Appendix E

Technology and Engineering Literacy Reports

1. *Student report*
2. *School Report*
3. *Final Adjudication Decisions*

Technology and Engineering Literacy Reports

1. *Student report*

NAEP Item Development (ID)

Technology and Engineering Literacy (TEL)

2014 Probe Survey Questionnaire

Recommendations to NCES

Grade 8 Student Questionnaire

Deliverable in response to ID Task 3.1.2

Submitted: March 12, 2013

Listening.
Learning.
Leading.

Table of Contents

2014 Technology and Engineering Literacy (TEL)
Grade 8 Student Questionnaire:
Post-Pilot Analysis and Recommendations

2014 Technology and Engineering Literacy (TEL)
Grade 8 Student Questionnaires:
Post-Pilot Analysis and Recommendations

This document provides a post-pilot review of the grade 8 student and school Technology and Engineering Literacy (TEL) questionnaires using data collected in the 2013 pilot administration. The goal of this report is to evaluate the performance of the items and propose a set of questions that will be included in the 2014 TEL probe assessment. As such, this review serves the research objective to develop items that provide reportable survey results based on measures of contextual factors that might explain differences in student performance (e.g., more proficient students have access to more instructional or extracurricular content related to engineering design).

Unlike previous post-pilot recommendations, a much stricter item evaluation and selection was required for this recommendation given the spiraled design in the 2013 pilot administration (see more details below). The questionnaire material had to be reduced from approximately 24 minutes of assessment time in the pilot (based on actual pilot timing data) to 10 minutes of assessment time in the probe assessment. Recommendations are based on a combination of criteria including an analysis of frequency data and theoretical considerations.

Background

The NAEP TEL assessment measures three core areas of interest: Technology and Society (T&S), Design and Systems (D&S), and Information and Communication Technologies (ICT). Technology and Society addresses the effects that technology has on society and on the natural world. Design and Systems covers the nature of technology, the engineering design process, and basic principles of dealing with everyday technologies. Information and Communication Technology includes computers and software learning tools, networking systems and protocols, handheld digital devices, and other technologies for accessing, creating, and communicating information and for facilitating creative expression (WestEd, 2010). The TEL issues paper identified four broad issues that informed and guided the survey questionnaire development administered in the pilot assessment. These are: availability of school resources; organization of technology and engineering instruction; teacher preparation; and student engagement. Each of these issues comprises several sub-issues. Two of these four issues were covered in both the student and school questionnaires. Teacher preparation was covered in the school questionnaire only and student engagement was covered in the student questionnaire only.

The 2013 TEL pilot used a spiraled design where not every student received all questionnaire items. In order to maximize the number of questions included certain items were spiraled across different, partially overlapping, questionnaire forms. This design was chosen to make

better use of the limited questionnaire time, while covering a maximum number of topics and constructs, particularly in the pilot assessment. This ensured that a sufficient number of items pertaining to each topic and each issue could be piloted. The available questionnaire response time was 15 minutes per student, of which approximately 4–5 minutes were devoted to a student core section (e.g., demographic items) which is required to be administered as part of every NAEP survey questionnaire. Questions in the remaining 10–11 minutes were TEL specific questions. At the end of the questionnaire, a few debriefing items were administered, as was the case in other NAEP questionnaires.

In the spiraling design, questions were divided into separate blocks (or sections) that were configured into 10 different booklets (see details below) that were administered to students. Spiraling provided randomly equivalent samples of students receiving each of the blocks. Using timing data collected from the tryout, an appropriate division of items and a spiraling approach was determined that would adequately pilot all of the items without reducing data quality or increasing respondent burden. Students were allotted four minutes to complete each of five different blocks. There were ten different combinations of the five blocks resulting in 10 different booklets. This procedure ensured that 1) every BQ spiraled item was paired with other spiraled BQ items; 2) the position effect of the blocklets in the combination were removed (i.e., each of the five blocklets appeared an equal number of times in the each of two positions), and 3) each of the BQ combinations were paired with each of the cognitive blocks.

Table 1 (on page 6) shows how the items were distributed across the ten booklets with each category represented by a different color.

Criteria for Item Review

Analysis of Frequency Distributions

Following the same procedure as for other background questionnaire item reviews, a set of frequency-based flagging criteria were considered in evaluating whether items were applicable to the targeted population. It is important to keep in mind that flags are indications that a particular item should be thoroughly evaluated. Flags are not absolute criteria for making decisions regarding the use or quality of items. Instead, the flagging criteria should be viewed collectively, along with other criteria and professional judgment, in recommending keeping, revising, or dropping items from the 2014 TEL Probe survey questionnaires.

For this analysis, we examined item response frequencies for response options. We also assessed item non-response patterns to determine whether problematic items or response options warrant revising items, expanding or collapsing response categories, or dropping an item. The flagging criteria on response patterns and item non-response (i.e., missing response) rates for reviewing the data are:

- A high percentage of item non-response (relative to other adjacent items) may indicate that the item content might have been problematic (e.g., ambiguous, burdensome, overly complex, offensive) or that the format might have caused respondents to overlook the item. Note that, this criterion does not apply to multiple selection multiple-choice items, because the missing rate for "select all that apply" items contains both missing responses and "not apply" responses.

- Low single-category response rates (e.g., <10%) may indicate that a category does not apply to this population and possibly that different categories may be more informative.

- High single-category response rates (e.g., >80%) may indicate that almost all respondents in the population fall into one category and that a limited range of demographics or behavior indicators are collected.

- In addition to these flagging criteria, we investigated differences in relative frequencies for response categories across the different booklets in which an item had been administered. High variation in relative frequencies across booklets might be an indicator for instability of item performance.

Implications of flags on any of these criteria for a given item will be discussed in more detail. Note again that, flagging an item on one of these criteria does not, by itself, warrant the necessity for revising or dropping the item. Whether an item needs to be modified or revised also depends on whether response categories are unique to an item versus representing one of the standard formats used across many questionnaire items, and whether certain response categories are needed from a theoretical perspective. Maintaining a high level of consistency across items is one important consideration for the validity of the questionnaires as well as the trend information being collected.

Response Time/Burden

Item selection was guided by available response time data from the pilot assessment. All timing estimates were based on the 90th percentile of the response time based on available pilot data. The rationale for choosing this value was that a maximum not-complete-rate of 10% is expected when basing timing decisions on the 90th percentile. Results from previous analyses with NAEP questionnaires showed that a 10% missing rate seemed to be acceptable from a sampling and analysis perspective with unbiased estimates for each subgroup investigated. Further, 10% missing rates for BQ items have been considered acceptable in previous operational NAEP assessments. For example, in 2011 Grade 8 science some science specific BQ items had 11% (2009: 8 %) or 12% (2009: 13%) missing rate in the teacher's BQ questionnaire that was used in the NAEP analysis. Our previous operational experience shows that about 90% of the response rate still ensured us a valid sample to represent the whole population. Therefore, using the 90th percentile of the complete time as the cutoff is effective from an analysis perspective. Note that the same rule for timing estimates was used when the TEL pilot questionnaires were assembled. The data used for the item review summarized in

this document shows that using the 90th percentile actually resulted in rather conservative time estimates with missing values rates clearly less than 10%. Even for the items at the very end of the questionnaire, missing value rates only reached values of around 5 % for the TEL pilot assessment. Overall, missing value rates were close to zero for most items.

The number of TEL-specific items that can be selected for the probe assessment was limited to what will fit into 600 seconds questionnaire time. The recommendations summarized in the following are in line with the criterion of including not more than 600 seconds of material. Wherever feasible, reducing the number of sub-items in matrix items was considered as one mean to reduce burden while maintaining the breadth of the questionnaire.

Because of the strict timing constraints, many of the items that are recommended to be dropped showed satisfactory performance and might serve as an item pool for future assessments.

Theoretical Coherence, Relevance, and Content Coverage

In addition to purely data-driven evaluation, a number of theory-based criteria were applied when making recommendations. First, even a reduced questionnaire needs to include questions about each of the three main topic areas as well as the three issues covered in the student questionnaire. Items were selected to create a balance of the number of items or sub-items across the three areas and to cover the most important themes and sub-themes as defined in the TEL issues paper.

Another important goal was to include items addressing both at-school and out-of-school learning and activities given the importance of out-of-school learning experiences for TEL. Few studies have systematically investigated effects of out-of-school learning experiences. The available research suggests that under certain circumstances, technology and engineering education can boost learning and achievement in science and mathematics.

Further, the coverage of all three topic areas for student engagement questions was an important criterion, i.e., the inclusion of questions related to student interest in each of the domains given the importance of interests in particular content areas as predictors of subsequent career choices (e.g., Holland 1997; Lubinski 2000), and a selection of self-efficacy or self-concept items for the three areas. Meta-analyses have shown that self-efficacy is one of the strongest predictors of student achievement (e.g., Richardson, Abraham, & Bond, 2012). Students' self-efficacy perceptions can be considered an important achievement predictor as well as an informative outcome with policy relevance by themselves.

When possible items with clearly quantifiable, behavior-related response categories were preferred over items with more vague response categories.

Table 1 - Spiraling Design in the TEL Pilot

J2TXBQ01	J2TXBQ02	J2TXBQ03	J2TXBQ04	J2TXBQ05	J2TXBQ06	J2TXBQ07	J2TXBQ08	J2TXBQ09	J2TXBQ10
VE631435	VE631435	VE631435	VE631435	VE631435	VE631435	VE631435	VE631435	VE631435	VE631435
VE631437	VE631437	VE631437	VE631437	VE631437	VE631437	VE631437	VE631437	VE631437	VE631437
VE011083	VE011083	VE011083	VE011083	VE011083	VE011083	VE011083	VE011083	VE011083	VE011083
VE011103	VE011103	VE011103	VE011103	VE011103	VE011103	VE011103	VE011103	VE011103	VE011103
VF541314	VF541314	VF541314	VF541314	VF541314	VF541314	VF541314	VF541314	VF541314	VF541314
VE011108	VE011108	VE011108	VE011108	VE011108	VE011108	VE011108	VE011108	VE011108	VE011108
VE011109	VE011109	VE011109	VE011109	VE011109	VE011109	VE011109	VE011109	VE011109	VE011109
VE011111	VE011111	VE011111	VE011111	VE011111	VE011111	VE011111	VE011111	VE011111	VE011111
VE011063	VE011063	VE011063	VE011063	VE011063	VE011063	VE011063	VE011063	VE011063	VE011063
VE011064	VE011064	VE011064	VE011064	VE011064	VE011064	VE011064	VE011064	VE011064	VE011064
VE011121	VE011121	VE011121	VE011121	VE011121	VE011121	VE011121	VE011121	VE011121	VE011121
VF541324	VF541324	VF541324	VF541324	VF541324	VF541324	VF541324	VF541324	VF541324	VF541324
VE117468	VE117468	VE117468	VE117468	VE117468	VE117468	VE117468	VE117468	VE117468	VE117468
VE682225	VE639123	VE639025	VE639847	VE639842	VE682225	VE639123	VE639847	VE639025	VE639842
VE682232	VF025108	VF009050	VE638956	VE639172	VE682232	VF025108	VE638956	VF009050	VE639172
VE639166	VE682276	VE682274	VE638983	VE681624	VE639166	VE682276	VE638983	VE682274	VE681624
VE639123	VE639025	VE682217	VF238958	VE682225	VE639025	VE639847	VF238958	VE682217	VE639123
VF025108	VF009050	VE682215	VE639842	VE682232	VF009050	VE638956	VE682225	VE682215	VF025108
VE682276	VE682274	VE639847	VE639172	VE639166	VE682274	VE638983	VE682232	VE639842	VE682276
VE638999	VE682217	VE638956	VE681624	VE638999	VE682217	VF238958	VE639166	VE639172	VE638999
VE639008	VE682215	VE638983	VE638999	VE639008	VE682215	VE638999	VE638999	VE681624	VE639008
VE682315	VE638999	VF238958	VE639008	VE682315	VE638999	VE639008	VE639008	VE638999	VE682315
VE682317	VE639008	VE638999	VE682315	VE682317	VE639008	VE682315	VE682315	VE639008	VE682317
VF009358	VE682315	VE639008	VE682317	VF009358	VE682315	VE682317	VE682317	VE682315	VF009358
VE401773	VE682317	VE682315	VF009358	VE401773	VE682317	VF009358	VF009358	VE682317	VE401773
VE401776	VF009358	VE682317	VE401773	VE401776	VF009358	VE401773	VE401773	VF009358	VE401776
VE401779	VE401773	VF009358	VE401776	VE401779	VE401773	VE401776	VE401776	VE401773	VE401779
	VE401776	VE401773	VE401779		VE401776	VE401779	VE401779	VE401776	
	VE401779	VE401776			VE401779			VE401779	
		VE401779							

Note. Within each booklet, the item sequence follows the order from top to the bottom.

Legend

- Common (items apply to all the three assessment areas, that is D&S, ICT, and T&S)
- Design and Systems
- Information and Communication Technology
- Technology and Society
- Common Debrief

Recommendations for the 2014 TEL Probe Assessment – Overview

In the following we will summarize our item review in detail for each item, along with the recommendation for the 2014 TEL Probe assessment. Three different cases are distinguished:

1.) An item is recommended to be kept in the questionnaire;
2.) An item is recommended to be dropped from the questionnaire based on timing constraints and student burden;
3.) An item is recommended to be dropped in the questionnaire based on poor item performance.

Note that, in cases 1 and 2, an item shows satisfactory performance to be included in the 2014 TEL probe assessment but is recommended to be dropped only based on timing constraints and student burden.

For some matrix items we may recommend to keep the item stem and certain sub-items but to drop specific sub-items, either based on item performance or for burden reasons.

Table 2 presents an overview of all recommendations. For each item, the number in the booklet, the Accession number, and the area and issue that are addressed are given in the table. In addition, the two rightmost columns summarize our recommendation and the rationale for recommending dropping complete items or sub-items.

Table 2 - Recommendations for 2014 TEL Probe - Overview

Item #	AccNum	Area	Issue	Recommendation	Rationale for Recommendation
14	VE682225	Design and Systems	Org. of Instruction	Drop	Time restrictions/student burden
15	VE682232	Design and Systems	Student Engagement	Drop	Time restrictions/student burden
16	VE639166	Common	Student Engagement	Keep	NA
17	VE639123	ICT	Org. of Instruction	Keep this item and sub-items a, c, d, e, and f; Drop sub-item b (VE639127).	Time restrictions/student burden
18	VF025108	ICT	Student Engagement	Keep this item and sub-items a, c, d, e, and f; Drop sub-item b (VF025110)	Time restrictions/student burden
19	VE682276	Design and Systems	Student Engagement	Keep this item and sub-items b, c, and d; Drop sub-items a (VE682278) and e (VE682286).	Time restrictions/student burden
20	VE639025	Common	Student Engagement	Drop	Time restrictions/student burden and item performance
21	VF009050	Common	Student Engagement	Drop	Time restrictions/student burden and item performance
22	VE682274	Design and Systems	Availability and Use of Instructional Resources	Drop	Item performance
23	VE682217	ICT	Student Engagement	Keep this item and sub-items a, b, and c; Drop sub-item d (VE682222).	Time restrictions/student burden
24	VE682215	ICT	Availability and Use of Instructional Resources	Drop	Item performance
25	VE639847	Common	Org. of Instruction	Drop	Time restrictions/student burden
26	VE638956	Design and Systems	Org. of Instruction	Keep this item and sub-items b, c, d, and e; Drop sub-items a (VE638957) and f (VE682248).	Time restrictions/student burden and item performance
27	VE638983	Design and Systems	Student Engagement	Keep this item and sub-items c, d, e, and f; Drop sub-items a (VE638986), b (VE009777), and g (VE682268).	Time restrictions/student burden and item performance for sub-item g.

Item #	AccNum	Area	Issue	Recommendation	Rationale for Recommendation
28	VF238958	ICT	Org. of Instruction	Drop	Time restrictions/student burden
29	VE639842	Common	Org. of Instruction	Keep	NA
30	VE639172	Common	Student Engagement	Drop	Item performance
31	VE681624	ICT	Org. of Instruction	Keep	NA
32	VE638999	Technology and Society	Org. of Instruction	Keep	NA
33	VE639008	Technology and Society	Student Engagement	Keep	NA
34	VE682315	Technology and Society	Availability and Use of Instructional Resources	Drop	Item performance
35	VE682317	Technology and Society	Student Engagement	Keep	NA
36	VF009358	Common -- Debrief	Student Engagement	Keep	NA
37	VE401773	Common -- Debrief	Student Engagement	Keep	NA
38	VE401776	Common -- Debrief	Student Engagement	Keep	NA
39	VE401779	Common -- Debrief	Student Engagement	Keep	NA

Note. NA = not applicable

Item Review and Recommendations for the 2014 TEL Student Grade 8 Probe Assessment

Note: Core NAEP background items are not included in this review

VE682225

14. In school, how often have you learned about or discussed the following? Select **one** circle in each row.

	Never	Rarely	Sometimes	Often	
a. The use and purpose of tools, machines, or devices	(A)	(B)	(C)	(D)	VE682226
b. The care or maintenance of tools, machines, or devices	(A)	(B)	(C)	(D)	VE682227
c. Designing or creating something to solve a problem	(A)	(B)	(C)	(D)	VE682228
d. Designing something when there is limited time, money, or materials	(A)	(B)	(C)	(D)	VE682229
e. Figuring out how to fix something	(A)	(B)	(C)	(D)	VE682230
f. Finding the right people to work with or get help from to fix something	(A)	(B)	(C)	(D)	VE682231

Area: Design and Systems

Issue: Organization of Instruction

Booklets: 1, 5, 6, 8

Item Review:

This item provides contextual information for the cognitive assessment pertaining to Design and Systems literacy. It focuses on TEL-related learning opportunities and experiences at school. Exactly the same sub-items as in its outside-of-school-related counterpart (VE682232) are used. The frequency distribution across response options is satisfactory for all sub-items with reasonable balance of responses across all response categories. The missing rate is close to zero (0.23 – 0.29%) across all questionnaire booklets. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 13%-points, which indicates that there is some variation in item performance across booklets that should be investigated more closely.

Overall, this item and all sub-items show satisfactory item statistics to be included in the TEL student questionnaire. There is no evidence that any response categories need to be collapsed, expanded, or deleted. Item VE638956, however, covers similar content and should be given higher priority as the response options represent more quantifiable, behavior-related categories than those in item VE682225.

Recommendation:

Drop this item and all sub-items from the 2014 TEL Probe Administration based on time restrictions/consideration of student burden.

VE682232

15. Outside of school, how often have you learned about or discussed the following? Select **one** circle in each row.

	Never	Rarely	Sometimes	Often	
a. The use and purpose of tools, machines, or devices	(A)	(B)	(C)	(D)	VE682233
b. The care or maintenance of tools, machines, or devices	(A)	(B)	(C)	(D)	VE682234
c. Designing or creating something to solve a problem	(A)	(B)	(C)	(D)	VE682238
d. Designing something when there is limited time, money, or materials	(A)	(B)	(C)	(D)	VE682236
e. Figuring out how to fix something	(A)	(B)	(C)	(D)	VE682237
f. Finding the right people to work with or get help from to fix something	(A)	(B)	(C)	(D)	VE682235

Area: Design and Systems

Issue: Student Engagement

Booklets: 1, 5, 6, 8

Item Review:

This item provides contextual information for the cognitive assessment pertaining to Design and Systems literacy. It focuses on TEL-related learning opportunities and experiences outside of school. Exactly the same sub-items as in the previous at-school item are used. The frequency distribution across response options is satisfactory for five of the six sub-items with reasonable balance of responses across all response categories. Sub-item e has a low response rate (less than 10%) for one category. The missing rate is close to zero (0.31 – 0.39%) across all questionnaire booklets. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 13%-points, which might indicate that there is some variation in item performance across booklets.

Overall, this item and all sub-items show satisfactory item statistics to be included in the TEL student questionnaire. There is no evidence that any response categories need to be collapsed, expanded, or deleted. Item VE638983, however, covers similar content and should be given higher priority as the response options represent more quantifiable, behavior-related anchors than those in item VE682232.

Recommendation:

Drop this item and all sub-items from the 2014 TEL Probe Administration based on time restrictions/consideration of student burden.

VE639166

16. How interested are you in learning about the following areas of technologies? Select **one** circle in each row.

	Not at all interested	Not too interested	Somewhat interested	Very interested	
a. Information and communication (for example, computers, Internet, social networking sites)	(A)	(B)	(C)	(D)	VE639168
b. Transportation (for example, cars, planes, trains, traffic analysis)	(A)	(B)	(C)	(D)	VE639169
c. Construction (for example, architecture, building a bridge)	(A)	(B)	(C)	(D)	VE639171
d. Power and energy (for example, dams, power plants, batteries)	(A)	(B)	(C)	(D)	VE639173
e. Environmental and green technologies (for example, recycling, renewable energy sources such as sunlight and wind)	(A)	(B)	(C)	(D)	VE639174
f. Agriculture (for example, farming, food chemistry)	(A)	(B)	(C)	(D)	VE639175
g. Medical technologies (for example, vaccines, drugs, surgical tools, heart monitors, x-ray machines)	(A)	(B)	(C)	(D)	VE639176
h. Home and domestic (for example, air conditioning, cleaning, cooking, heating, plumbing, sewing)	(A)	(B)	(C)	(D)	VF009755
i. Manufacturing (for example, what goes on in factories, developing or improving products)	(A)	(B)	(C)	(D)	VE639170

Area: Common

Issue: Student Engagement

Booklets: 1, 5, 6, 8

Item Review:

This is common item across the three TEL areas and provides information about students' interest in nine areas of technologies. The item collects important information regarding whether students would like to learn more in each of the areas of technologies in the future and as such result may inform TEL curriculum design and have important policy implication. The frequency distribution across response options is satisfactory for all sub-items with reasonable balance of responses across all response categories. The missing rate is less than 1% (0.45 – 0.56%) in the aggregated response frequency. There is no evidence that any response options need to be collapsed, expanded, or deleted. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 6%-point indicating that performance is very stable across different booklets for this item.

This item and all sub-items show satisfactory item statistics to be included in the TEL student questionnaire. In direct comparison with the two other matrix items focusing on student engagement (VE639025, VF009050), higher priority should be given to this item because it provides more specific information about multiple areas of technologies, and not only on technology and engineering in general. Moreover, frequency distributions for this item are more balanced than those for items VE639025 and VF009050 allowing better differentiation across students.

Recommendation:
Keep this item and all sub-items in the 2014 TEL Probe Administration.

VE639123

17. For school work, how often do you use a computer or other digital technology for the following activities? Select **one** circle in each row.

	Never or almost never	A few times a year	Once or twice a month	Once or twice a week	Every day or almost every day	
a. Send or receive messages (for example, chat, e-mail, instant messages, text messages)	(A)	(B)	(C)	(D)	(E)	VE639125
b. View or download digital media (for example, art, books, games, mobile apps, music, pictures, software, videos)	(A)	(B)	(C)	(D)	(E)	VE639127
c. Create, edit, or organize digital media	(A)	(B)	(C)	(D)	(E)	VE639130
d. Send, share, present, or upload digital media	(A)	(B)	(C)	(D)	(E)	VE639131
e. Create a presentation	(A)	(B)	(C)	(D)	(E)	VE639137
f. Create a spreadsheet (a table or grid that displays data into columns and rows and may be used to create charts and graphs)	(A)	(B)	(C)	(D)	(E)	VE639136

Area: Information and Communication Technology

Issue: Organization of Instruction

Booklets: 1, 2, 7, 10

Item Review:

This item provides contextual information for the cognitive assessment pertaining to Information and Communication Technology literacy. It focuses on TEL-related learning opportunities and experiences at school. Exactly the same sub-items as in its outside-of-school-related counterpart (VF025108) are used. The frequency distribution across response options is satisfactory for four of the six sub-items with reasonable balance of responses across all response categories. Some response categories for sub-items e and f have low response rates less than 10%. The missing rate is close to zero (0.43 – 0.62 %) across all questionnaire booklets. There is no evidence that any response options need to be collapsed, expanded, or deleted. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 9%-point indicating relatively stable performance across different booklets for this item.

This item and all sub-items show satisfactory item statistics to be included in the TEL student questionnaire. The item collects important information regarding frequencies at which students use computer or other digital technology while doing ICT related activities.

A further content review of the TEL cognitive assessment items indicated that sub-item b of this matrix item is less strongly linked to the content of any cognitive item compared to the other sub-items.

Despite its satisfactory performance, dropping sub-item b in order to reduce student burden would be reasonable.

Recommendation:
Keep this matrix item and sub-items a, c, d, e, and f in the 2014 TEL Probe Administration.
Drop sub-item b from the 2014 TEL Probe administration based on time restrictions/consideration of student burden.

VF025108

18. In this question, please think about activities you do that are not related to your school work. How often do you use a computer or other digital technology for the following activities **not for school work**? Select **one** circle in each row.

	Never or almost never	A few times a year	Once or twice a month	Once or twice a week	Every day or almost every day	
a. Send or receive messages (for example, chat, e-mail, instant messages, text messages)	(A)	(B)	(C)	(D)	(E)	VF025109
b. View or download digital media (for example, art, books, games, mobile apps, music, pictures, software, videos)	(A)	(B)	(C)	(D)	(E)	VF025110
c. Create, edit, or organize digital media	(A)	(B)	(C)	(D)	(E)	VF025112
d. Send, share, present, or upload digital media	(A)	(B)	(C)	(D)	(E)	VF025113
e. Create a presentation	(A)	(B)	(C)	(D)	(E)	VF025117
f. Create a spreadsheet (a table or grid that displays data into columns and rows and may be used to create charts and graphs)	(A)	(B)	(C)	(D)	(E)	VF025116

Area: Information and Communication Technology

Issue: Student Engagement

Booklets: 1, 2, 7, 10

Item Review:

This item provides contextual information for the cognitive assessment pertaining to Information and Communication Technology (ICT) literacy. It focuses on TEL-related learning opportunities and experiences outside of school. Exactly the same sub-items as in its at-school-related counterpart (VE639123) are used. Although relative frequencies for response options a or f are less than 10% for sub-items a, b, e, and f, there is sufficient variation across response options to distinguish different levels of student engagement. Moreover, keeping response options the same for all sub-items, and consistent with the response options used for the at-school related version of this matrix item is important for comparisons of and reporting on the results for these items. The missing rate is close to zero (0.43 – 0.51 %) across all questionnaire booklets. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 8%-point indicating relatively stable performance across different booklets for this item.

This item and all sub-items show satisfactory item statistics to be included in the TEL student questionnaire. The item collects important information regarding the frequencies at which students use computer or other digital technology engaging in ICT related activities that is **not for school work**.

A further content review of the TEL cognitive assessment items indicated that sub-item b of this matrix item is less strongly linked to the content of any cognitive item compared to the other sub-items. Despite its satisfactory performance, dropping sub-item b in order to reduce student burden—as for item VF025110—would be reasonable.

Recommendation:
Keep this matrix item and sub-items a, c, d, e, and f in the 2014 TEL Probe Administration.
Drop sub-item b from the 2014 TEL Probe administration based on time restrictions/consideration of student burden.

VE682276

19. Do you think that you would be able to do each of the following? Select **one** circle in each row.

	I definitely can't	I probably can't	Maybe	I probably can	I definitely can	
a. Build a model using a kit	(A)	(B)	(C)	(D)	(E)	VE682278
b. Build a model without using a kit	(A)	(B)	(C)	(D)	(E)	VE682280
c. Use tools or materials to fix something	(A)	(B)	(C)	(D)	(E)	VE682281
d. Take something apart in order to fix it or see how it works	(A)	(B)	(C)	(D)	(E)	VE682284
e. Design a computer program	(A)	(B)	(C)	(D)	(E)	VE682286

Area: Design and Systems

Issue: Student Engagement

Booklets: 1, 2, 7, 10

Item Review:

This item provides contextual information for the cognitive assessment pertaining to Design and Systems (D&S). The item collects important information regarding student self-efficacy in conducting activities that are related to Design and Systems. Meta-analyses have shown that self-efficacy is one of the strongest predictors of student achievement (e.g., Richardson et al, 2012). This item can be considered an important achievement predictor as well as an informative outcome with policy relevance by itself.

Even though relative frequencies for response categories A and B are lower for most sub-items with frequency distributions skewed to the right there is sufficient variation across response options to differentiate across the range of levels of student self-efficacy perceptions. The missing rate is close to zero (0.37 – 0.45%) across all questionnaire booklets. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 8%-points indicating reasonably stable performance across different booklets for this item.

This item and all sub-items show satisfactory item statistics to be included in the TEL student questionnaire. In addition to an analysis as stand-alone items, the sub-items should be analyzed as part of a potential broader student self-efficacy index based on aggregation of these items with items VE682217 and VE682317, which were designed to measure student self-efficacy in the two other content areas.

Item content was reviewed in more detail to evaluate whether the number of sub-items might be reduced considering student burden and timing constraints. This review indicated that sub-items a and e were less strongly linked to the content of the cognitive items compared to the other sub-items. Further, relative frequencies for sub-items a and e were less balanced than for the other sub-items. Dropping sub-items a and e in order to reduce student burden would seem reasonable. Retaining three

sub-items for this matrix items would also increase consistency with its Technology & Society-related counterpart (VE682317) where only three sub-items were administered in the pilot.

Recommendation:
Keep this item and sub-items b, c, and d in the 2014 TEL Probe Administration.
Drop sub-items a and e from the 2014 TEL Probe administration based on time restrictions/consideration of student burden.

VE639025

20. *Technology* refers to all the things people make and do to their natural environment in order to get the things they want and need. How much do you disagree or agree with the following statements about technology? Select **one** circle in each row.

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	
a. Technology is important to society.	(A)	(B)	(C)	(D)	(E)	VE639028
b. Technology is important to my daily life.	(A)	(B)	(C)	(D)	(E)	VE639043
c. Learning about technology will help me in the future.	(A)	(B)	(C)	(D)	(E)	VE639048
d. Learning about technology will help me do (or get) the job I want.	(A)	(B)	(C)	(D)	(E)	VE639046
e. I enjoy learning about technology.	(A)	(B)	(C)	(D)	(E)	VE639053
f. I enjoy using technology.	(A)	(B)	(C)	(D)	(E)	VF009048

Area: Common

Issue: Student Engagement

Booklets: 2, 3, 6, 9

Item Review:

This is a common item across the three TEL areas. It was designed to capture student engagement, specifically interest in technology. The frequency distribution across response options is skewed for all sub-items. All six sub-items have very low response rates for both options A and B while relative frequencies for the categories D and E are very high. This might indicate that the sub-items represent highly socially desirable statements. Compared to item VE639166 which also addresses student interest, this item seems less suited to differentiate across a wide range of levels of interest. The response categories would need to be revised prior to an operational use. The missing rate is close to zero (0.31 – 0.44%) across all questionnaire booklets in the aggregated response frequency. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 8%-points indicating reasonably stable performance across different booklets for this item.

Recommendation:

Drop this item from the 2014 TEL Probe Administration based on item performance as well as time restrictions/consideration of student burden.

VF009050

21. *Engineering* refers to using skills or knowledge to solve problems that meet people's wants and needs. How much do you disagree or agree with the following statements about engineering? Select **one** circle in each row.

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	
a. Engineering is important to society.	(A)	(B)	(C)	(D)	(E)	VF009051
b. Engineering is important to my daily life.	(A)	(B)	(C)	(D)	(E)	VF009052
c. Learning about engineering will help me in the future.	(A)	(B)	(C)	(D)	(E)	VF009053
d. Learning about engineering will help me do (or get) the job I want.	(A)	(B)	(C)	(D)	(E)	VF009054
e. I enjoy learning about engineering.	(A)	(B)	(C)	(D)	(E)	VF009055
f. I enjoy solving problems.	(A)	(B)	(C)	(D)	(E)	VF009056
g. I enjoy fixing things.	(A)	(B)	(C)	(D)	(E)	VF009061
h. I enjoy creating, building, or designing things.	(A)	(B)	(C)	(D)	(E)	VF009064
i. I enjoy figuring out how things work.	(A)	(B)	(C)	(D)	(E)	VF009065
j. I do things that I would describe as engineering.	(A)	(B)	(C)	(D)	(E)	VF009066

Area: Common

Issue: Student Engagement

Booklets: 2, 3, 6, 9

Item Review:

This is a common item across the three TEL areas. It was designed to capture student engagement, specifically interest in engineering. The frequency distribution across response options is skewed for all sub-items. All ten sub-items have low response rate less than 10% for both options A and B while relative frequencies for the categories D and E are very high. This might indicate that the sub-items represent highly socially desirable statements. Compared to item VE639166 which also addresses student interest, this item seems less suited to differentiate across a wide range of levels of interest. The response categories would need to be revised prior to an operational use. The missing rate is less than 1% (0.51 – 0.66%) across all questionnaire booklets. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 6%-points indicating reasonably stable performance across different booklets for this item.

Recommendation:

Drop this item from the 2014 TEL Probe Administration based on item performance as well as time restrictions/consideration of student burden.

VE682274

22. Who taught you most of what you know about building things, fixing things, or how things work?

A. I taught myself.
B. Family members
C. Friends
D. Teachers
E. Someone else

Area: Design and Systems

Issue: Availability and Use of Instructional Resources

Booklets: 2, 3, 6, 9

Item Review:

This is an item that provides contextual information for cognitive assessment pertaining to Design and Systems. The frequency distribution across response options is clearly not satisfactory for the item. Options c, d, and e have low response rates less than 10%. The missing rate is close to zero (0.23%) across all booklets. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 4%-points indicating reasonably stable performance across different booklets for this item.

Overall, this item does not perform well enough to be included in the TEL student questionnaire without making revisions.

Recommendation:

Drop this item from the 2014 TEL Probe Administration based on item performance.

VE682217

23. Do you think that you would be able to do each of the following? Select **one** circle in each row.

	I definitely can't	I probably can't	Maybe	I probably can	I definitely can	
a. Publish or maintain a personal website or blog	(A)	(B)	(C)	(D)	(E)	VE682218
b. Create presentations with sound, pictures, or video	(A)	(B)	(C)	(D)	(E)	VE682219
c. Organize information into a chart, graph, or spreadsheet	(A)	(B)	(C)	(D)	(E)	VE682221
d. Compare products using the Internet	(A)	(B)	(C)	(D)	(E)	VE682222

Area: Information and Communication Technology

Issue: Student Engagement

Booklets: 2, 3, 6, 9

Item Review:

This is an item that provides contextual information for the cognitive assessment pertaining to Information and Communication Technology (ICT) literacy. The item collects important information regarding student self-efficacy in conducting activities that are related to ICT. Meta-analyses have shown that self-efficacy is one of the strongest predictors of student achievement (e.g., Richardson et al, 2012). This item can be considered an important achievement predictor as well as an informative outcome with policy relevance by itself.

Even though relative frequencies for response categories A and B are lower for most sub-items with frequency distributions skewed to the right there is sufficient variation across response options to differentiate across the range of levels of student self-efficacy perceptions. The missing rate is close to zero (0.37 – 0.44%) across all questionnaire booklets. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 8%-points indicating reasonably stable performance across different booklets for this item.

This item and all sub-items show satisfactory item statistics to be included in the TEL student questionnaire. In addition to an analysis as stand-alone items, the sub-items should be analyzed as part of a potential broader student self-efficacy index based on aggregation of these items with items VE682276 and VE682317, which were designed to measure student self-efficacy in the two other content areas.

Item content was reviewed in more detail to evaluate whether the number of sub-items might be reduced considering student burden and timing constraints. This review indicated that sub-item d was less strongly linked to the content of the cognitive items compared to the other sub-items. Further, relative frequencies for sub-item d were less balanced than for the other sub-items. Dropping sub-item d in order to reduce student burden would seem reasonable. Retaining three sub-items for this matrix items would also increase consistency with its Technology & Society-related counterpart (VE682317) where only three sub-items were administered in the pilot.

Recommendation:
Keep this item and sub-items a, b, and c in the 2014 TEL Probe Administration.
Drop sub-item d from the 2014 TEL Probe administration based on time restrictions/consideration of student burden.

VE682215

24. Who taught you most of what you know about using computers or other digital technology for collecting or sharing information?

A. I taught myself.
B. Family members
C. Friends
D. Teachers
E. Someone else

Area: Information and Communication Technology

Issue: Availability and Use of Instructional Resources

Booklets: 2, 3, 6, 9

Item Review:

This is an item that provides contextual information for cognitive assessment pertaining to Information and Communication Technology (ICT) literacy. The frequency distribution across response options is not satisfactory for this item. Options c and e have low response rate less than 10%. The missing rate is close to zero (0.38%) across all booklets. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 4%-points indicating reasonably stable performance across different booklets for this item.

Overall, this item does not perform well enough to be included in the TEL student questionnaire without making revisions.

Recommendation:

Drop this item from the 2014 TEL Probe Administration based on item performance.

VE639847

25. Have you ever studied technology or engineering topics in any of the following classes or subjects in school? Select **one or more** squares.

A. Mathematics
B. Science
C. Social studies or history
D. I have not studied technology or engineering in any of the classes or subjects listed above.

Area: Common

Issue: Organization of Instruction

Booklets: 3, 4, 7, 8

Item Review:

This is a common item across the three TEL areas. The frequency distribution across response options is satisfactory for the item. The missing rate is close to zero (0.14%) in the aggregated response frequency. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 15%-point, which might indicate that there is some variation in item performance across booklets.

This item shows satisfactory performance to be included in the TEL student questionnaire.
Item VE639842, however, covers similar content and should be given higher priority as it addresses technology and engineering classes more explicitly than this item.

Recommendation:

Drop this item from the 2014 TEL Probe Administration based on time restrictions/consideration of student burden.

VE638956

26. In school, how often have you ever done the following activities? Select **one** circle in each row.

	Never	Once or twice	Three to five times	More than five times	
a. Used tools or materials to fix or build something	(A)	(B)	(C)	(D)	VE638957
b. Used different tools, materials, or machines to see which are best for a given purpose	(A)	(B)	(C)	(D)	VE638959
c. Built or tested a model to see if it solves a problem	(A)	(B)	(C)	(D)	VE638963
d. Figured out why something is not working in order to fix it	(A)	(B)	(C)	(D)	VE682247
e. Taken something apart in order to fix it or see how it works	(A)	(B)	(C)	(D)	VE638965
f. Designed a computer program	(A)	(B)	(C)	(D)	VE682248

Area: Design and Systems

Issue: Organization of Instruction

Booklets: 3, 4, 7, 8

Item Review:

This item provides contextual information for the cognitive assessment pertaining to Design and Systems. It focuses on TEL-related learning opportunities and experiences at school. The same sub-items are administered in its outside-of-school counterpart (VE638983). The frequency distribution across response options is satisfactory for five of the six sub-items with a reasonable balance of responses across all response categories. Sub-item f has low relative frequencies for categories C and D. The response categories seem to work not very well for this sub-item. The missing rate is close to zero (0.26 – 0.41%) across all booklets. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 8%-point indicating reasonably stable performance across different booklets for this item.

Overall, this item and sub-items a-e show satisfactory item statistics to be included in the TEL student questionnaire. There is no evidence that any response categories for these items need to be collapsed, expanded, or deleted. This matrix item covers similar content as matrix item VE682225. It should be given priority over item as the response options represent more quantifiable, behavior-related categories than those in item VE682225.

Item content was reviewed in more detail to evaluate whether the number of sub-items might be reduced considering student burden and timing constraints. This review indicated that sub-items a and f were less strongly linked to the content of the cognitive items compared to the other sub-items. Dropping sub-items a and f in order to reduce student burden would seem reasonable.

Recommendation:

Keep this item and sub-items b, c, d, and e in the 2014 TEL Probe Administration.

Drop sub-item a and f from the 2014 TEL Probe administration based on item performance (sub-item f) and time restrictions/consideration of student burden.

VE638983

27. **Outside of school**, how often have you ever done the following activities? Select **one** circle in each row.

	Never	Once or twice	Three to five times	More than five times	
a. Used tools or materials to fix or build something	(A)	(B)	(C)	(D)	VE638986
b. Used tools or materials to plan or design something (for example, cake recipe, party)	(A)	(B)	(C)	(D)	VE009777
c. Used different tools, materials, or machines to see which are best for a given purpose	(A)	(B)	(C)	(D)	VE638998
d. Built or tested a model to see if it solves a problem	(A)	(B)	(C)	(D)	VE639038
e. Figured out why something is not working in order to fix it	(A)	(B)	(C)	(D)	VE682267
f. Taken something apart in order to fix it or see how it works	(A)	(B)	(C)	(D)	VE639042
g. Designed a computer program	(A)	(B)	(C)	(D)	VE682268

Area: Design and Systems

Issue: Student Engagement

Booklets: 3, 4, 7, 8

Item Review:

This is an item that provides contextual information for the cognitive assessment pertaining to Design and Systems. It focuses on TEL-related learning opportunities and experiences outside of school. Sub-items a and c-g are also administered in its at-school counterpart (VE638956). The frequency distribution across response options is satisfactory for six of the seven sub-items with reasonable balance of responses across all response categories. Sub-item g has low relative frequencies for categories C and D. The missing rate is less than 1% (0.46 – 0.53 %) across all booklets. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 8%-points indicating reasonably stable performance across different booklets for this item.

Overall, this item and sub-items a–f show satisfactory item statistics to be included in the TEL student questionnaire. There is no evidence that any response categories for these items need to be collapsed, expanded, or deleted. This matrix item covers similar content as matrix item VE682232. It should be given priority over item as the response options represent more quantifiable, behavior-related categories than those in item VE682232.

Item content was reviewed in more detail to evaluate whether the number of sub-items might be reduced considering student burden and timing constraints. This review indicated that sub-items a, b, and g were less strongly linked to the content of the cognitive items compared to the other sub-items.

Moreover, sub-item b was not included in the at-school version of this matrix item, making it less valuable for direct comparisons of learning opportunities and behaviors at and outside of school. Dropping sub-items a, b, and g to reduce student burden would seem reasonable.

Recommendation:
Keep this item and sub-items c, d, e, and f in the 2014 TEL Probe Administration.

Drop sub-items a, b, and g from the 2014 TEL Probe administration based on item performance (sub-item g) and time restrictions/consideration of student burden.

VF238958

28. For school work, how often do you use a computer or other digital technology for the following activities? Select **one** circle in each row.

	Never or almost never	A few times a year	Once or twice a month	Once or twice a week	Every day or almost every day	
a. Participate in online discussion forums, social networking sites, or virtual communities	(A)	(B)	(C)	(D)	(E)	VE238965
b. Work with others to solve a problem	(A)	(B)	(C)	(D)	(E)	VF238968
c. Get information from experts (people with strong skills or knowledge in a subject)	(A)	(B)	(C)	(D)	(E)	VF238969
d. Maintain a website or blog	(A)	(B)	(C)	(D)	(E)	VF238973
e. Search for information (for example, browse the Internet or check out websites)	(A)	(B)	(C)	(D)	(E)	VF238974
f. Play games or run simulations	(A)	(B)	(C)	(D)	(E)	VF238975

Area: Information and Communication Technology

Issue: Organization of Instruction

Booklets: 3, 4, 7, 8

Item Review:

This is an item that provides contextual information for cognitive assessment on Information and Communication Technology literacy. It focuses on TEL-related learning opportunities and experiences at school. In contrast to item VE639123, this matrix item does not have a outside-of-school type counterpart. The frequency distribution across response options is satisfactory for four of the six sub-items with reasonable balance of responses across all response categories. For two sub-items frequency distributions indicate less variation among students: sub-items d and e have low response rates less than 10% for some response options. However, NCES might want to retain the response categories as is to maintain consistency across sub-items. The missing rate is less than 1% (0.56 – 0.72%) across all booklets. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 8%-point indicating reasonably stable performance across different booklets for this item.

Overall, this item shows satisfactory performance to be included in the TEL student questionnaire. There is no evidence that any response categories for these items need to be collapsed, expanded, or deleted. This matrix item covers similar content as matrix item VE639123. Compared to VE639123, one issue regarding the current item is that no direct comparison between at school and out-of-school experiences can be made. Giving consideration to the timing constraints and reducing student burden, dropping this matrix item including all sub-items would seem reasonable.

Recommendation:

Drop this matrix item including all sub-items from the 2014 TEL Probe administration based on time restrictions/consideration of student burden.

VE639842

29. Have you ever taken or are you currently taking any of the following classes or subjects in school? Select **one or more** squares.

A. Industrial technology (for example, auto mechanics, carpentry)
B. Engineering (for example, robotics, bridge building, rocketry)
C. Any class that involves learning to use, program, or build computers
D. Any other technology-related class (for example, electronics, sewing, farming)
E. I have not taken any of the classes listed above.

Area: Common

Issue: Organization of Instruction

Booklets: 4, 5, 9, 10

Item Review:

This is a common item across the three TEL areas. It provides important contextual information on the organization of instruction, specifically whether students have attended classes specifically targeting at technology and engineering. This is a multiple selection item. Relative selection frequencies are reasonably balanced across all response options. The missing rate is close to zero (0.34%) across all booklets. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 5%-points indicating reasonably stable performance across different booklets for this item.

This item shows satisfactory performance to be included in the TEL student questionnaire. In direct comparison to item VE639847 that also addresses organization of instruction, this item should be given higher priority as it addresses technology and engineering classes more explicitly than item VE639847.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

VE639172

30. In school or outside of school, how often do the following? Select **one** circle in each row.

	Never or almost never	A few times a year	Once or twice a month	Several times a month	At least once a week	
a. Participate in clubs, camps, or competitions about technology or engineering (for example, digital art and editing, design, programming, robotics, science)	(A)	(B)	(C)	(D)	(E)	VE639177
b. Go to museums or events to learn about technology or engineering	(A)	(B)	(C)	(D)	(E)	VE639178
c. Edit digital photographs or other graphic images	(A)	(B)	(C)	(D)	(E)	VE639179
d. Create, build, or design things (for example, robots, clothes, science projects, recipes)	(A)	(B)	(C)	(D)	(E)	VE639180
e. Work in a shop or garage with industrial technologies (for example, auto mechanics, machining, metalworking, construction, carpentry)	(A)	(B)	(C)	(D)	(E)	VE639181
f. Work with drafting or design tools (for example, computer aided design [CAD], systems analysis)	(A)	(B)	(C)	(D)	(E)	VE639182
g. Take online classes to learn more about technology or engineering	(A)	(B)	(C)	(D)	(E)	VE639183
h. Watch video or listen to audio to learn more about technology or engineering (video or audio includes online videos, movies, television shows, podcasts, radio programs)	(A)	(B)	(C)	(D)	(E)	VE677642

Area: Common

Issue: Student Engagement

Booklets: 4, 5, 9, 10

Item Review:

This is a common item across the three TEL areas. It was developed to provide additional contextual information on student engagement in technology and engineering related activities. The frequency distribution across response options is not satisfactory for the item. Five of the eight sub-items have low response rates less than 10% across several response categories. The missing rate is less than 1% (0.58 – 0.81%) across all booklets. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 12%-points, which might indicate that the item did not have a stable performance across the booklets in which the previous items vary.

Overall, this matrix item does not perform well enough to be included in the TEL student questionnaire without making revisions. Given that student engagement is covered by several other items which show satisfactory performance, dropping this matrix items and all sub-items would be reasonable.

Recommendation:
Drop this item from the 2014 TEL Probe Administration based on item performance.

VE681624

31. In school, how often do you learn about or discuss the following? Select **one** circle in each row.

	Never	Rarely	Sometimes	Often	
a. How to judge reliability of sources (for example, how a website might be biased or inaccurate)	(A)	(B)	(C)	(D)	VE681629
b. How to credit others for their ideas (for example, citing sources, using endnotes and footnotes in reports)	(A)	(B)	(C)	(D)	VE681632

Area: Information and Communication Technology

Issue: Organization of Instruction

Booklets: 4, 5, 9, 10

Item Review:

This is a common item across the three TEL areas. The item collects important information regarding whether students have learned how to judge the reliability of sources and how to credit others for their ideas. Both sub-items function well. The frequency distribution across response options is satisfactory for both sub-items with a reasonable balance of responses across all response categories. There is no evidence that any response options need to be collapsed, expanded, or deleted. The missing rate is close to zero (0.34 – 0.38%) across all booklets... The maximum difference in the response proportion across the four booklets in which the item has been administrated is 9%- points indicating reasonably stable performance across different booklets for this item.

This matrix item and both sub-items show satisfactory performance to be included in the TEL student questionnaire.

Recommendation:

Keep this item and both sub-items in the 2014 TEL Probe Administration.

VE638999

32. In school, how often have you learned about or discussed the following? Select **one** circle in each row.

	Never	Rarely	Sometimes	Often	
a. Inventions that change the way people live	(A)	(B)	(C)	(D)	VE639002
b. Choices people make that affect the environment	(A)	(B)	(C)	(D)	VE639004
c. Conditions that influence the use or availability of machines or devices	(A)	(B)	(C)	(D)	VE639005
d. The ways people work together to solve problems in their community or the world	(A)	(B)	(C)	(D)	VE682300

Area: Technology and Society

Issue: Organization of Instruction

Booklets: 1–10

Item Review:

This item provides contextual information for the cognitive assessment pertaining to Technology and Society. Response on the four sub-items provide important information regarding students' opportunities in school to learn how about Technology and Society. Exactly the same four sub-items as in this item are as well used in its outside-of-school-related counterpart (VE639008).The frequency distribution across response options is very balanced for two of the four sub-items. Although sub-items b and d have lower relative frequencies (<10%) for selected categories, there is still reasonable variation across response options to make this a useful item in the student questionnaire. In order to maintain consistency in response options across sub-items, NCES may consider leaving the response categories unchanged. The missing rate is very low (1.55 – 1.75%) across all booklets.

Although item performance (based on frequencies) is slightly worse for this item than for its outside-of-school version, it seems important to retain both items given that no other item in the questionnaire captures students' learning opportunities regarding Technology and Society at school. Overall, item performance is satisfactory to be included in the TEL student questionnaire, and there is no evidence that any response options need to be collapsed, expanded, or deleted. Moreover, the burden for the student associated with this item is low given that this matrix includes only four sub-items.

Recommendation:

Keep this item and all sub-items in the 2014 TEL Probe administration.

VE639008

33. **Outside of school**, how often have you learned about or discussed the following? Select **one** circle in each row.

	Never	Rarely	Sometimes	Often	
a. Inventions that change the way people live	(A)	(B)	(C)	(D)	VE639012
b. Choices people make that affect the environment	(A)	(B)	(C)	(D)	VE639013
c. Conditions that influence the use or availability of machines or devices	(A)	(B)	(C)	(D)	VE639014
d. The ways people work together to solve problems in their community or the world	(A)	(B)	(C)	(D)	VE682314

Area: Technology and Society

Issue: Student Engagement

Booklets: 1–10

Item Review:

This item provides contextual information for the cognitive assessment pertaining to Technology and Society. Response on the four sub-items provide important information regarding students' opportunities outside of school to learn about Technology and Society. Exactly the same four sub-items as in this item are as well used in its at-school-related counterpart (VE638999).This matrix item functions very well. The frequency distributions across response options are satisfactory for all sub-items with reasonable variation across response options. There is no evidence that any response options need to be collapsed, expanded, or deleted. The missing rate is very low (2.18 – 2.39%) across all booklets.

Overall, item performance is satisfactory to be included in the TEL student questionnaire. The burden for the student associated with this item is low given that this matrix includes only four sub-items.

Recommendation:

Keep this item and all sub-items in the 2014 TEL Probe administration.

VE682315

34. Who taught you most of what you know about how technology, people, and the environment are related to each other?

A. I taught myself.
B. Family members
C. Friends
D. Teachers
E. Someone else

Area: Technology and Society

Issue: Availability and Use of Instructional Resources

Booklets: 1–10

Item Review:

This is an item that provides contextual information for the cognitive assessment pertaining to Technology and Society. The frequency distribution across response options is not satisfactory for the item. Options c and e have low response rate less than 10%. The missing rate is very low (2.15%) across all booklets. The maximum difference in the response proportion across the ten booklets in which the item has been administrated is 8%-points indicating relatively stable performance across different booklets for this item.

Overall, this item does not perform well enough to be included in the TEL student questionnaire without making substantial revisions.

Recommendation:

Drop this item from the 2014 TEL Probe Administration based on item performance.

VE682317

35. Do you think that you would be able to do each of the following? Select **one** circle in each row.

	I definitely can't	I probably can't	Maybe	I probably can	I definitely can	
a. Describe how inventions change society	(A)	(B)	(C)	(D)	(E)	VE682321
b. Compare how different activities affect the environment	(A)	(B)	(C)	(D)	(E)	VE682323
c. Explain why people have different tools, machines, or devices in different parts of the world	(A)	(B)	(C)	(D)	(E)	VE682324

Area: Technology and Society

Issue: Student Engagement

Booklets: 1–10

Item Review:

This is an item that provides contextual information for the cognitive assessment pertaining to Technology and Society. The item collects important information regarding student self-efficacy in conducting activities that are related to Technology and Society. Meta-analyses have shown that self-efficacy is one of the strongest predictors of student achievement (e.g., Richardson et al, 2012). This item can be considered an important achievement predictor as well as an informative outcome with policy relevance by itself.

Even though relative frequencies for response categories A and B are lower for most sub-items with frequency distributions skewed to the right there is sufficient variation across response options to differentiate across the range of levels of student self-efficacy perceptions. The missing rate is low (2.74 – 3.05%) across all questionnaire booklets. The maximum difference in the response proportion across the four booklets in which the item has been administrated is 11%-points pointing to some variation in item performance across booklets.

Overall, this item and all sub-items show satisfactory item statistics to be included in the TEL student questionnaire. In addition to an analysis as stand-alone items, the sub-items might as well be analyzed as part of a potential broader student self-efficacy index based on aggregation of these items with items VE682276 and VE682217, which were designed to measure student self-efficacy in the two other content areas.

No further reduction of the number of sub-items seemed feasible given that only three sub-items were included in the pilot.

Recommendation:

Keep this item and all sub-items in the 2014 TEL Probe Administration.

VF009358

36. Before today, had you ever taken an interactive computer test similar to the one you just took? Select **one** circle in each row.

	Yes	No	
a. I had taken an interactive computer test in school.	(A)	(B)	VF009360
b. I had taken an interactive computer test outside of school.	(A)	(B)	VF009361

Area: Common Debrief

Issue: Student Engagement

Booklets: 1–10

Item Review:

This is a common debrief item asking whether students have taken interactive computer test prior to taking the TEL assessment. The item collects important information regarding prior knowledge and exposure of students to similar assessments.

The relative frequencies for sub-item a are reasonably balanced indicating that there is considerable variation in schools' use of interactive computer tests. For sub-item b, more than 80% of all students indicate that they do not have experiences with interactive computer tests outside of school. Although variation on item b is limited, including this sub-item seems important for the comparison of at school and out-of-school experiences as well as for future trend analyses. The missing rate is low (3.33 – 3.79%) across all booklets. The maximum difference in the response proportion across the ten booklets in which the item has been administrated is 12%-point pointing to some variation in item performance across booklets.

Overall, this item shows satisfactory performance to be included in the TEL student questionnaire.

Recommendation:

Keep this item and both sub-items in the 2014 TEL Probe Administration.

VE401773

37. How hard was this test compared to most other tests you have taken this year in school?

A. Easier than other tests
B. About as hard as other tests
C. Harder than other tests
D. Much harder than other tests

Area: Common Debrief
Issue: Student Engagement
Booklets: 1–10

Item Review:
This is a common debrief item that is typically asked at the end of student questionnaire for every subject. Although response options “C” and “D” have low response rates, the frequency distribution across all response options can be considered reasonable and satisfactory for this type of questionnaire item The missing rate is low (3.71%) across all questionnaire booklets. The maximum difference in the relative frequencies across the ten booklets in which the item has been administrated is 8%-points indicating reasonably stable performance across different booklets for this item.

Overall, this item shows satisfactory performance to be included in the TEL student questionnaire.

Recommendation:
Keep this item in the 2014 TEL Probe Administration.

VE401776

38. How hard did you try on this test compared to how hard you tried on most other tests you have taken this year in school?

A. Not as hard as on other tests
B. About as hard as on other tests
C. Harder than on other tests
D. Much harder than on other tests

Area: Common Debrief
Issue: Student Engagement
Booklets: 1–10

Item Review:
This is a common debrief item that is typically asked at the end of all NAEP student questionnaires. Although response option "D" has a less than 10% response rate, the frequency distribution across all response options can be considered reasonable and satisfactory for this type of questionnaire item. The missing rate is low (4.33%) across all booklets. The maximum difference in the response proportion across the ten booklets in which the item has been administrated is 6%-points indicating reasonably stable performance across different booklets for this item.

Overall, this item shows satisfactory performance to be included in the TEL student questionnaire.

Recommendation:
Keep this item in the 2014 TEL Probe Administration.

VE401779

39. How important was it to you to do well on this test?

A. Not very important
B. Somewhat important
C. Important
D. Very important

Area: Common Debrief

Issue: Student Engagement

Booklets: 1–10

Item Review:

This is a common debrief item that is typically asked at the end of all NAEP student questionnaires. Although response option "A" has a less than 10% response rate, the frequency distribution across all response options can be considered reasonable and satisfactory for this type of questionnaire item. The missing rate is low (4.78%) across all booklets. The maximum difference in the response proportion across the ten booklets in which the item has been administrated is 5%- points indicating reasonably stable performance across different booklets for this item.

Overall, this item shows satisfactory performance to be included in the TEL student questionnaire.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

References

Holland, J.L. (1997). *Making vocational choices*. Odessa: FL: Psychological Assessment Resources.

Lubinski, D. (2000). Scientific and social significance of assessing individual differences: Sinking shafts at a few critical points. *Annual Review of Psychology,* 51, 405-444.

Richardson, M., Abraham, C., & Bond, R. (2012). Psychological Correlates of University Students Academic Performance: A Systematic Review and Meta-Analysis, *Psychological Bulletin*, 138, 353-387.

WestEd (2010). *Technology and Engineering Literacy Framework for the 2014 National Assessment of Educational Progress*. Washington, DC: WestEd.

Technology and Engineering Literacy Reports

2. School report

NAEP Item Development (ID)

Technology and Engineering Literacy (TEL)

2014 Probe Survey Questionnaire

Recommendations to NCES

Grade 8 School Questionnaire

Deliverable in response to ID Task 3.1.2

Submitted: March 14, 2013

Listening.
Learning.
Leading.

Table of Contents

2014 Technology and Engineering Literacy (TEL)
Grade 8 School Questionnaire:
Post-Pilot Analysis and Recommendations

2014 Technology and Engineering Literacy (TEL)
Grade 8 School Questionnaires:
Post-Pilot Analysis and Recommendations

This document provides a post-pilot review of the grade 8 school Technology and Engineering Literacy (TEL) questionnaire using data collected in the 2013 pilot administration. The goal of this report is to evaluate the performance of the items and determine whether revisions or deletions are necessary for the 2014 TEL probe assessment.

Background

The NAEP TEL assessment measures three core areas of interest: Technology and Society (T&S), Design and Systems (D&S), and Information and Communication Technologies (ICT). Technology and Society addresses the effects that technology has on society and on the natural world. Design and Systems covers the nature of technology, the engineering design process, and basic principles of dealing with everyday technologies. Information and Communication Technology includes computers and software learning tools, networking systems and protocols, handheld digital devices, and other technologies for accessing, creating, and communicating information and for facilitating creative expression (WestEd, 2010). The TEL Issues Paper identified four broad issues that informed and guided the survey questionnaire development administered in the pilot assessment. These are: availability of school resources; organization of technology and engineering instruction; teacher preparation; and student engagement. Each of these issues comprises several sub-issues. Two of these four issues were covered in both the student and school questionnaires. Teacher preparation was covered in the school questionnaire only and student engagement was covered in the student questionnaire only.

Criteria for Item Review

Analysis of Frequency Distributions

Following the same procedure as for other background questionnaire item reviews, a set of frequency-based flagging criteria were considered in evaluating whether items were applicable to the targeted population. It is important to keep in mind that flags are indications that a particular item should be thoroughly evaluated. Flags are not absolute criteria for making decisions regarding the use or quality of items. Instead, the flagging criteria should be viewed collectively, along with other criteria and professional judgment, in recommending keeping, revising, or dropping items from the 2014 TEL Probe survey questionnaires.

For this analysis, we examined item response frequencies for response options. We also assessed item non-response patterns to determine whether problematic items or response

options warrant revising items, expanding or collapsing response categories, or dropping an item. The flagging criteria on response patterns and item non-response (i.e., missing response) rates for reviewing the data are:

- A high percentage of item non-response (relative to other adjacent items) may indicate that the item content might have been problematic (e.g., ambiguous, burdensome, overly complex, offensive) or that the format might have caused respondents to overlook the item. Note that, this criterion does not apply to multiple selection multiple-choice items, because the missing rate for "select all that apply" items contains both missing responses and "not apply" responses.

- Low single-category response rates (e.g., <10%) may indicate that a category does not apply to this population and possibly that different categories may be more informative.

- High single-category response rates (e.g., >80%) may indicate that almost all respondents in the population fall into one category and that a limited range of demographics or behavior indicators are collected.

Implications of flags on any of these criteria for a given item will be discussed in more detail. Note again that, flagging an item on one of these criteria does not, by itself; warrant the necessity for revising or dropping the item. Whether an item needs to be modified or revised also depends on whether response categories are unique to an item versus representing one of the standard formats used across many questionnaire items, and whether certain response categories are needed from a theoretical perspective. Maintaining a high level of consistency across items is one important consideration for the validity of the questionnaires as well as the trend information being collected.

Response Time/Burden

The length of time it takes a respondent to complete a questionnaire is important. If a questionnaire to too long or "burdensome," the respondent will not exert their best efforts, especially at the end of the questionnaire. It does not appear that school administrators were overly burdened with the length of this questionnaire. The missing rate for the TEL School questionnaire ranged from 1%–2%.

Recommendations for the 2014 TEL Probe Assessment – Overview

In the following we will summarize our item review in detail for each item, along with the recommendation for the 2014 TEL Probe assessment.

Table 1 on the following page presents an overview of all recommendations. For each item, the accession number and the area and issue that are addressed are given in the table.

Table 1 - Recommendations for 2014 TEL School Probe - Overview

Item #	AccNum	Area	Issue	Recommendation
1	VE638378	Common	Organization of Instruction	Keep
2	VE638432	Common	Organization of Instruction	Keep
	VE638446	Common	Organization of Instruction	Keep
4	VE638450	Common	Organization of Instruction	Keep
5	VE638334	Common	Organization of Instruction	Keep
6	VE681573	Common	Organization of Instruction	Keep
7	VE638483	Common	Organization of Instruction	Keep
8	VE638475	Common	Availability and Use of Instructional Resources	Keep
9	VE675587	Common	Availability and Use of Instructional Resources	Keep
10	VE638517	Common	Availability and Use of Instructional Resources	Keep
11	VE638436	Common	Availability and Use of Instructional Resources	Keep
12	VE675659	Common	Availability and Use of Instructional Resources	Keep
13	VE638523	Common	Availability and Use of Instructional Resources	Keep
14	VE638496	Common	Teacher Preparation	Keep
15	VE638333	Technology and Society	Organization of Instruction	Keep
16	VE638350	Technology and Society	Organization of Instruction	Keep
17	VE638372	Design and Systems	Organization of Instruction	Keep
18	VE638380	Design and Systems	Organization of Instruction	Keep
19	VE638391	Information and Communication Technology	Organization of Instruction	Keep
20	VE638410	Information and Communication Technology	Organization of Instruction	Keep

Item Review and Recommendations for the 2014 TEL School Grade 8 Probe Assessment

Note: The "missing rate" for most items range from 1%–2% for this questionnaire. ETS finds this missing rate acceptable and will not address this criteria item-by-item below except where indicated.

VE638378

1. In your school, prior to or in eighth grade, what percentage of eighth-grade students receive instruction in each of the following topics? Fill in **one** oval in each row.

	None: Not included in the curriculum	Under 10%	10–25%	26–50%	51–75%	Over 75%	
a. How objects are designed to solve problems or meet people's needs	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	VE638386
b. The interactions among technology, society, and the environment	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	VE638388
c. The role of technology systems (for example, energy usage, healthcare, communications)	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	VE638389
d. How computers, the Internet, and other digital technologies affect society	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	VE638390
e. Careers in technical fields (for example, engineer, medical technician, computer programmer)	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	VE638392
f. Concepts related to specific technologies (for example, electronics, biotechnology, agriculture)	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	VE638395

Area: Common

Issue: Organization of Instruction

Item Review:

This is a common item across the three TEL target assessment areas and provides information about students' previous instruction in six areas of technology. Response options are skewed toward the middle of the scale with options "C" and "D" exhibiting low response rates for sub-items "a–d" (7%–9%).

Although relative frequencies for response options "C" and "D" are less than 10% for these four sub-items, there is sufficient variation across response options to distinguish different levels of instruction.

Moreover, keeping response options the same for all sub-items is important for comparisons of and reporting on the results for these items.

Overall, the sub-items show satisfactory item statistics to be included in the TEL school questionnaire.

Recommendation:
Keep the item and sub-items in the 2014 TEL Probe Administration.

VE638432

2. Prior to or in eighth grade, how are each of the following areas addressed in your school's curriculum? Fill in **one or more** ovals in each row.

	Required	Elective	After school	Not offered	
a. Technology and Society (the effects that technology has on society or the natural world; or, the ethical questions that arise from those effects)	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638435
b. Design and Systems (the nature of technology, the engineering design process by which technologies are developed, or basic approaches to dealing with everyday technologies, including maintenance or troubleshooting)	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638438
c. Information and Communication Technology (for example, computers; software learning tools; networking systems and protocols; handheld digital devices; other technologies for accessing, creating, or communicating information for facilitating creative expression)	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638442

Area: Common

Issue: Organization of Instruction

Item Review:

This is a common item across the three TEL target assessment areas and provides information about how instruction is administered in the three TEL target assessment areas. Response option "C – After school" had low response rates for all three sub-items (5%, 9%, and 7%, respectively), however this response option may provide interesting findings for trend going forward. ETS does not recommend removing this response option.

The frequency distribution across the other response options shows a reasonable and expected balance of responses across response categories. Overall, the sub-items show satisfactory item statistics to be included in the TEL school questionnaire.

Recommendation:

Keep this item and all sub-items in the 2014 TEL Probe Administration.

VE638446

3. Prior to or in eighth grade, does your school require any technology or engineering instruction to students?

Ⓐ Yes ➔ *Continue to Question 4.*

Ⓑ No ➔ *Skip to Question 5.*

Area: Common

Issue: Organization of Instruction

Item Review:

This is a common item across the three TEL target assessment areas and provides information about whether the school requires any technology or engineering instruction to students.

The frequency distribution across both response options is satisfactory with a reasonable balance of response.

Recommendation:

Keep this item and in the 2014 TEL Probe Administration.

VE638450

4. To what extent is your school's technology or engineering instruction based on the following? Fill in **one** oval in each row.

	Not at all	Small extent	Moderate extent	Large extent	
a. State curriculum standards or frameworks	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638453
b. District curriculum standards or curriculum guides	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638456
c. Results from state/district assessments	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638457
d. Results from school assessments	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638462
e. In-school curriculum frameworks or standards for learning	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638459
f. Recommendations from your teachers or content specialists	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638464
g. Commercially designed programs	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638470
h. Textbooks	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638472
i. Other (specify):_____ _____	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638467

Area: Common

Issue: Organization of Instruction

Item Review:

This is a common item across the three TEL target assessment areas and provides information about the schools' instruction in eight areas of technology and engineering. Response option "A" had low response rates for sub-items "a," "b," "e," and "f" – (7%– 9%). In addition, sub-item "i" had a missing rate of 73%.

Because four other items use the identical set of response options, response option "A" should remain. Overall, the sub-items show satisfactory item statistics to be included in the TEL school questionnaire.

For sub-item "i," the write-in responses are shown on the following page.

21 THINGS FOR STUDENTS
ADMINISTRATIVE DIRECTIVE
GRAPHIC DESIGN ILLUSTRATOR, GOOGLE DOCS, PREP, ETC. ADOBE PHOTO
HABIT
I think society is the driving force of technology use in school.
IB Middle Years Program standards
IB MVP TECHNOLOGY COURSE REQUIREMENTS
IB Program
International Baccalaureate Middle Years Programme Technology
Keyboarding Instruction
Parental technical input
Professional growth
Project Lead the Way
Project Lead the Way (Gateway to Technology Middle School Program)
School developed programming
Student shared information
Teacher Created
TEXT INFORMATIONAL
Workbook

Recommendation:
Keep this item and sub-items in the 2014 TEL Probe Administration.

VE638334

5. Prior to or in eighth grade, does your school offer any courses or afterschool programs that cover technology or engineering concepts?

Ⓐ Yes ➔ *Continue to Question 6.*

Ⓑ No ➔ *Skip to Question 8.*

Area: Common

Issue: Organization of Instruction

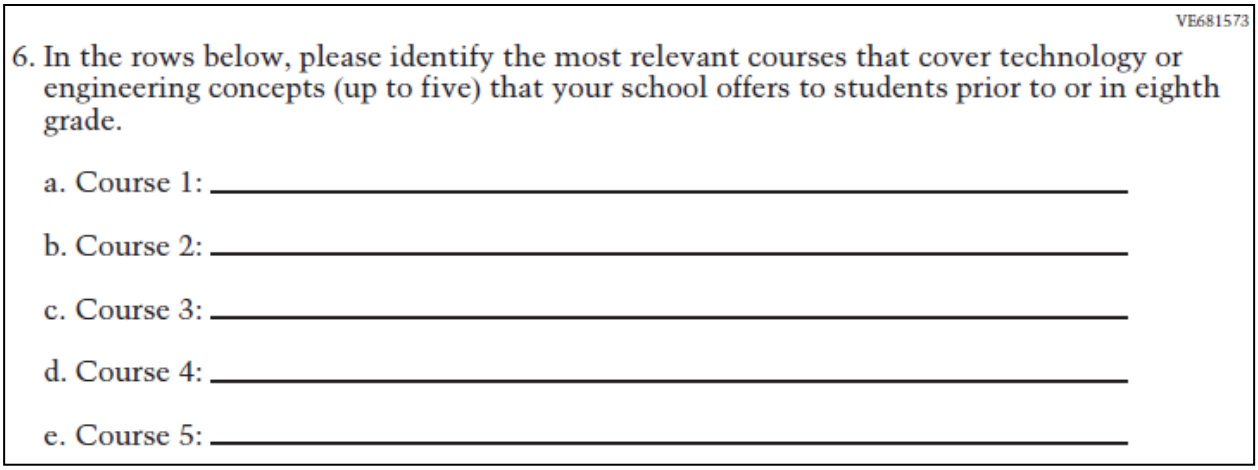
Item Review:

This is a common item across the three TEL target assessment areas and provides information about whether the school provides any courses or afterschool programs that cover technology or engineering concepts.

The frequency distribution across both response options is satisfactory with reasonable balance of responses and should be included in the 2014 school questionnaire.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.



Area: Common

Issue: Organization of Instruction

Item Review:

The purpose of this constructed-response item is to identify the most relevant courses that cover technology and engineering concepts. The non-response rate for sub-item "a" is 28% and rises to 87% for sub-item "e." Among 467 respondents who were directed to the item, 103 respondents did not provide any write-in answers to any of the five options, therefore, the missing rate for this item is 28%.

In the write-in responses, administrators provided a variety of courses that cover technology or engineering concepts. The item collects important information regarding TEL-related instruction.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

VE638483

7. In an average school year, how often is the typical eighth-grade student at your school assessed in what he or she knows about technology or engineering using the following methods? Fill in **one** oval in each row.

	Never	Once or twice a year	Once or twice a quarter	Once or twice a month	Once a week or more	I don't know.	
a. Standardized or performance tests	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	VE638486
b. Teacher-developed tests and quizzes	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	VE638487
c. Student assignments, projects, or homework	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	VE638490

Area: Common

Issue: Organization of Instruction

Item Review:

This is a common item across the three TEL target assessment areas and provides information about how often a grade 8 student is assessed about what he or she knows about technology or engineering.

The frequency distribution across the response options is satisfactory with a reasonable balance of responses across all response categories. The items and sub-items show satisfactory item statistics to be included in the TEL school questionnaire. There is no evidence that any response categories need to be collapsed, expanded, or deleted.

Overall, the sub-items show satisfactory item statistics to be included in the TEL school questionnaire.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

VE638475

8. The goal of the following set of questions is to gather information about the student–computer ratio for eighth-grade students at your school.

	Number	
a. At your school, what is the total number of students in the eighth grade?	☐,☐☐☐	VE638480
b. Approximately how many computers in the school are available to eighth-grade students for educational purposes?	☐,☐☐☐	VE638484
c. Approximately how many of these computers are connected to the Internet?	☐,☐☐☐	VE638485
d. Approximately how many of all computers are eighth-grade students allowed to take home with them (for example, laptops or tablets)?	☐,☐☐☐	VE675583

If you answered question 8d with a number greater than 0, *continue to Question 9.*

If you answered question 8d with 0, *skip to Question 10.*

Area: Common

Issue: Availability and Use of Instructional Resources

Item Review:

This is a common item across the three TEL target assessment areas and provides information about the number of grade 8 students in the school, the number of computers available for educational purposes, the number of computers connected to the Internet, and the number of computers for students to take home.

Although the item has low response rates for all sub-items on specific response options, the options provided clearly cover the full range of all possible responses. The item collects information about school resources regarding computer availability, and could be used to measure growth in the future.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

VE675587

9. Does your school provide computers that students are allowed to take home with them?

Ⓐ Yes, and students are allowed to keep their computer after the school year ends.

Ⓑ Yes, but students must return their computer (for example, at the end of the week or end of the school year).

Ⓒ No

Area: Common

Issue: Availability and Use of Instructional Resources

Item Review:

This is a common item across the three TEL target assessment areas and provides information about schools providing computers for students to take home.

While only 3% of administrators indicated a response in sub-item "a," this is an important sub-item for understanding trend. The frequency distribution across the other response options is satisfactory with reasonable balance of responses.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

VE638517

10. In your school, prior to or in eighth grade, what percentage of eighth-grade students has taken advantage of the following school-sponsored resources during or after school? Fill in **one** oval in each row.

	School does not provide this resource to students.	0–5%	6–20%	21–50%	Over 50%	
a. Clubs, competitions, exhibits, etc., related to some aspect of technology and engineering	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638518
b. Technology resources such as robotics or digital photography	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638519
c. Workshop for industrial technologies (for example, auto mechanics, machining, metalworking, construction, carpentry)	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638520
d. Workshop or laboratory for drafting or design tools (for example, computer-aided design [CAD], systems analysis)	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638521
e. Online courses in any subject	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638522

Area: Common

Issue: Availability and Use of Instructional Resources

Item Review:

This is a common item across the three TEL target assessment areas and provides information about students taking advantage of school-sponsored resources.

The frequency distribution across sub-items indicates a skew to the left with low responses for sub-items “c,” “d,” and “e” (1%–9%). Most school administrators indicated that the school does not provide resources to students (“A”), (67%–76%) or at very low proportions (“B”), (11%–20%). Sub-items “a” and “b” show a satisfactory frequency distribution.

While there is some evidence to collapse response options “A” and “B” together, these are important measurements for the future study of trend. This item and all sub-items should be included in the TEL school questionnaire.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

VE638436

11. This year in your school, are the following resources available to teachers for teaching or professional development? Fill in **one** oval in each row.

	Yes	No	
a. Financial support for professional development related to technology and engineering	Ⓐ	Ⓑ	VE638440
b. Financial support for association memberships related to technology and engineering	Ⓐ	Ⓑ	VE638441
c. Financial support for university or online courses related to technology and engineering	Ⓐ	Ⓑ	VE638443
d. Technology resources such as robotics or digital photography	Ⓐ	Ⓑ	VE638445
e. Workshop for industrial technologies (for example, auto mechanics, machining, metalworking, construction, carpentry)	Ⓐ	Ⓑ	VE638449
f. Workshop or laboratory for drafting or design tools (for example, computer-aided design [CAD], systems analysis)	Ⓐ	Ⓑ	VE638452
g. Supplies or equipment for technology demonstrations	Ⓐ	Ⓑ	VE638454
h. Textbooks or digital tutorials related to technology or engineering	Ⓐ	Ⓑ	VE675624

Area: Common

Issue: Availability and Use of Instructional Resources

Item Review:

This is a common item across the three TEL target assessment areas and provides information about resources available to teachers.

The frequency distribution across response options is satisfactory for all sub-items with reasonable balance of responses across all response. Moreover, keeping response options the same for all sub-items is important for comparisons of and reporting on the results for these items.

Overall, the sub-items show satisfactory item statistics to be included in the TEL school questionnaire.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

VE675659

12. Does your school have equipment available for instruction with the following capabilities? Fill in **one** oval in each row.

	Not available	Available for some teachers	Available for all teachers	
a. Viewing movies and television programs	Ⓐ	Ⓑ	Ⓒ	VE677022
b. Recording video	Ⓐ	Ⓑ	Ⓒ	VE677568
c. Taking digital images	Ⓐ	Ⓑ	Ⓒ	VE677569
d. Converting non-digital images or content (for example, scanner)	Ⓐ	Ⓑ	Ⓒ	VE677570
e. Projecting digital images	Ⓐ	Ⓑ	Ⓒ	VE677571
f. Projecting interactive data (for example, interactive whiteboard that responds to user control via stylus, finger, or other device)	Ⓐ	Ⓑ	Ⓒ	VE677572
g. Collecting data (for example, tools such as sensors or probes that detect or collect information such as motion, pH, temperature, light)	Ⓐ	Ⓑ	Ⓒ	VE677573
h. Mobile computing (for example, handheld or portable computer devices)	Ⓐ	Ⓑ	Ⓒ	VE677574

Area: Common

Issue: Availability and Use of Instructional Resources

Item Review:

This is a common item across the three TEL target assessment areas and provides information about equipment available for instruction. Response option "A" had low response rates for sub-items "a–f" (1%–6%), however this response option may provide an interesting finding going forward. ETS does not recommend removing this response option.

The frequency distribution across the other response options is satisfactory for all sub-items with a reasonable and expected balance of responses across response categories. Moreover, keeping response options the same for all sub-items is important for comparisons of and reporting on the results for these items.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

VE638523

13. To what extent is your school's capability to provide instruction in technology or engineering concepts hindered by any of the following? Fill in **one** oval in each row.

	Not at all	Small extent	Moderate extent	Large extent	
a. Lack of qualified teachers trained in technological or engineering content	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638524
b. Lack of technical support personnel	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638525
c. Lack or inadequacy of instructional materials (for example, textbooks, computers, software)	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638526
d. Lack or inadequacy of Internet connectivity	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638528
e. Lack or inadequacy of laboratory or workshop equipment	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638529
f. Lack or inadequacy of audio-visual resources	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638533
g. Lack of curriculum development expertise or standards specificity	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638534
h. Lack of time because of demands for other curriculum content	Ⓐ	Ⓑ	Ⓒ	Ⓓ	VE638535

Area: Common

Issue: Availability and Use of Instructional Resources

Item Review:

This is a common item across the three TEL target assessment areas and provides information about whether the school's capability to provide instruction in technology or engineering concepts is hindered.

Sub-item "d" had low responses for response options "C"–9% and "D"–4%. Sub-item "f" had a low response for "D"–5%, however there is sufficient variation across response options to distinguish different levels of problems in the school. Moreover, keeping response options the same for all sub-items, and consistent with the response options used for other versions of this matrix item is important for comparisons of and reporting on the results for these items.

Overall, the sub-items show satisfactory item statistics to be included in the TEL school questionnaire.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

VE638496

14. In the past two years, what percentage of teachers in your school has participated in professional development in any of the following? Fill in **one** oval in each row.

	Not Applicable	0%	1–25%	26–50%	51–75%	Over 75%	I don't know.	
a. Content, curriculum, or pedagogy related to engineering design	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	VE638497
b. Content, curriculum, or pedagogy related to technology or technological literacy	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	VE638498
c. Integrating information and communications technology into instruction	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	VE638504

Area: Common

Issue: Teacher Preparation

Item Review:

This is a Common item across the three TEL target assessment areas and provides information about teachers' professional development.

All sub-items exhibited low relative frequencies for one or more response options: "a" for D–F, "b" for B and E, "c" for B, however there is sufficient variation across response options to distinguish different levels of professional development. Moreover, keeping response options the same for all sub-items is important for comparisons of and reporting on the results for these items.

Overall, the sub-items show satisfactory item statistics to be included in the TEL school questionnaire.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

VE638333

15. In your school, prior to or in eighth grade, how much emphasis is placed on teaching students the following? Fill in **one** oval in each row.

	None	A little	Some	A lot	I don't know.	
a. Inventions that change the way people live	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638336
b. Choices people make that affect the environment	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638338
c. Conditions that influence the use or availability of machines or devices	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638340
d. The ways people work together to solve problems in their community or the world	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE677585

Area: Technology and Society

Issue: Organization of Instruction

Item Review:

This item provides contextual information for the cognitive assessment pertaining to Technology and Society (T&S) and discusses the emphasis placed on teaching students various topics. Response option "A" had a low response rate for all sub-items (1%–5%).

Although relative frequencies for response options "A" are less than 10% for the sub-items, there is sufficient variation across response options to distinguish different levels of teaching engagement. Moreover, keeping response options the same for all sub-items, and consistent with the response options used for other versions of this matrix item is important for comparisons of and reporting on the results for these items.

Overall, the sub-items show satisfactory item statistics to be included in the TEL school questionnaire.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

VE638350

16. In your school, prior to or in eighth grade, to what extent do students do the following activities? Fill in **one** oval in each row.

	Not at all	Small extent	Moderate extent	Large extent	I don't know.	
a. Describe how inventions change society	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638354
b. Compare how different activities affect the environment	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638355
c. Explain why people have different tools, machines, or devices in different parts of the world	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638356

Area: Technology and Society

Issue: Organization of Instruction

Item Review:

This item provides contextual information for the cognitive assessment pertaining to Technology and Society (T&S) and discusses various student activities prior to grade 8.

Response option "A" had a low response rate for all sub-items (2%–3%). Although relative frequencies for response options "A" are less than 10% for the sub-items, there is sufficient variation across response options to distinguish different levels of student activities. Moreover, keeping response options the same for all sub-items, and consistent with the response options used for other versions of this matrix item is important for comparisons of and reporting on the results for these items.

Overall, the sub-items show satisfactory item statistics to be included in the TEL school questionnaire.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

VE638372

17. In your school, prior to or in eighth grade, how much emphasis is placed on teaching students the following? Fill in **one** oval in each row.

	None	A little	Some	A lot	I don't know.	
a. The use and purpose of tools, machines, or devices	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638375
b. The care or maintenance of tools, machines, or devices	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638376
c. Designing or creating something to solve a problem	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638377
d. Designing something when there is limited time, money, or materials	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE639184
e. Figuring out how to fix something	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE677599
f. Finding the right people to work with or get help from to fix something	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE677600

Area: Design and Systems

Issue: Organization of Instruction

Item Review:

This item provides contextual information for the cognitive assessment pertaining to Design and Systems (D&S) and discusses teaching emphasis for various topics.

Two response options had low response rates: "A" had a low response rate for sub-items "a" and "c" (4%–5%) and "D" had low response rates for sub-items "b," "d," and "e" (8%–9%).

Although relative frequencies for response options "A" and "D" are less than 10% for some sub-items, there is sufficient variation across response options to distinguish different levels of teacher emphasis. Moreover, keeping response options the same for all sub-items, and consistent with the response options used for other versions of this matrix item is important for comparisons of and reporting on the results for these items.

Overall, the sub-items show satisfactory item statistics to be included in the TEL school questionnaire.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

VE638380

18. In your school, prior to or in eighth grade, to what extent do students do the following activities? Fill in **one** oval in each row.

	Not at all	Small extent	Moderate extent	Large extent	I don't know.	
a. Use tools and materials to fix something	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE677603
b. Use different tools, materials, or machines to see which are best for a given purpose	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638383
c. Build or test a model to see if it solves a problem	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638384
d. Figure out why something is not working in order to fix it	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE677604
e. Take something apart in order to fix it or see how it works	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638385
f. Design a computer program	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE677605
g. Examine how parts, processes, or people work together in a system	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE677606

Area: Design and Systems

Issue: Organization of Instruction

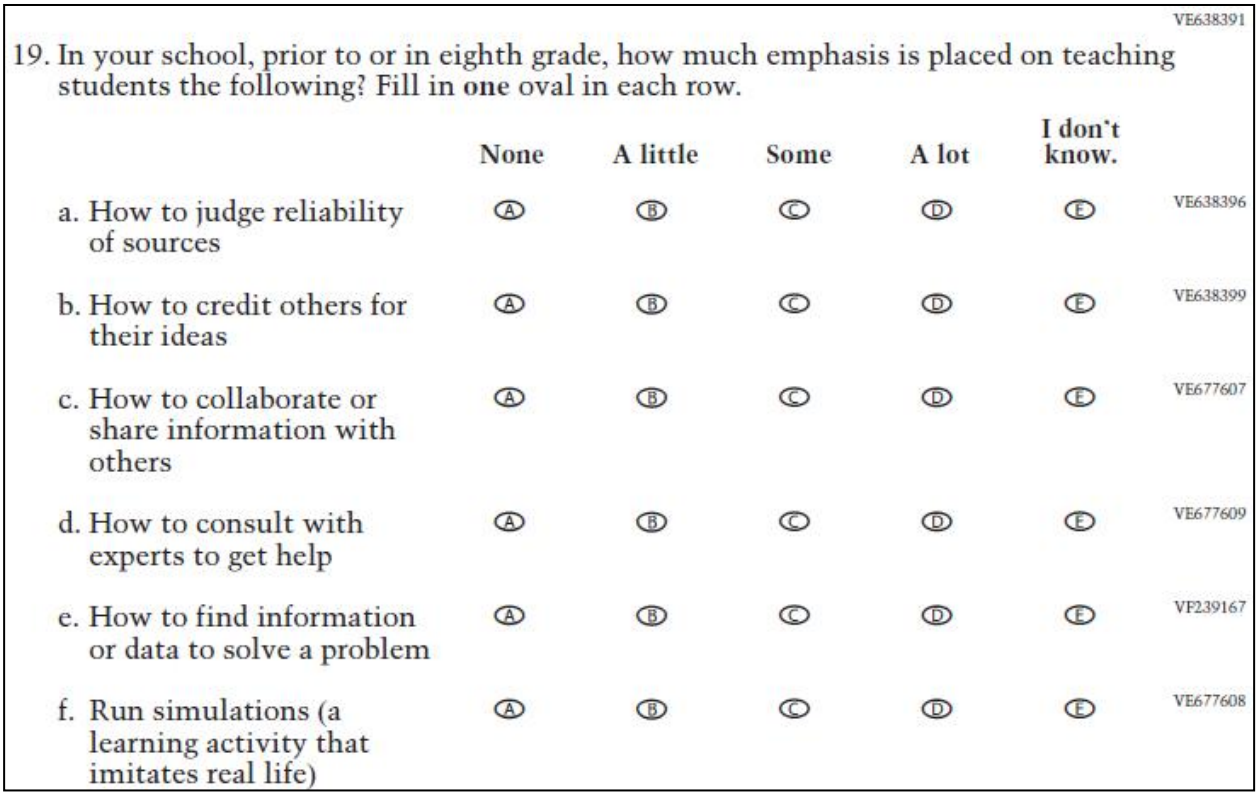
Item Review:

This item provides contextual information for the cognitive assessment pertaining to Design and Systems (D&S) and discusses the extent students participate in various activities. Response option "D" had a low response rate for six of seven sub-items (1%–8%).

Although relative frequencies for response options "D" are less than 10% for many sub-items, there is sufficient variation across response options to distinguish different levels of student participation. Moreover, keeping response options the same for all sub-items, and consistent with the response options used for other versions of this matrix item is important for comparisons of and reporting on the results for these items. Overall, the sub-items show satisfactory item statistics to be included in the TEL school questionnaire.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.



VE638391

19. In your school, prior to or in eighth grade, how much emphasis is placed on teaching students the following? Fill in **one** oval in each row.

	None	A little	Some	A lot	I don't know.	
a. How to judge reliability of sources	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638396
b. How to credit others for their ideas	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638399
c. How to collaborate or share information with others	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE677607
d. How to consult with experts to get help	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE677609
e. How to find information or data to solve a problem	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VF239167
f. Run simulations (a learning activity that imitates real life)	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE677608

Area: Information and Communication Technology

Issue: Organization of Instruction

Item Review:

This item provides contextual information for the cognitive assessment pertaining to Information and Communication Technology (ICT) and discusses teaching emphasis for or various topics.

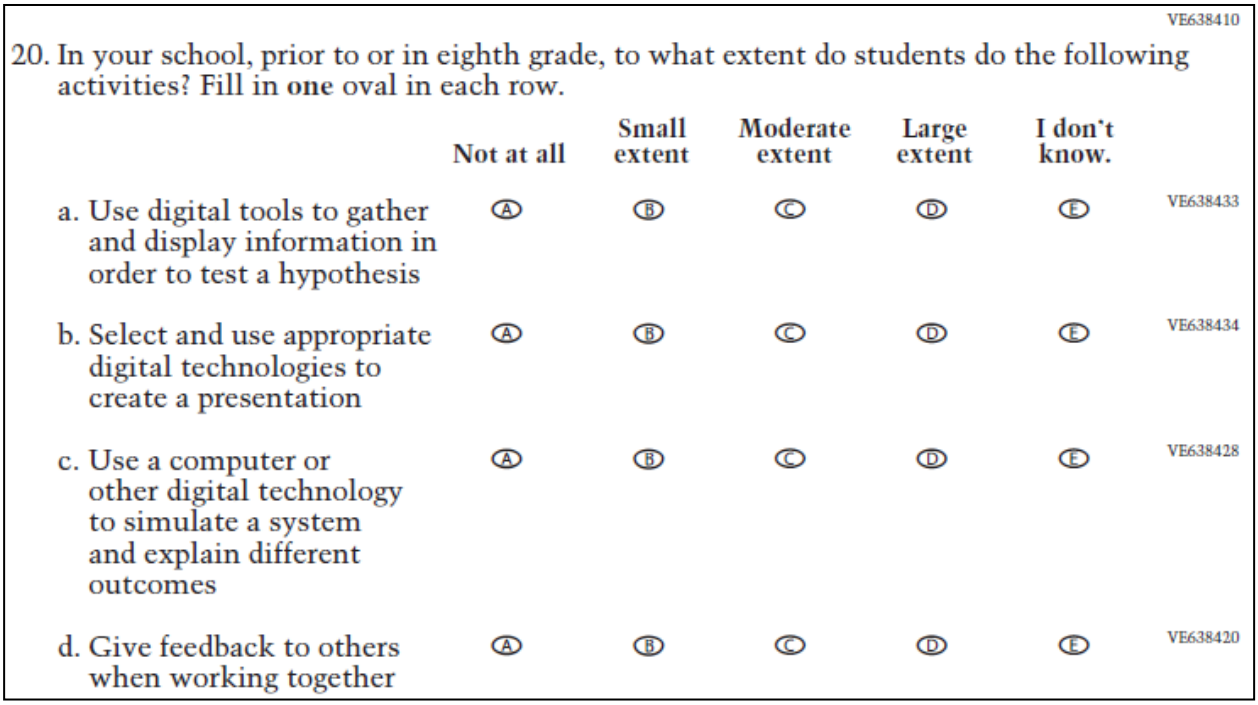
Two response options had low response rates: "A" had a low response rate for sub-items "a–e" (1%–7%) and "B" had a low response rate for sub-items "c" and "e" (7% and 9%).

Although relative frequencies for response options "A" and "B" are less than 10% for some sub-items, there is sufficient variation across response options to distinguish different levels of teaching emphasis. Moreover, keeping response options the same for all sub-items, and consistent with the response options used for other versions of this matrix item is important for comparisons of and reporting on the results for these items.

Overall, the sub-items show satisfactory item statistics to be included in the TEL school questionnaire.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.



VE638410

20. In your school, prior to or in eighth grade, to what extent do students do the following activities? Fill in **one** oval in each row.

	Not at all	Small extent	Moderate extent	Large extent	I don't know.	
a. Use digital tools to gather and display information in order to test a hypothesis	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638433
b. Select and use appropriate digital technologies to create a presentation	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638434
c. Use a computer or other digital technology to simulate a system and explain different outcomes	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638428
d. Give feedback to others when working together	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	VE638420

Area: Information and Communication Technology

Issue: Organization of Instruction

Item Review:

This item provides contextual information for the cognitive assessment pertaining to Information and Communication Technology (ICT) and discusses the extent students' conduct various activities.

Response option "A" had a low response rate for sub-items "b" and "d" (5% each).

Although relative frequencies for response options "A" are less than 10% for two sub-items, there is sufficient variation across response options to distinguish different levels of student participation. Moreover, keeping response options the same for all sub-items, and consistent with the response options used for other versions of this matrix item is important for comparisons of and reporting on the results for these items.

Overall, the sub-items show satisfactory item statistics to be included in the TEL school questionnaire.

Recommendation:

Keep this item in the 2014 TEL Probe Administration.

References

WestEd (2010). *Technology and Engineering Literacy Framework for the 2014 National Assessment of Educational Progress*. Washington, DC: WestEd.

Technology and Engineering Literacy Reports

3. Final Adjudication Decisions

TEL 2014 Student and School Questionnaires: Final Decisions

The tables below summarize the final adjudication decisions for the TEL student questionnaire (Table 1) and the TEL school questionnaire (Table 2) that were made after the 2013 pilot. After the initial recommendations reports for the two questionnaires were developed, an additional review and evaluation, conducted by NCES and the Governing Board, informed these final decisions based on policy relevance and content coverage of the questionnaire items.

In the table headers, "Type" refers to whether the item described in the row is a discrete item, an item stem of a matrix item, or a sub-item of a matrix item. The "Pilot AccNum" header refers to the item accession number used in the 2013 pilot administration. The "2014 Sequence" header refers to the item sequence that will be used in the 2014 administration. The "2014 AccNum" header refers to the item accession number that will be used in the 2014 administration. The "Area" header indicates which TEL area the item measures. In the "Area" column, the text "Common" indicates that the item measures a topic that is common to all of the three specific areas of the TEL assessment (i.e., Design and Systems, Technology and Society, and Information and Communication Technology). The "Issue" header indicates which specific issue the item addresses. In the "2014 Sequence" and "2014 AccNum" columns, the text "Dropped" indicates that an item that has been used in the 2013 pilot administration, but will not be administered in 2014 per the adjudication decision. The rows that have been highlighted in dark grey are discrete items or item stems of matrix items. The rows that have been highlighted in light grey are sub-items of matrix items.

Table 1: Final adjudication decisions for the 2014 TEL student questionnaire

Type	Pilot AccNum	2014 Sequence	2014 AccNum	Area	Issue
Discrete	VE639842	1	VE639842	Common	Organization of Instruction
Discrete	VE639847	2	VE639847	Common	Organization of Instruction
Item Stem	VE681624	3	VE681624	Information and Communication Technology	Organization of Instruction
Sub-item	VE681629	3a	VE681629	Information and Communication Technology	Organization of Instruction
Sub-item	VE681632	3b	VE681632	Information and Communication Technology	Organization of Instruction
Item Stem	VE639123	4	VE639123	Information and Communication Technology	Organization of Instruction
Sub-item	VE639125	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VE639127	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VE639130	4a	VE639130	Information and Communication Technology	Organization of Instruction

Type	Pilot AccNum	2014 Sequence	2014 AccNum	Area	Issue
Sub-item	VE639131	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VE639137	4b	VE639137	Information and Communication Technology	Organization of Instruction
Sub-item	VE639136	4c	VE639136	Information and Communication Technology	Organization of Instruction
Item Stem	VF025108	5	VF025108	Information and Communication Technology	Student Engagement
Sub-item	VF025109	Dropped	Dropped	Information and Communication Technology	Student Engagement
Sub-item	VF025110	Dropped	Dropped	Information and Communication Technology	Student Engagement
Sub-item	VF025112	5a	VF025112	Information and Communication Technology	Student Engagement
Sub-item	VF025113	Dropped	Dropped	Information and Communication Technology	Student Engagement
Sub-item	VF025117	5b	VF025117	Information and Communication Technology	Student Engagement
Sub-item	VF025116	5c	VF025116	Information and Communication Technology	Student Engagement
Item Stem	VE682225	6	VE682225	Design and Systems	Organization of Instruction
Sub-item	VE682226	Dropped	Dropped	Design and Systems	Organization of Instruction
Sub-item	VE682227	Dropped	Dropped	Design and Systems	Organization of Instruction
Sub-item	VE682228	6a	VE682228	Design and Systems	Organization of Instruction
Sub-item	VE682229	6b	VE682229	Design and Systems	Organization of Instruction
Sub-item	VE682230	Dropped	Dropped	Design and Systems	Organization of Instruction
Sub-item	VE682231	Dropped	Dropped	Design and Systems	Organization of Instruction
Item Stem	VE638956	7	VE638956	Design and Systems	Organization of Instruction
Sub-item	VE638957	Dropped	Dropped	Design and Systems	Organization of Instruction
Sub-item	VE638959	7a	VE638959	Design and Systems	Organization of Instruction
Sub-item	VE638963	7b	VE638963	Design and Systems	Organization of Instruction
Sub-item	VE682247	7c	VE682247	Design and Systems	Organization of Instruction
Sub-item	VE638965	7d	VE638965	Design and Systems	Organization of Instruction
Sub-item	VE682248	Dropped	Dropped	Design and Systems	Organization of Instruction
Item Stem	VE638983	8	VE638983	Design and Systems	Student Engagement
Sub-item	VE638986	Dropped	Dropped	Design and Systems	Student Engagement
Sub-item	VF009777	8a	VF009777	Design and Systems	Student Engagement
Sub-item	VE638998	8b	VE638998	Design and Systems	Student Engagement
Sub-item	VE639038	8c	VE639038	Design and Systems	Student Engagement
Sub-item	VE682267	8d	VE682267	Design and Systems	Student Engagement
Sub-item	VE639042	8e	VE639042	Design and Systems	Student Engagement
Sub-item	VE682268	Dropped	Dropped	Design and Systems	Student Engagement
Item Stem	VE682217	9	VH008232	Design and Systems, Technology and Society, & Information and Communication Technology	Student Engagement

Type	Pilot AccNum	2014 Sequence	2014 AccNum	Area	Issue
Sub-item	VE682218	Dropped	Dropped	Information and Communication Technology	Student Engagement
Sub-item	VE682219	9a	VH008238	Information and Communication Technology	Student Engagement
Sub-item	VE682221	9b	VH008240	Information and Communication Technology	Student Engagement
Sub-item	VE682222	9c	VH008241	Information and Communication Technology	Student Engagement
Item Stem	VE682276	Dropped	Dropped	Design and Systems	Student Engagement
Sub-item	VE682278	Dropped	Dropped	Design and Systems	Student Engagement
Sub-item	VE682280	Dropped	Dropped	Design and Systems	Student Engagement
Sub-item	VE682281	9d	VH008243	Design and Systems	Student Engagement
Sub-item	VE682284	9e	VH008244	Design and Systems	Student Engagement
Sub-item	VE682286	Dropped	Dropped	Design and Systems	Student Engagement
Item Stem	VE682317	Dropped	Dropped	Technology and Society	Student Engagement
Sub-item	VE682321	9f	VH008245	Technology and Society	Student Engagement
Sub-item	VE682323	9g	VH008247	Technology and Society	Student Engagement
Sub-item	VE682324	9h	VH008248	Technology and Society	Student Engagement
Item Stem	VE638999	10	VE638999	Technology and Society	Organization of Instruction
Sub-item	VE639002	10a	VE639002	Technology and Society	Organization of Instruction
Sub-item	VE639004	10b	VE639004	Technology and Society	Organization of Instruction
Sub-item	VE639005	10c	VE639005	Technology and Society	Organization of Instruction
Sub-item	VE682300	10d	VE682300	Technology and Society	Organization of Instruction
Item Stem	VE639008	11	VE639008	Technology and Society	Student Engagement
Sub-item	VE639012	11a	VE639012	Technology and Society	Student Engagement
Sub-item	VE639013	11b	VE639013	Technology and Society	Student Engagement
Sub-item	VE639014	11c	VE639014	Technology and Society	Student Engagement
Sub-item	VE682314	11d	VE682314	Technology and Society	Student Engagement
Discrete	VE682274	12	VE682274	Design and Systems	Availability and Use of Instructional Resources
Discrete	VE682215	13	VE682215	Information and Communication Technology	Availability and Use of Instructional Resources
Discrete	VE682315	14	VE682315	Technology and Society	Availability and Use of Instructional Resources
Item Stem	VF009358	15	VF009358	Common	Student Engagement
Sub-item	VF009360	15a	VF009360	Common	Student Engagement
Sub-item	VF009361	15b	VF009361	Common	Student Engagement
Discrete	VE401773	16	VE401773	Common	Student Engagement
Discrete	VE401776	17	VE401776	Common	Student Engagement
Discrete	VE401779	18	VE401779	Common	Student Engagement
Item Stem	VE639166	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639168	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639169	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639171	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639173	Dropped	Dropped	Common	Student Engagement

Type	Pilot AccNum	2014 Sequence	2014 AccNum	Area	Issue
Sub-item	VE639174	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639175	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639176	Dropped	Dropped	Common	Student Engagement
Sub-item	VF009755	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639170	Dropped	Dropped	Common	Student Engagement
Item Stem	VE639025	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639028	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639043	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639048	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639046	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639053	Dropped	Dropped	Common	Student Engagement
Sub-item	VF009048	Dropped	Dropped	Common	Student Engagement
Item Stem	VF009050	Dropped	Dropped	Common	Student Engagement
Sub-item	VF009051	Dropped	Dropped	Common	Student Engagement
Sub-item	VF009052	Dropped	Dropped	Common	Student Engagement
Sub-item	VF009053	Dropped	Dropped	Common	Student Engagement
Sub-item	VF009054	Dropped	Dropped	Common	Student Engagement
Sub-item	VF009055	Dropped	Dropped	Common	Student Engagement
Sub-item	VF009056	Dropped	Dropped	Common	Student Engagement
Sub-item	VF009061	Dropped	Dropped	Common	Student Engagement
Sub-item	VF009064	Dropped	Dropped	Common	Student Engagement
Sub-item	VF009065	Dropped	Dropped	Common	Student Engagement
Sub-item	VF009066	Dropped	Dropped	Common	Student Engagement
Item Stem	VF238958	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VE238965	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VF238968	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VF238969	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VF238973	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VF238974	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VF238975	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Item Stem	VE639172	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639177	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639178	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639179	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639180	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639181	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639182	Dropped	Dropped	Common	Student Engagement
Sub-item	VE639183	Dropped	Dropped	Common	Student Engagement

Type	Pilot AccNum	2014 Sequence	2014 AccNum	Area	Issue
Sub-item	VE677642	Dropped	Dropped	Common	Student Engagement
Item Stem	VE682232	Dropped	Dropped	Design and Systems	Student Engagement
Sub-item	VE682233	Dropped	Dropped	Design and Systems	Student Engagement
Sub-item	VE682234	Dropped	Dropped	Design and Systems	Student Engagement
Sub-item	VE682238	Dropped	Dropped	Design and Systems	Student Engagement
Sub-item	VE682236	Dropped	Dropped	Design and Systems	Student Engagement
Sub-item	VE682237	Dropped	Dropped	Design and Systems	Student Engagement
Sub-item	VE682235	Dropped	Dropped	Design and Systems	Student Engagement
Item Stem	VF238997	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VF239009	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VF239000	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VF239004	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VF239007	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VF239008	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VF239010	Dropped	Dropped	Information and Communication Technology	Organization of Instruction
Sub-item	VF239003	Dropped	Dropped	Information and Communication Technology	Organization of Instruction

Table 2: Final adjudication decisions for the 2014 TEL school questionnaire

Type	Pilot AccNum	2014 Sequence	2014 AccNum	Area	Issue
Item Stem	VE638378	1	VE638378	Common	Organization of Instruction
Sub-item	VE638386	1a	VE638386	Common	Organization of Instruction
Sub-item	VE638388	1b	VE638388	Common	Organization of Instruction
Sub-item	VE638389	1c	VE638389	Common	Organization of Instruction
Sub-item	VE638390	1d	VE638390	Common	Organization of Instruction
Sub-item	VE638392	1e	VE638392	Common	Organization of Instruction
Sub-item	VE638395	1f	VE638395	Common	Organization of Instruction
Item Stem	VE638432	2	VE638432	Common	Organization of Instruction
Sub-item	VE638435	2a	VE638435	Common	Organization of Instruction
Sub-item	VE638438	2b	VE638438	Common	Organization of Instruction
Sub-item	VE638442	2c	VE638442	Common	Organization of Instruction
Discrete	VE638446	3	VE638446	Common	Organization of Instruction
Item Stem	VE638450	4	VE638450	Common	Organization of Instruction

Type	Pilot AccNum	2014 Sequence	2014 AccNum	Area	Issue
Sub-item	VE638453	4a	VE638453	Common	Organization of Instruction
Sub-item	VE638456	4b	VE638456	Common	Organization of Instruction
Sub-item	VE638457	4c	VE638457	Common	Organization of Instruction
Sub-item	VE638462	4d	VE638462	Common	Organization of Instruction
Sub-item	VE638459	4e	VE638459	Common	Organization of Instruction
Sub-item	VE638464	4f	VE638464	Common	Organization of Instruction
Sub-item	VE638470	4g	VE638470	Common	Organization of Instruction
Sub-item	VE638472	4h	VF821977	Common	Organization of Instruction
Sub-item	VE638467	4i	VE638467	Common	Organization of Instruction
Discrete	VE638334	5	VE638334	Common	Organization of Instruction
Discrete	VE681573	6	VE681573	Common	Organization of Instruction
Item Stem	VE638483	7	VE638483	Common	Organization of Instruction
Sub-item	VE638486	7a	VE638486	Common	Organization of Instruction
Sub-item	VE638487	7b	VE638487	Common	Organization of Instruction
Sub-item	VE638490	7c	VE638490	Common	Organization of Instruction
Item Stem	VE638475	8	VE638475	Common	Availability and Use of Instructional Resources
Sub-item	VE638480	8a	VE638480	Common	Availability and Use of Instructional Resources
Sub-item	VE638484	8b	VE638484	Common	Availability and Use of Instructional Resources
Sub-item	VE638485	8c	VE638485	Common	Availability and Use of Instructional Resources
Sub-item	VE675583	8d	VE675583	Common	Availability and Use of Instructional Resources
Discrete	VE675587	9	VE675587	Common	Availability and Use of Instructional Resources
Item Stem	VE638517	10	VE638517	Common	Availability and Use of Instructional Resources
Sub-item	VE638518	10a	VE638518	Common	Availability and Use of Instructional Resources
Sub-item	VE638519	10b	VE638519	Common	Availability and Use of Instructional Resources
Sub-item	VE638520	10c	VE638520	Common	Availability and Use of Instructional Resources
Sub-item	VE638521	10d	VE638521	Common	Availability and Use of Instructional Resources
Sub-item	VE638522	10e	VE638522	Common	Availability and Use of Instructional Resources
Item Stem	VE638436	11	VE638436	Common	Availability and Use of Instructional Resources
Sub-item	VE638440	11a	VE638440	Common	Availability and Use of Instructional Resources
Sub-item	VE638441	11b	VE638441	Common	Availability and Use of Instructional Resources

Type	Pilot AccNum	2014 Sequence	2014 AccNum	Area	Issue
Sub-item	VE638443	11c	VE638443	Common	Availability and Use of Instructional Resources
Sub-item	VE638445	11d	VE638445	Common	Availability and Use of Instructional Resources
Sub-item	VE638449	11e	VE638449	Common	Availability and Use of Instructional Resources
Sub-item	VE638452	11f	VE638452	Common	Availability and Use of Instructional Resources
Sub-item	VE638454	11g	VE638454	Common	Availability and Use of Instructional Resources
Sub-item	VE675624	11h	VE675624	Common	Availability and Use of Instructional Resources
Item Stem	VE675659	12	VE675659	Common	Availability and Use of Instructional Resources
Sub-item	VE677022	Dropped	Dropped	Common	Availability and Use of Instructional Resources
Sub-item	VE677568	12a	VE677568	Common	Availability and Use of Instructional Resources
Sub-item	VE677569	12b	VE677569	Common	Availability and Use of Instructional Resources
Sub-item	VE677570	12c	VE677570	Common	Availability and Use of Instructional Resources
Sub-item	VE677571	12d	VE677571	Common	Availability and Use of Instructional Resources
Sub-item	VE677572	12e	VE677572	Common	Availability and Use of Instructional Resources
Sub-item	VE677573	12f	VE677573	Common	Availability and Use of Instructional Resources
Sub-item	VE677574	12g	VE677574	Common	Availability and Use of Instructional Resources
Item Stem	VE638523	13	VE638523	Common	Availability and Use of Instructional Resources
Sub-item	VE638524	13a	VE638524	Common	Availability and Use of Instructional Resources
Sub-item	VE638525	13b	VE638525	Common	Availability and Use of Instructional Resources
Sub-item	VE638526	13c	VE638526	Common	Availability and Use of Instructional Resources
Sub-item	VE638528	13d	VE638528	Common	Availability and Use of Instructional Resources
Sub-item	VE638529	13e	VE638529	Common	Availability and Use of Instructional Resources
Sub-item	VE638533	13f	VE638533	Common	Availability and Use of Instructional Resources
Sub-item	VE638534	13g	VE638534	Common	Availability and Use of Instructional Resources
Sub-item	VE638535	13h	VE638535	Common	Availability and Use of Instructional Resources
Item Stem	VE638496	14	VE638496	Common	Teacher Preparation
Sub-item	VE638497	14a	VE638497	Common	Teacher Preparation

Type	Pilot AccNum	2014 Sequence	2014 AccNum	Area	Issue
Sub-item	VE638498	14b	VE638498	Common	Teacher Preparation
Sub-item	VE638504	14c	VE638504	Common	Teacher Preparation
Item Stem	VE638333	15	VE638333	Technology and Society	Organization of Instruction
Sub-item	VE638336	15a	VE638336	Technology and Society	Organization of Instruction
Sub-item	VE638338	15b	VE638338	Technology and Society	Organization of Instruction
Sub-item	VE638340	15c	VE638340	Technology and Society	Organization of Instruction
Sub-item	VE677585	15d	VE677585	Technology and Society	Organization of Instruction
Item Stem	VE638350	16	VE638350	Technology and Society	Organization of Instruction
Sub-item	VE638354	16a	VE638354	Technology and Society	Organization of Instruction
Sub-item	VE638355	16b	VE638355	Technology and Society	Organization of Instruction
Sub-item	VE638356	16c	VE638356	Technology and Society	Organization of Instruction
Item Stem	VE638372	17	VE638372	Design and Systems	Organization of Instruction
Sub-item	VE638375	17a	VE638375	Design and Systems	Organization of Instruction
Sub-item	VE638376	17b	VE638376	Design and Systems	Organization of Instruction
Sub-item	VE638377	17c	VE638377	Design and Systems	Organization of Instruction
Sub-item	VE639184	17d	VE639184	Design and Systems	Organization of Instruction
Sub-item	VE677599	17e	VE677599	Design and Systems	Organization of Instruction
Sub-item	VE677600	17f	VE677600	Design and Systems	Organization of Instruction
Item Stem	VE638380	18	VE638380	Design and Systems	Organization of Instruction
Sub-item	VE677603	18a	VE677603	Design and Systems	Organization of Instruction
Sub-item	VE638383	18b	VE638383	Design and Systems	Organization of Instruction
Sub-item	VE638384	18c	VE638384	Design and Systems	Organization of Instruction
Sub-item	VE677604	18d	VE677604	Design and Systems	Organization of Instruction
Sub-item	VE638385	18e	VE638385	Design and Systems	Organization of Instruction
Sub-item	VE677605	18f	VE677605	Design and Systems	Organization of Instruction
Sub-item	VE677606	18g	VE677606	Design and Systems	Organization of Instruction
Item Stem	VE638391	19	VE638391	Information and Communication Technology	Organization of Instruction
Sub-item	VE638396	19a	VE638396	Information and Communication Technology	Organization of Instruction
Sub-item	VE638399	19b	VE638399	Information and Communication Technology	Organization of Instruction
Sub-item	VE677607	19c	VE677607	Information and Communication Technology	Organization of Instruction
Sub-item	VE677609	19d	VE677609	Information and Communication Technology	Organization of Instruction
Sub-item	VF239167	19e	VF239167	Information and Communication Technology	Organization of Instruction
Sub-item	VE677608	19f	VE677608	Information and Communication Technology	Organization of Instruction
Item Stem	VE638410	20	VE638410	Information and Communication Technology	Organization of Instruction

Type	Pilot AccNum	2014 Sequence	2014 AccNum	Area	Issue
Sub-item	VE638433	20a	VE638433	Information and Communication Technology	Organization of Instruction
Sub-item	VE638434	20b	VE638434	Information and Communication Technology	Organization of Instruction
Sub-item	VE638428	20c	VE638428	Information and Communication Technology	Organization of Instruction
Sub-item	VE638420	20d	VE638420	Information and Communication Technology	Organization of Instruction