are fun (68%) and creative (64%), named by about two-thirds of respondents. Negative adjectives, such as dark, dangerous, or dirty, were not selected as often by participants. The most frequently selected negative adjective was "hard" (36%), which was named by only about one-third of respondents.

Interest in manufacturing careers

Given the increased awareness and positive perceptions of manufacturing, it is not surprising that **interest in manufacturing careers** also increased. Before camp, 19 percent of participants said they had "a lot" of interest in manufacturing careers, whereas 28 percent said the same after camp. Though more than twice as many boys came to camp with "a lot" of interest in manufacturing careers (26% for boys, 9% for girls), both boys and girls increased their interest in manufacturing careers (Figure 7). However, boys' interest increased at a slightly higher rate than girls (+13 percentage points for boys vs. +7 percentage points for girls).

7. Interest in manufacturing careers (pre- and post-camp)

Girls' interest	Before camp (N=281)	After camp (N=282)	Change
A lot	9%	16%	+7%
Some	28%	38%	+10%
Very little	34%	25%	-9%
Not at all	28%	21%	-7%
Boys' interest	**(N=370)**	**(N=370)**	
A lot	26%	39%	+13%
Some	40%	44%	+4%
Very little	23%	11%	-12%
Not at all	11%	6%	-5%

Note. Totals may not add up to 100% due to rounding.

Conclusion

Overall, the findings from the summer camp surveys are positive. Participants had a high level of satisfaction with the camps, youth are engaged and learning, and the camps appear to have a positive impact on perspectives regarding STEM and manufacturing careers. In all areas measured, boys arrived at camp with greater confidence, higher levels of interest in STEM and manufacturing, greater awareness of manufacturing careers, and higher perceptions of manufacturing careers. However, girls' and boys' interest and knowledge in most areas increased by the same amount. The only exception would be in perceptions of manufacturing careers, where boys' opinion of manufacturing increased more than girls'. Overall, these findings are largely positive.

Appendix

Survey methodology

To help understand the impact of these summer camps, 360 staff members distributed self-administrated questionnaires, developed by Wilder Research, to participants at the end of each camp. In total, 695 youth participants from more than 4 different camps completed the survey. Wilder Research received forms from South Central College – Fairbault, South Central College – North Mankato, Clearbrook, Adams, and other sites. Some forms were not labeled with site information.

Readers should bear in mind that the pre-post questions (which analyze changes in attitude over time) were asked during the same survey. Participants were asked to recall their opinions from a time before they attended camp.

Data tables

Demographics

A1. Number of participants (N=695)

	N	%
South Central College – North Mankato	277	40%
South Central College – Faribault	107	15%
Clearbrook	21	3%
Adams	20	3%
Unknown	270	39%

A2. Gender (N=660)

	N	%
Girl	285	43%
Boy	375	57%

A3. Age (N=652)

	N	%
9 years old	1	0%
10 years old	5	1%
11 years old	28	4%
12 years old	38	6%
13 years old	43	7%
14 years old	83	13%
15 years old	89	14%
16 years old	162	25%
17 years old	155	24%
18 years old	46	7%
19 years old	2	0%

Note. Total may not add up to 100% due to rounding. The average (mean) age of respondents was 15 years old.

A4. Grade level (N=689)

	N	%
5	8	1%
6	33	5%
7	44	6%
8	43	6%
9	124	18%
10	95	14%
11	214	31%
12	128	19%

Note. Total may not add up to 100% due to rounding.

A5. Race/Ethnicity (N=607)

	N	%
White or Caucasian	477	79%
Multi-racial/Other	35	6%
Hispanic, Chicano, or Latino	34	6%
African American or Black	30	5%
American Indian or Native American	19	3%
Asian American or Pacific Islander	12	2%

Note. Responses add up to more than 100%, as respondents were able to select more than one race or ethnicity. An additional 88 respondents chose not to provide their race/ethnicity.

A6. Parents attended college (N=600)

	N	%
Yes, both	329	55%
Yes, one	161	27%
No, neither	110	18%

Note. Twenty-two students were not sure if their parents had attended college; they are excluded from these counts.

Satisfaction

A7. Overall opinion of camp (N=690)

	N	%
I like it a lot	466	68%
I liked it a little bit	205	30%
I did not like it very much	15	2%
I did not like it all	4	1%

A8. Reasons for coming to summer camp (N=673)

	N	%
Learn about career options/a specific career	196	29%
To build robots/for hands-on learning/robotics/Lego robots	127	19%
To learn something new	99	15%
It sounded fun/exciting/interesting/cool	78	12%
Someone made me go/school required/fieldtrip	58	9%
To stay in a dorm/Learn more about college/college classes	48	7%
Competition/to compete	42	6%
To get away from home/school/something to do for the summer	13	2%
Had previous interest in some aspect of the camp (e.g. robots, electronics, building, medical things, teachers)	6	1%
A friend/family member was attending camp	7	1%
It was fun last year/I wanted to come back	1	0%
To meet new people/make new friends	3	0%
Other	15	2%

Note. Percentages may equal more than 100% as respondents were able to give multiple reasons. Open-ended responses to the questions were coded into the above categories.

A9. Best thing about camp (N=682)

	N	%
Doing hands-on work	341	50%
Other camp things (e.g. lake, swimming, food, teachers/counselors, fieldtrips, tours)	64	9%
Using the finalized product/competing (e.g. demolition derby, dump buckets, wrestling)	62	9%
Meeting people/making new friends/working with new people	56	8%
Learning something new	54	8%
Learning about, applying, or preparing for jobs/careers	42	6%
It was fun (unspecified)	23	3%
Trying different classes/projects/things	19	3%
Being with my friend/my team/teamwork	19	3%
Being creative/designing/problem solving	11	2%
Staying in the dorms/going to college	11	2%
Everything	10	1%
Teacher/instructors	9	1%
Not being in school	8	1%
Dissecting	1	<1%
Other	6	1%

Note. Percentages may equal more than 100% as respondents were able to give multiple reasons. Open-ended responses to the questions were coded into the above categories.

A10. Would refer friends to camp (N=665)

	N	%
Yes, definitely	338	51%
Yes, maybe	261	39%
No	27	4%
I'm not sure	39	6%

A11. What could make this camp better (N=612)

	N	%
More classes/projects/activities/resources	120	20%
Nothing	111	18%
More time to build/hands-on experiences/more detail/more information	107	17%
Longer lunches/better lunches/better food/more food	55	9%
Improve competition/better set-up/better rules/more teams/more action/more fields/stream it so everyone can see	46	8%
If camp lasted longer/too rushed/more time	29	5%
More free time/leisurely activities/not so stressed/more fun	16	3%
More/ different kinds of parts to work with/better design	11	2%
Bigger/ more advanced robots/better robot	12	2%
Having a better partner/teammates/less arguing/less rudeness	12	2%
Winning/performing better	14	2%
Generally doing better/better instructors	13	2%
Have more people/meeting more people	13	2%
Better work space/better work space	15	2%
Dividing the younger from the older kids	8	1%
Learning more about college/cost of college/college tour	6	1%
Different fieldtrip experience	2	<1%
More one-on-one/time to talk personally	2	<1%
Better weather	2	<1%
Other	24	4%

Note. Percentages may equal more than 100% as respondents were able to give multiple reasons. Open-ended responses to the questions were coded into the above categories.

Learning

A12. How much did you learn about the following at camp?

	A lot	Some	Very little	Not at all
Finding solutions to problems (N=682)	40%	38%	16%	6%
Manufacturing and making things (N=683)	39%	37%	12%	12%
Working together in teams (N=685)	37%	41%	14%	8%
Careers in manufacturing (N=682)	29%	35%	21%	15%
Science, technology, engineering, and math (N=684)	28%	49%	14%	10%

Note. Totals may not add up to 100% due to rounding.

A13. How much did you learn about finding solutions to problems at camp?

	Girls (N=278)	Boys (N=371)
A lot	33%	45%
Some	39%	37%
Very little	18%	15%
Not at all	10%	4%

Note. Totals may not add up to 100% due to rounding.

A14. How much did you learn about manufacturing and making things at camp?

	Girls (N=279)	Boys (N=371)
A lot	26%	50%
Some	40%	35%
Very little	14%	11%
Not at all	20%	5%

Note. Totals may not add up to 100% due to rounding.

A15. How much did you learn about working together in teams at camp?

	Girls (N=281)	Boys (N=371)
A lot	36%	37%
Some	43%	39%
Very little	14%	16%
Not at all	7%	8%

Note. Totals may not add up to 100% due to rounding.

A16. How much did you learn about science, technology, engineering, and math (STEM) at camp?

	Girls (N=282)	Boys (N=369)
A lot	23%	33%
Some	48%	50%
Very little	15%	12%
Not at all	14%	5%

Note. Totals may not add up to 100% due to rounding.

A17. How much did you learn about careers in manufacturing at camp?

	Girls (N=278)	Boys (N=370)
A lot	21%	35%
Some	31%	39%
Very little	24%	18%
Not at all	23%	8%

Note. Totals may not add up to 100% due to rounding.

Interest in STEM

A18. Interest in STEM (pre- and post-camp)

Interested in science, technology, engineering, or math	Before camp (N=687)	After camp (N=670)	Change
A lot	36%	48%	+12%
Some	36%	36%	0%
Very little	18%	10%	-8%
Not at all	10%	6%	-4%

Note. Totals may not add up to 100% due to rounding.

A19. Interest in STEM for girls (pre- and post-camp)

Interested in science, technology, engineering, or math	Before camp (N=284)	After camp (N=284)	Change
A lot	25%	36%	+11%
Some	37%	43%	+6%
Very little	22%	12%	-10%
Not at all	16%	8%	-8%

Note. Totals may not add up to 100% due to rounding.

A20. Interest in STEM for boys (pre- and post-camp)

Interested in science, technology, engineering, or math	Before camp (N=371)	After camp (N=371)	Change
A lot	45%	57%	+12%
Some	36%	31%	-5%
Very little	14%	9%	-5%
Not at all	5%	4%	-1%

Note. Totals may not add up to 100% due to rounding.

Confidence in STEM abilities

A21. Confidence in STEM abilities (pre- and post-camp)

Confident in ability to do science, technology, engineering, or math	Before camp (N=686)	After camp (N=670)	Change
A lot	27%	39%	+12%
Some	46%	46%	0%
Very little	20%	10%	-10%
Not at all	7%	5%	-2%

Note. Totals may not add up to 100% due to rounding.

A22. Confidence in STEM abilities for girls (pre- and post-camp)

Confident in ability to do science, technology, engineering, or math	Before camp (N=283)	After camp (N=282)	Change
A lot	15%	28%	+13%
Some	49%	53%	+4%
Very little	25%	12%	-13%
Not at all	11%	7%	-4%

Note. Totals may not add up to 100% due to rounding.

A23. Confidence in STEM abilities for boys (pre- and post-camp)

Confident in ability to do science, technology, engineering, or math	Before camp (N=370)	After camp (N=369)	Change
A lot	37%	49%	+12%
Some	43%	40%	-3%
Very little	16%	8%	-8%
Not at all	4%	3%	-1%

Note. Totals may not add up to 100% due to rounding.

Interest in manufacturing careers

A24. Interest in manufacturing careers (pre- and post-camp)

Interest in manufacturing careers	Before camp (N=684)	After camp (N=667)	Change
A lot	19%	28%	+9%
Some	35%	41%	+6%
Very little	28%	18%	-10%
Not at all	18%	12%	-6%

Note. Totals may not add up to 100% due to rounding.

A25. Interest in manufacturing careers for girls (pre- and post-camp)

Interest in manufacturing careers	Before camp (N=281)	After camp (N=282)	Change
A lot	9%	16%	+7%
Some	28%	38%	+10%
Very little	34%	25%	-9%
Not at all	28%	21%	-7%

Note. Totals may not add up to 100% due to rounding.

A26. Interest in manufacturing careers for boys (pre- and post-camp)

Interest in manufacturing careers	Before camp (N=370)	After camp (N=370)	Change
A lot	26%	39%	+13%
Some	40%	44%	+4%
Very little	23%	11%	-12%
Not at all	11%	6%	-5%

Note. Totals may not add up to 100% due to rounding.

Awareness of manufacturing careers

A27. Awareness of manufacturing careers (pre- and post-camp)

Aware of manufacturing careers	Before camp (N=684)	After camp (N=671)	Change
A lot	22%	36%	+14%
Some	42%	41%	-1%
Very little	26%	15%	-11%
Not at all	11%	8%	-3%

Note. Totals may not add up to 100% due to rounding.

A28. Awareness of manufacturing careers for girls (pre- and post-camp)

Aware of manufacturing careers	Before camp (N=281)	After camp (N=283)	Change
A lot	12%	26%	+14%
Some	39%	39%	0%
Very little	33%	21%	-12%
Not at all	16%	14%	-2%

Note. Totals may not add up to 100% due to rounding.

A29. Awareness of manufacturing careers for boys (pre- and post-camp)

Aware of manufacturing careers	Before camp (N=370)	After camp (N=373)	Change
A lot	31%	45%	+14%
Some	44%	42%	-2%
Very little	20%	10%	-10%
Not at all	5%	4%	-1%

Note. Totals may not add up to 100% due to rounding.

Perceptions of manufacturing careers

A30. Perceptions of manufacturing careers (pre- and post-camp)

Perceptions of manufacturing careers	Before camp (N=670)	After camp (N=666)	Change
I thought/think they were/are good	28%	53%	+25%
I thought/think they were/are just OK	41%	30%	-11%
I didn't/don't think they were/are good	8%	3%	-5%
I didn't/don't think about them	13%	5%	-8%

Note. Totals may not add up to 100% due to rounding.

A31. Perceptions of manufacturing careers for girls (pre- and post-camp)

Perceptions of manufacturing careers	Before camp (N=285)	After camp (N=284)	Change
I thought/think they were/are good	19%	43%	+24%
I thought/think they were/are just OK	42%	33%	-9%
I didn't/don't think they were/are good	9%	3%	-6%
I didn't/don't think about them	14%	6%	-8%
I am not sure	15%	15%	0%

Note. Totals may not add up to 100% due to rounding.

A32. Perceptions of manufacturing careers for boys (pre- and post-camp)

Perceptions of manufacturing careers	Before camp (N=373)	After camp (N=369)	Change
I thought/think they were/are good	35%	61%	+26%
I thought/think they were/are just OK	41%	28%	-13%
I didn't/don't think they were/are good	6%	2%	-4%
I didn't/don't think about them	13%	4%	-9%
I am not sure	5%	5%	0%

Note. Totals may not add up to 100% due to rounding.

Descriptions of manufacturing careers

A33. Adjectives for manufacturing careers, open-ended (N=579)

Words that come to mind when thinking of someone in a manufacturing career	N	%
Fun (e.g. exciting/awesome/amazing/cool/good/brave/ interesting/ inspiring/changing lives/fantastic)	155	27%
Hard-working/active/strong/shifts/all-day work	146	25%
Smart (e.g. educational/advanced/focus/problem-solving/intelligent	130	22%
Manufacturing fields/topics	68	12%
Creative (e.g. full of ideas/inventing)	37	6%
Hands-on/building (e.g. welding/making/construction/creating)	33	6%
Items used in manufacturing	27	5%
Good job/pay/career/money	31	5%
Hard/ difficult/tiring/a lot of work	29	5%
Talented/skilled	26	4%
Boring/dull/tedious	11	2%
Someone I know (e.g. dad, mom, uncle, aunt, friend, acquaintance)	7	1%
Dirty/smelly	4	1%
Repetitive	1	<1%
Nothing	2	<1%
Normal/simple	1	<1%
Other	23	4%

Note. Percentages may equal more than 100% as respondents were able to give multiple reasons. Open-ended responses to the questions were coded into the above categories.

A34. Descriptions of manufacturing careers (N=666)

Select all that apply	N	%
Fun	455	68%
Creative	426	64%
Exciting	330	50%
Advanced	312	47%
Hard	238	36%
Modern	233	35%
Noisy	147	22%
Dirty	104	16%
Dangerous	81	12%
Dark	27	4%

Note. Percentages may equal more than 100% as respondents were able to give multiple reasons.