Leveraging Longitudinal Formative Assessment at the American Board of Pathology (ABPath) as a Strategy to Improve Quality of Provider Care: Findings from the ABPath CertLink® Pilot

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Background

In July 2018, the American Board of Pathology (ABPath) launched ABPath CertLink® (ABPCL), a longitudinal formative assessment program intended to assess Pathologists' knowledge and judgment and provide real-time feedback after assessment. ABPCL allows pathologists to engage in continuous learning with formative assessment with the outcome of improving the quality of patient care.

Objectives

Currently, ABPCL is in a pilot phase. As of July 1, 2019, 6,450 diplomates are participating in the pilot. The goals of the pilot are to (1) create a robust bank of test questions (parent items and clones) for 31 practice areas; (2) enable each diplomate to create their own customized, practice-relevant assessment design by selecting in increments of 10% from 31 elective practice areas; (3) test an automated procedure for assembly of a customized test form for each diplomate; (4) collect data on item families (parent item and clone) that can be used to evaluate the levels of difficulty of the items; (5) collect data on how relevant items are to diplomates' practices; (6) collect data on diplomates' performances on individual items and item families for each practice area and overall; (7) collect data on diplomates' levels of confidence in their responses to test questions; and (8) create a continually updated dashboard that displays feedback to diplomates regarding their performances to help them identify knowledge gaps.

ABPCL uses spaced repetition to reinforce learning and assess retention. During each quarter (q=3 months) that a diplomate participates in ABPCL, an online delivery platform presents to the diplomate 15 new parent items that were algorithmically selected for fulfillment of their assessment design. When a parent item is answered correctly, and the diplomate indicates confidence about his/her response, the diplomate receives full credit for the item-family score. If the parent item is answered incorrectly, or the diplomate indicates no confidence about his/her response, the diplomate receives zero credit for the item-family score. After answering the item incorrectly, the diplomate is asked to re-attempt to answer the item after reading a critique, which explains correct and incorrect responses. This reattempt assesses learning. If the parent item was answered incorrectly, or if the diplomate indicated not confident, the participant is presented with a clone of the parent item in a subsequent quarter and can earn full credit for the item family by correctly answering the clone. Use of clones assesses retention of knowledge.

Beginning with the third quarter of participation, up to 10 clones can be presented in a quarter and are in addition to the 15 new parent items presented in a quarter. Learning occurs when a diplomate reads and understands the richly detailed item critique, which is immediately presented after the diplomate answers the parent or clone item. The critique provides a clear and comprehensive explanation why the item's answer key is correct and why the distractors are incorrect. The premise of spaced repetition is that diplomates, after answering an item incorrectly, will learn from the critique and retain that new knowledge so that when a clone is subsequently presented, the diplomates will answer the clone item correctly and earn full credit for that item family. Data collected from diplomates regarding their levels of confidence in their responses, and how relevant items are to their practice, provide information that ABPath can use to improve item development and delivery.

Method

Analyses using performance data from the July 2018 cohort:

a) The number and percent of new (parent) items, which all diplomates answered correctly on their first-attempt; this assesses the initial level of knowledge/mastery at the cohort level. Results are displayed for the following types of assessment designs: Anatomic Pathology (AP), Clinical Pathology (CP), and Anatomical Pathology and Clinical Pathology (APCP).

b) Of the parent items for which some diplomates answered incorrectly on the 1st attempt, the number and percent of those items that were answered correctly by all diplomates on the immediate reattempt to answer; this assesses the level of learning by the cohort after diplomates read the critiques of the parent items. Results are displayed for the following types of assessment designs: AP, CP and APCP.

c) Of the parent items for which all diplomates answered correctly on the 2nd attempt, the number and percent of those item families that all diplomates earned full credit by answering correctly a clone item presented in a later quarter; this assesses the level of retention of new knowledge/mastery by the cohort. Results are displayed for the following types of assessment designs: AP, CP and APCP.

Results

Anatomical Pathology Assessment Designs	N	%	Average Item P-Value 1st Attempt	Number of Parent Items Answered Correctly, 2nd Attempt[b]	Number of Item Families Diplomates Earned Full Credit, Later Quarter[c] [Correctly Answered Clone Presented During One of the Two Later Quarters.]
Parent Items All Diplomates Answered Correctly, 1st Attempt[a]	170	18%	100%	—	50 (Clones presented when diplomates indicated not confident, but answered correctly)
Parent Items Some Diplomates Answered Incorrectly, 1st Attempt	766	82%	73%	454 (59% learned/mastered out of 766)	117 (26% retention of new knowledge out of 454)
All Parent Items	936	100%	78%	454	167 (18% retention of new knowledge out of 936)

Clinical Pathology Assessment Designs	N	%	Average Item P-Value 1st Attempt	Number of Parent Items Answered Correctly, 2nd Attempt[b]	Number of Item Families Diplomates Earned Full Credit, Later Quarter[c] [Correctly Answered Clone Presented During One of the Two Later Quarters.]
Parent Items All Diplomates Answered Correctly, 1st Attempt[a]	116	23%	100%	—	54 (Clones presented when diplomates indicated not confident, but answered correctly)
Parent Items Some Diplomates Answered Incorrectly, 1st Attempt	396	77%	70%	244 (62% learned/mastered out of 396)	59 (24% retention of new knowledge out of 244)
All Parent Items	512	100%	77%	244	113 (22% retention of new knowledge out of 512)

Anatomical Pathology and Clinical Pathology Assessment Designs	N	%	Average Item P-Value 1st Attempt	Number of Parent Items Answered Correctly, 2nd Attempt[b]	Number of Item Families Diplomates Earned Full Credit, Later Quarter[c] [Correctly Answered Clone Presented During One of the Two Later Quarters.]
Parent Items All Diplomates Answered Correctly, 1st Attempt[a]	67	6%	100%	—	29 (Clones presented when diplomates indicated not confident, but answered correctly)
Parent Items Some Diplomates Answered Incorrectly, 1st Attempt	997	94%	78%	392 (39% learned/mastered out of 997)	120 (31% retention of new knowledge out of 392)
All Parent Items	1064	100%	79%	392	149 (14% retention of new knowledge out of 1064)

Conclusion

Of the parent items for which all diplomates answered correctly on the 2nd attempt, this cohort demonstrated between 24% to 31% retention of new knowledge within two quarters of clone item presentation for AP, CP and APCP assessment designs.
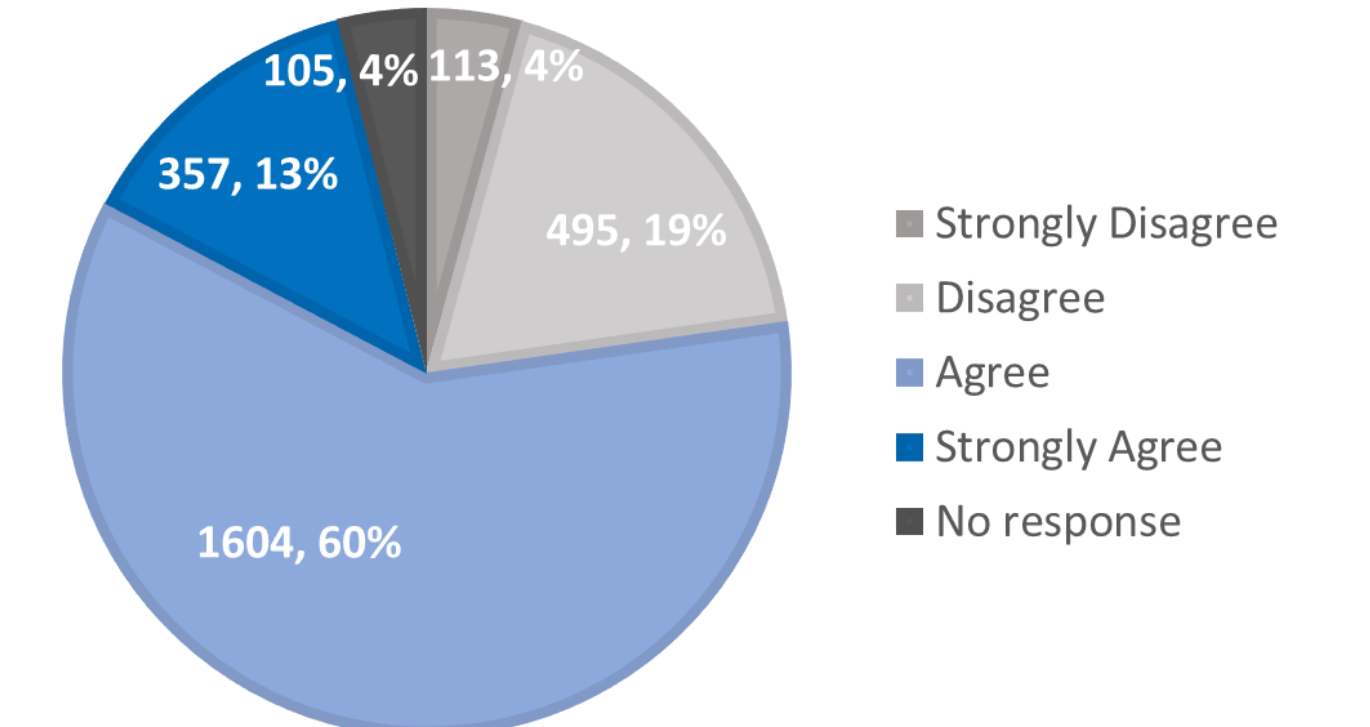
The ABPCL 2018 End-of-Year User Satisfaction Survey collected data regarding (1) participants' opinions about the overall effectiveness of ABPath CertLink®; (2) whether participants consider participation in ABPath CertLink® leads to an increase of knowledge for better practice; and (3) whether participants consider participation in ABPath CertLink® a positive experience. Select findings from the survey are displayed in the charts below.
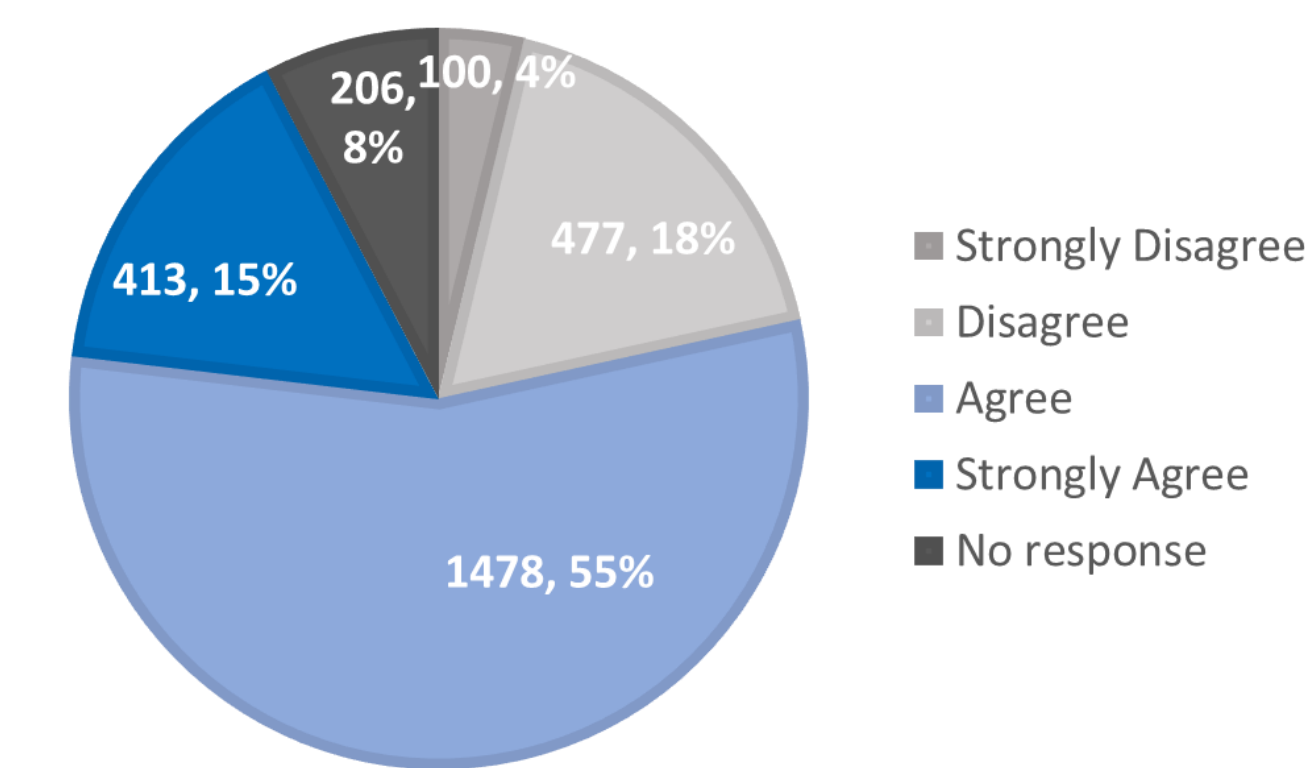
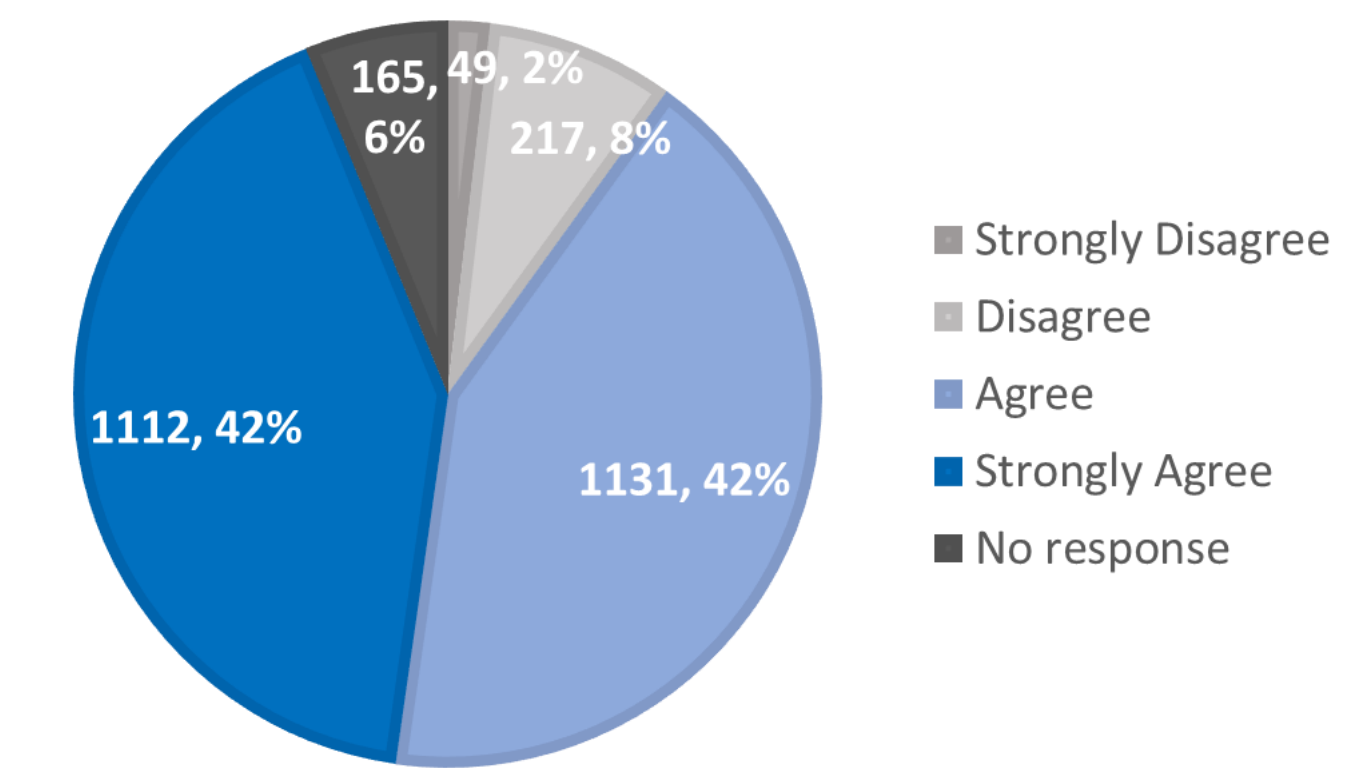### Survey Response Rate:

54%

4969 invited, 2674 responded.

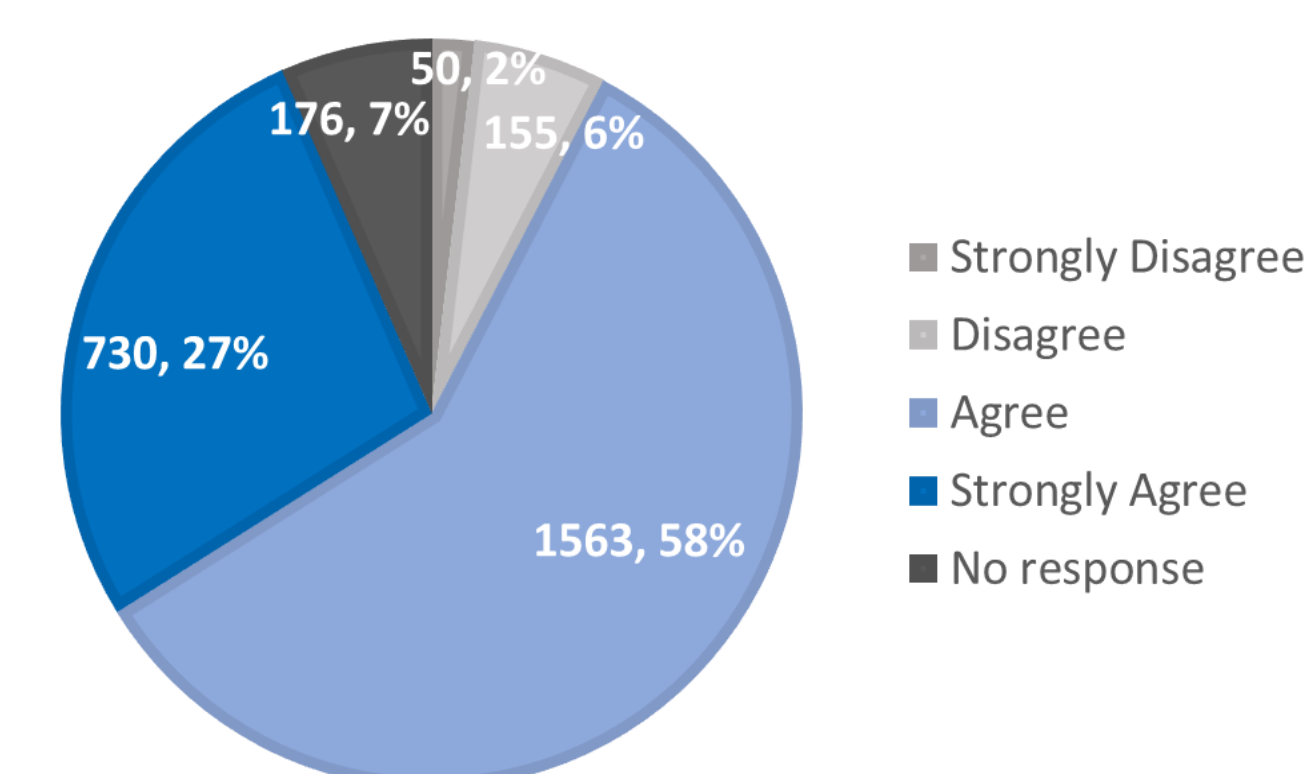### Survey Question 2.4 "Questions were relevant to my practice."

- Strongly Disagree — 105, 4%
- Disagree — 113, 4%
- Agree — 495, 19%
- Strongly Agree — 357, 13%
- No response — 1604, 60%

Survey Question 1.7 "The CertLink program helps me provide better care to my patients."

- Strongly Disagree — 206, 8%
- Disagree — 100, 4%
- Agree — 477, 18%
- Strongly Agree — 413, 15%
- No response — 1478, 55%

Survey Question 4.8 "I'm finding CertLink to be a valuable learning experience."

- Strongly Disagree — 165, 6%
- Disagree — 49, 2%
- Agree — 217, 8%
- Strongly Agree — 1112, 42%
- No response — 1131, 42%

Survey Question 1.5 "CertLink questions were useful learning tools."

- Strongly Disagree — 176, 7%
- Disagree — 50, 2%
- Agree — 155, 6%
- Strongly Agree — 730, 27%
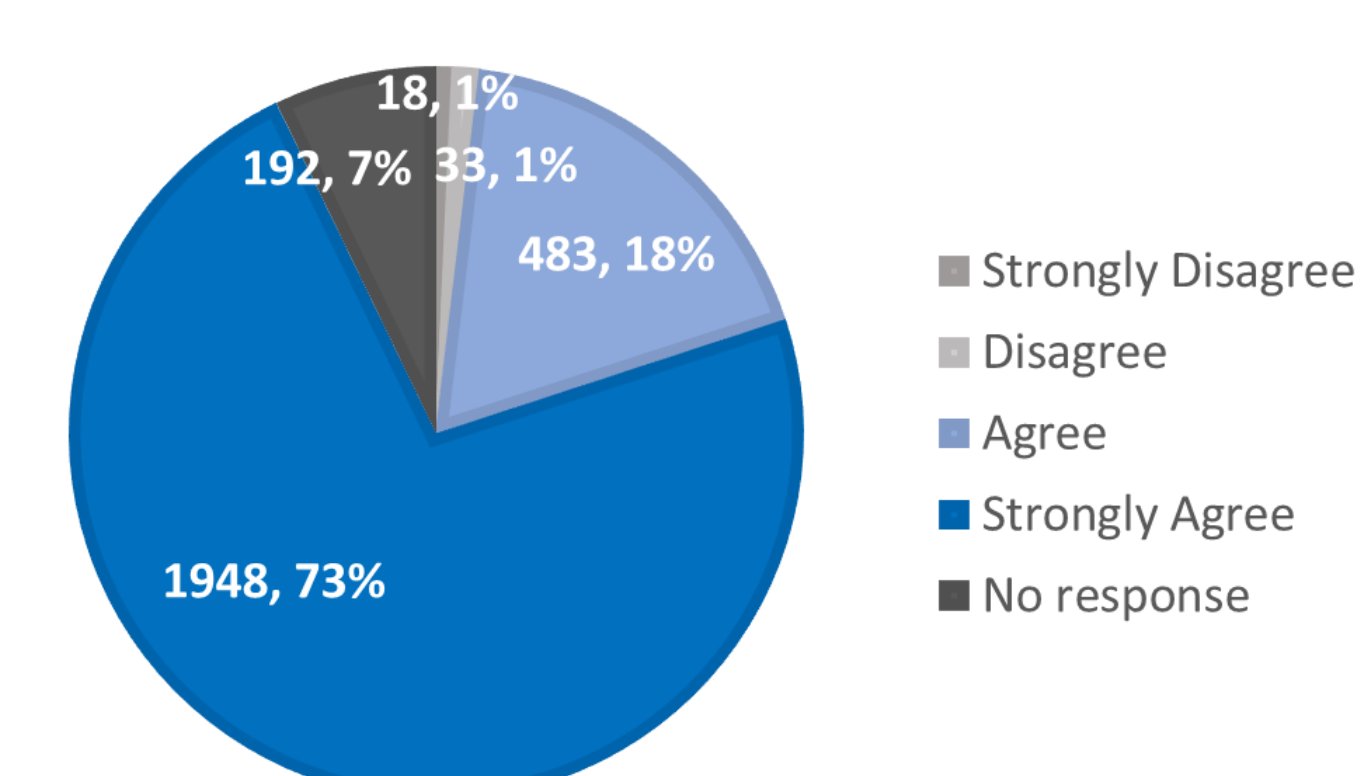- No response — 1563, 58%

Survey Question 4.4 "Participation in CertLink is a feasible method to keep up-to-date with developments."

- Strongly Disagree — 94, 4%
- Disagree — 29, 1%
- Agree — 136, 5%
- Strongly Agree — 1344, 50%
- No response — 1071, 40%
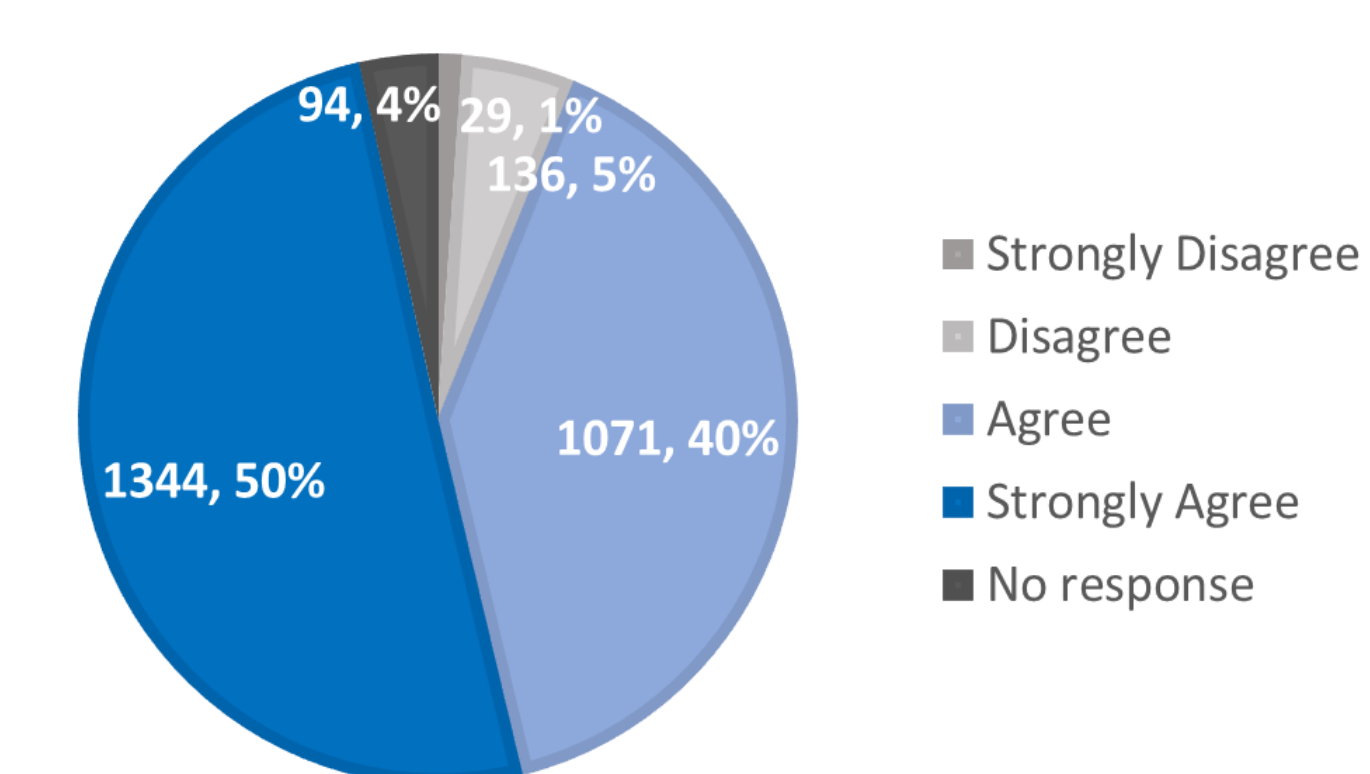
Survey Question 1.6 "CertLink has helped me to identify my knowledge gaps."

- Strongly Disagree — 190, 7%
- Disagree — 60, 2%
- Agree — 337, 13%
- Strongly Agree — 540, 20%
- No response — 1547, 58%
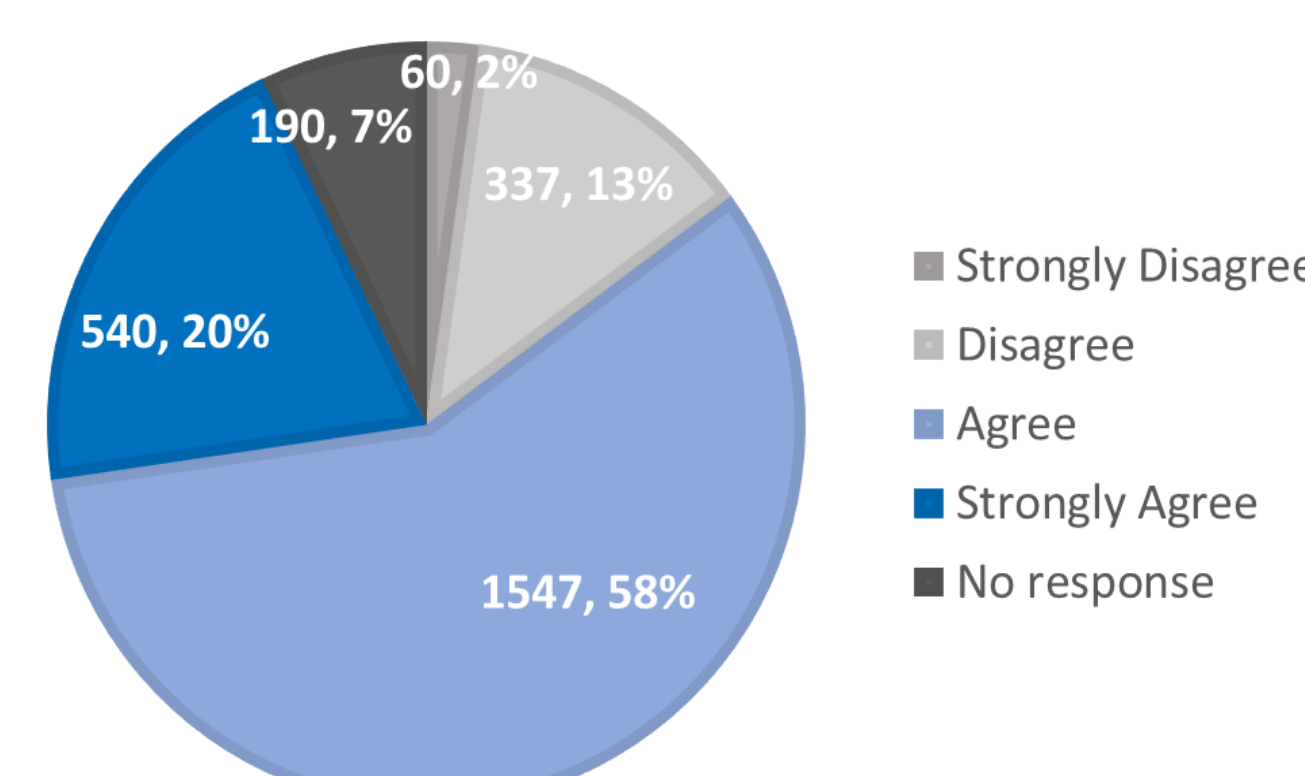
Survey Question 4.9 "I prefer to take a continuous assessment like CertLink over the secure MOC Part III exam."

- Strongly Disagree — 18, 1%
- Disagree — 33, 1%
- Agree — 192, 7%
- Strongly Agree — 483, 18%
- No response — 1948, 73%

Survey Question 2.2 "Questions assessed my judgment, going beyond factual recall."

- Strongly Disagree — 72, 3%
- Disagree — 38, 1%
- Agree — 377, 14%
- Strongly Agree — 370, 14%
- No response — 1817, 68%
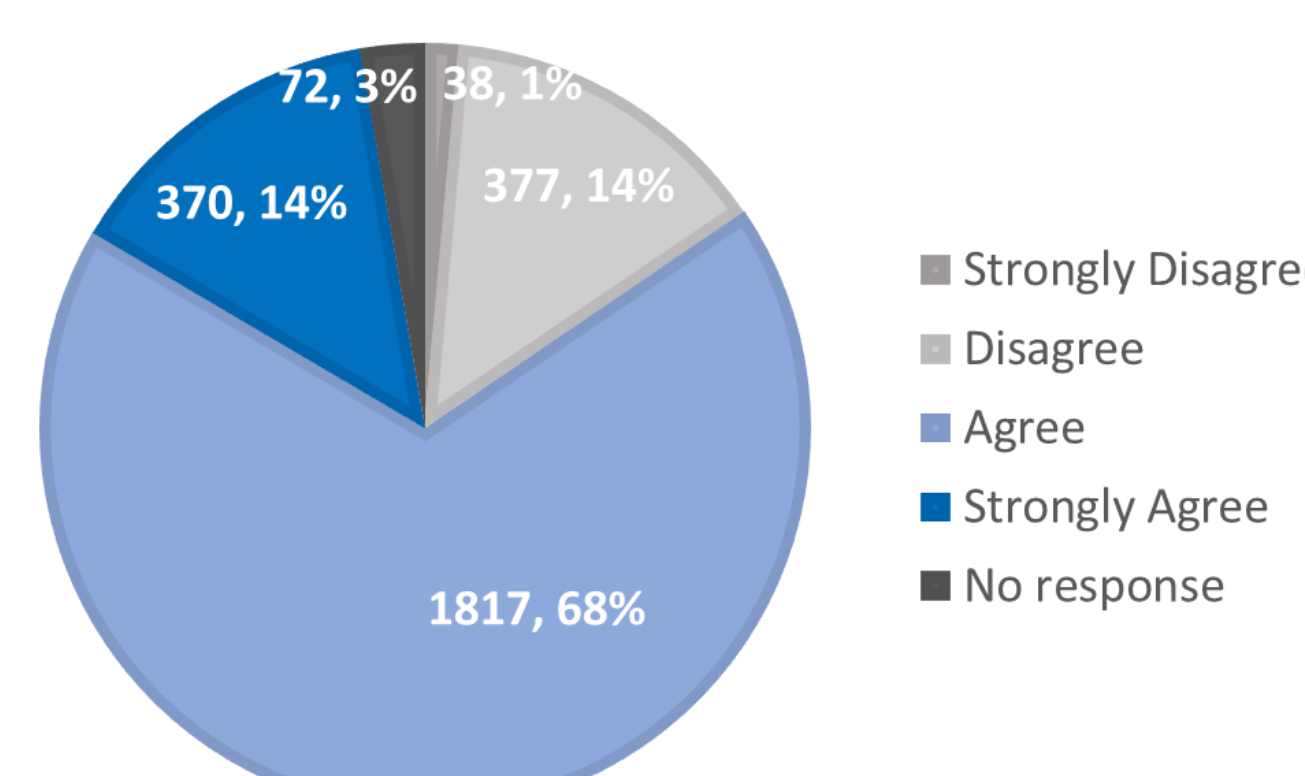
Survey Question 4.10 "I am likely to recommend CertLink to a friend or colleague."

- Strongly Disagree — 28, 1%
- Disagree — 72, 3%
- Agree — 209, 8%
- Strongly Agree — 782, 29%
- No response — 1583, 59%