Evaluation Instruments

221
Evaluation Instruments

147
Focused on computing

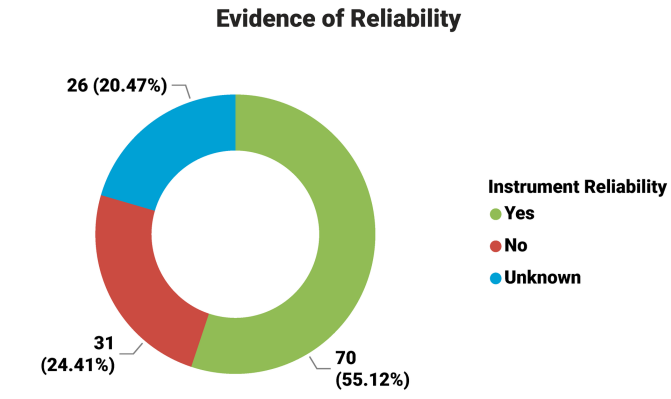
We offer a free, first-stop shop for finding instruments that suit your measurement needs.

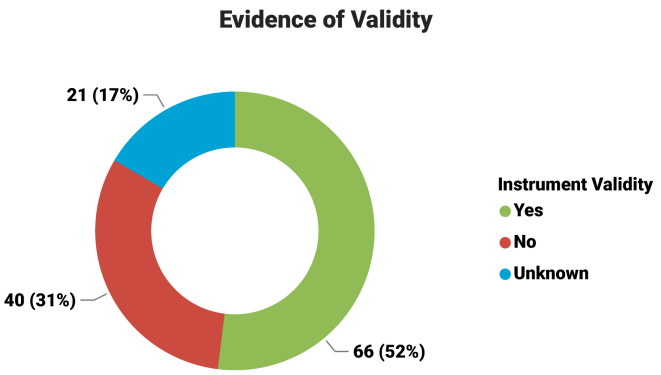
For all of the evaluation instruments that we curate and make available for free, we identify over 25 individual pieces of information for each. This gives a wide range of search filters to use when browsing them. All of our computing instruments have two additional pieces of data collected that identify the cognitive and noncognitive factors that each measures. As the list of instruments continues to grow, we have the ability to compare various pieces of information surrounding instruments that evaluate similar demographics, concepts and more, developing further insight into how question types and other factors lead to better measurement of interventions.

In this section of the report, we examine provide an overview of computing evaluation instruments provided on our site. Through this analysis, we highlight the successes of our resource curation as well as identify areas where gaps exist.

We review data curated from each instrument twice before adding it to our set or resources.

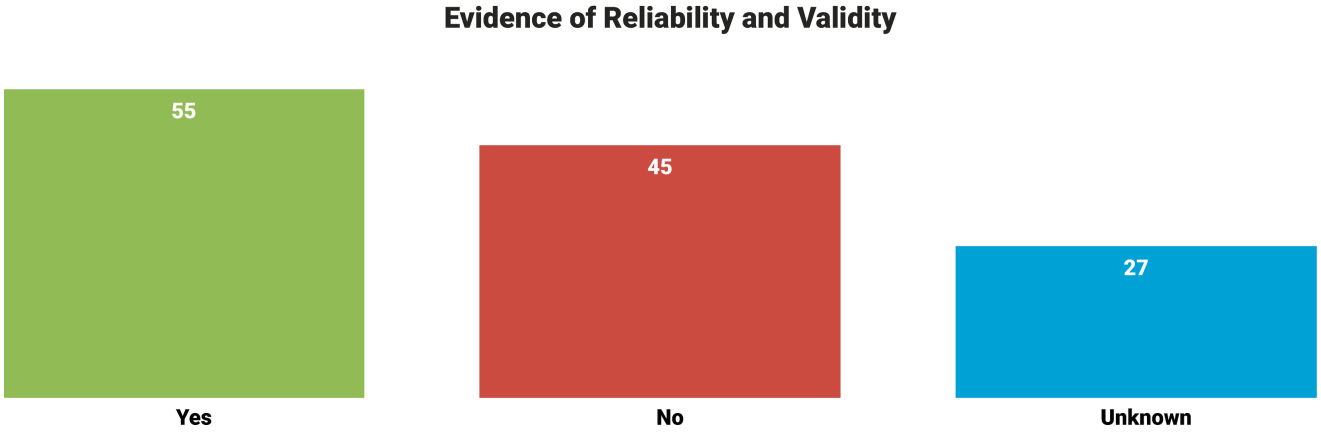
Is the Instrument Sound?





Like thermometers, instruments used to measure an intervention's impact also need to be accurate. We refer to this accuracy as having evidence of reliability and validity.

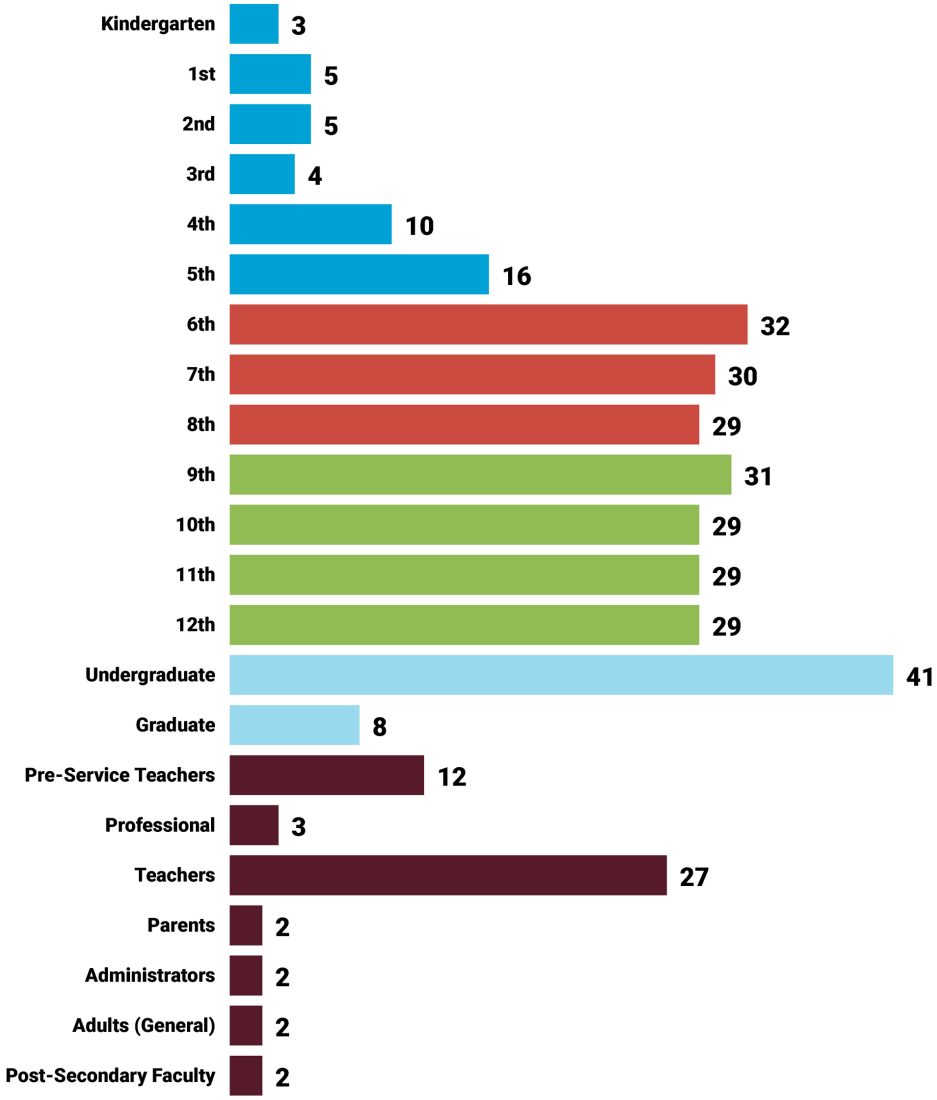
Of the 127 total computing instruments that are applicable, only 4 in 10 are known to have evidence indicating that it has a level of accuracy. Without such evidence, we have no assurance that the instrument used in a study actually measures the impact of the intervention with accuracy.



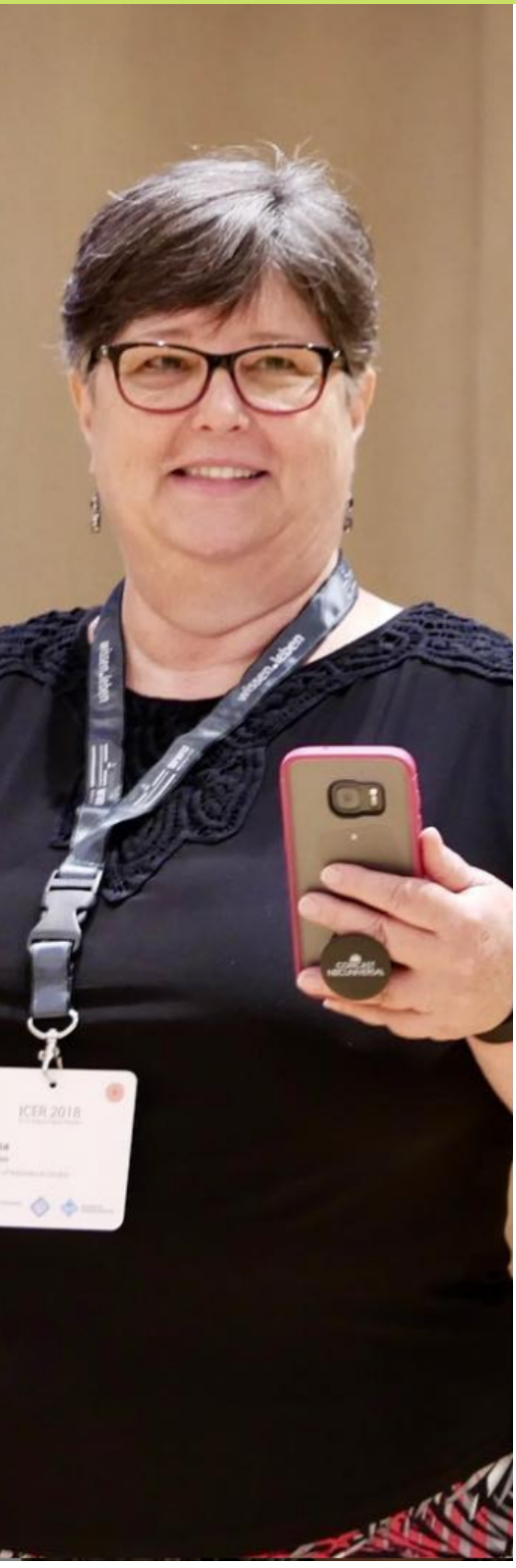
Demographics

We have collected a wide range of evaluation instruments that span kindergarteners all the way through professionals. Even with the largest portion of our resources targeting high school students, we have curated instruments for middle and elementary school students.

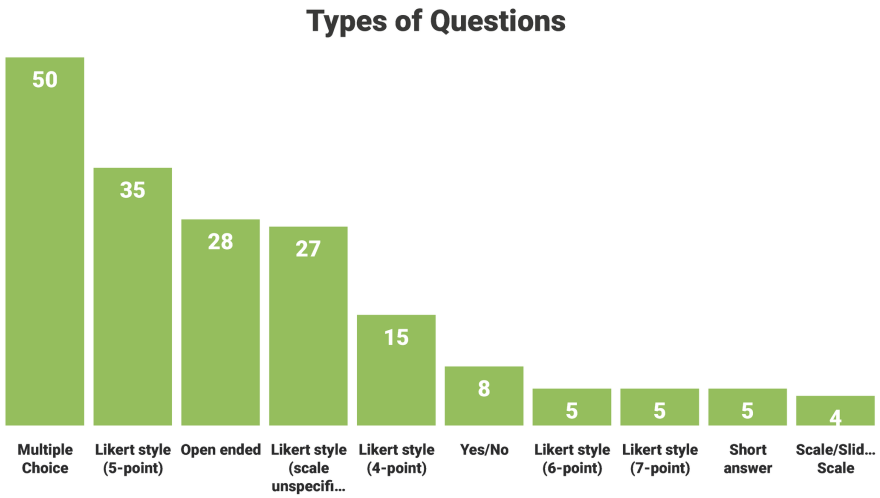
Demographic groups targeted by instruments

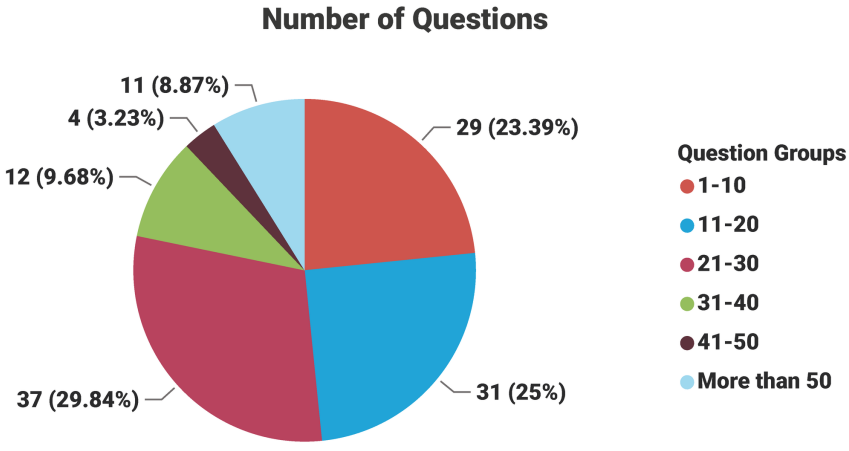


Instrument Composition

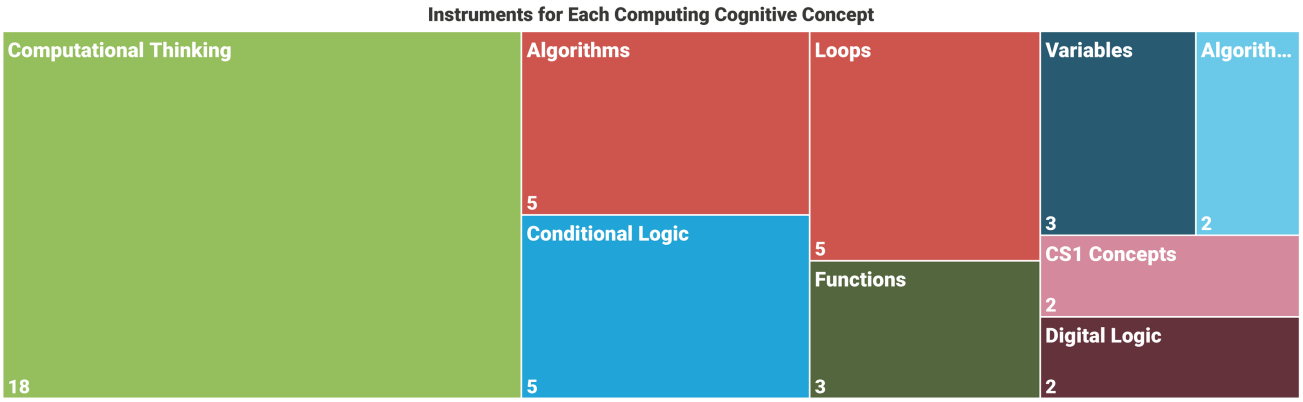


Each of our evaluation instruments uses various types and numbers of question to meet the desired needs of researchers and educators. The most popular question type is multiple choice, followed by Likert style 5-point, yet there are many other versions of Likert that evaluation instruments use. The most common length of these instruments is 21-30 questions, along with a large amount of instruments that provide fewer questions to fit in a more timely manner. We only see a small portion of overall computing instruments that go beyond 30 questions, showing potential room to expand in composition diversity.





Computing Cognitive Concepts



Of the various concepts that are addressed in the evaluation instruments, we see some concepts more prominently in different demographics. We hope to curate more evaluation instruments to provide at least one for every concept and every demographic. Out of the total 25 concepts in the resource center, we see only 14 that are related to some instrument, all of which having a computing evaluation instrument. Even within those 14, there are 4 concepts that only are addressed by one instrument, showing potential room for increased instrument curation for that concept.

Computing Cognitive Concepts and Their Demographics

cognitiveConcept	PreK-2nd	3rd-5th	Middle School	High School	College	Post-College	Total
Algorithm Analysis	1	1	1	1	1		2
Algorithms	2	1	1		2		5
Computational Thinking	3	3	5	2	4	6	18
Conditional Logic	2	2	2	2	1		5
CS1 Concepts	1	1	1	1	1		2
Data Structures					1		1
Digital Logic	1	1	1	1	1		2
Functions	1	1	1	2	1		3
Loops	1	1	1	1	2		5
Programming	1	1	1	1			1
Reasoning					1		1
Research Skills					1		1
Robotics			1				1
Variables	1	1	2	2			3
Total	**3**	**3**	**6**	**3**	**9**	**6**	**25**

Computing Beliefs and Dispositions

87
Concepts

Educators and researchers use our resource center to support their research, including finding tools that cover the exact concepts they need to measure. With 87 concepts measuring beliefs and dispositions, our users often come across tools for their needs.

Student Engagement

Non-Cognitive Concept	PreK-2nd	3rd-5th	Middle School	High School	College	Post-College	Total
Access			1				1
Agency				2			2
Anxiety (Computing)	1	2	2	1		2	5
Attitude (Academic Success)					1		1
Attitudes (toward collaboration)		1	2				2
Attitudes (toward Computers)		4	4	3	1		6
Attitudes (toward programming)		1	1	1			2
Autonomous				1			1
Beliefs		2	3	5	1		7
Belongingness				2			2
Cognitive Load		1	1	1	1		3
Comfort			1				1
Confidence	1	6	13	9	5	1	25
Creative Tendencies		1	2	1	2		5
Curiosity			1	1			2
Empathy	1	2	1	1			3
Engagement	1	1		2	1		3
Enjoyment (Computers)		2	5	6	2		10
Excitement					1		1
Fixed Mindset					1		1
Frequency			2				2
Friendship			1				1
Grit					1		1
Identity (Computer Science)			2	2	3		6
Intentions (To Study Computing)			5	10	2		13
Interest (Computing Careers)		2	4	6	1		9
Interest (Computing)		5	11	11	4		22
Leadership					1		1
Learning	1	2	2	1	1		4
Leisure	1	2	1	1	1		3
Liking	1	2	2		1		3
Motivation				1	3		4
Outcome Expectancy			2				2
Participation		1	1	2			3
Perceptions		2	6	6	7	1	17
Persistence		1	1	2	1	1	5
Relevance		2	3	4	3		9
Risk-taking				1			1
Self-Efficacy		4	5	4	10		18
Sense of Belonging			1	6	2		9
Sharing of Knowledge			1				1
Social Value		1	1	1			2
Support				1			1
Usefulness		2	2	2	4		8
Total	2	14	27	25	22	3	66

Learning Strategies

Non-Cognitive Concept	PreK-2nd	3rd-5th	Middle School	High School	College	Post-College	Total
Coping					1		1
Help Seeking					1		1
Knowledge Transfer					1		1
Perceptions	1	2	3	2	2	1	5
Problem Solving Strategies					2		2
Study Habits		1	1	1			2
Technology Adoption				1		1	2
Total	1	3	4	4	5	2	12

School climate is known to affect student academic achievement and growth (Lee and Shute, 2010). By mapping the known instruments against factors that impact student acedemic achievement, we can begin to determine the gaps in our research.

School Climate

Non-Cognitive Concept	3rd-5th	Middle School	High School	College	Post-College	Total
Advocacy					2	2
Anxiety (Computing)					2	2
Attitudes				1	8	8
Avoidance/Acceptance					1	1
Beliefs					8	8
Career Guidance				1	2	3
Comfort				1	3	3
Competence					2	2
Concerns					2	2
Coping					1	1
Curriculum/Program				1	5	6
Engagement					1	1
Enjoyment (School)	1	1	1			2
Enthusiasm					1	1
Innovativeness					1	1
Interest (Computing)				1	5	5
Leadership					1	1
Motivation					2	2
Pedagogical Content Knowledge			2	2	5	7
Perceptions					6	6
Professional Development					6	6
Recruitment Strategies (Teaching)					2	2
Self-Efficacy					14	14
Self-Esteem					1	1
Support					4	4
Support for teaching CS					5	5
Technology Adoption					4	4
Understanding					1	1
Usefulness					1	1
Total	1	1	3	4	33	39

The final two non-cognitive components (learning strategies and social-familial influences) cover a smaller amount of concepts than the previous two. With an average of 6 concepts each, these components could benefit from increased diversity of concepts in the future. Both of these components would also have more diversity through more demographics covered, as nearly 50% of learning strategies concepts only have 1 instrument and no instruments within social-familial influences target the PreK-2nd grade demographic.

Social-Familial Influences

Non-Cognitive Concept	3rd-5th	Middle School	High School	College	Post-College	Total
Access to Technology		1			1	2
Encouragement	1	1	1			2
Interest (Computing Careers)					1	1
Perceptions	1	2		1	1	4
Support			2		1	3
Total	2	3	3	1	2	9

What these visuals show us in terms of the evaluation instrument resources gathered so far is that our organization has done a great job in securing hundreds of instruments which spread across many different subjects, concepts, demographics, pay options and more, helping us to achieve our goals as a non-profit for researchers, educators and all other interested parties. With this information in mind we can make more conscious efforts moving forward to expand our diversity of tools so anyone who wishes to find support can find what they need.

Donate Today

Our mission is to improve K-12 CS education for all children by enabling and disseminating exemplary evidence-driven research.

We design, conduct, promote, support and disseminate research that K-12 Educators find relevant and actionable. We envision meaningful resources that provide transformed research practices to identify and promote high-impact, culturally relevant practices. With your support, you can help us continue this work, with the goal of driving forward high-quality research that answers meaningful questions about K-12 CS education.

Your contribution will go toward pursuing the following strategies:

- Increase the K-12 CS Education Research communities' knowledge of and experiences with producing relevant and rigorous research through education and promotion of high quality educational research practices.
- Widely disseminate research data and findings openly using existing and new support systems.
- Analyze research findings to determine promising practices that are shared with K-12 Educators.

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Level	After January 31, 2021
Bronze	$1,000 to $2,499
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	Bronze	Silver	Gold	Platinum
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Receipt of our monthly newsletters	X	X	X	X
Copy of our annual State of K-12 CS Education Research report	X	X	X	X
Receipt of CSEdResearch.org quarterly updates		X	X	X
Submission of up to 2 white papers a year to our Resource Center at no charge (a $100 value)			X	X
Logo in our monthly newsletters			X	X
Logo on one slide for research presentations where slides are used				X
Logo in our State of K-12 CS Education Research annual report				X
Logo on our footer				X
Two guest blog entries				X
A “brought to you by” offering on Article Summary search pages				X

We welcome funding for specific projects.

Teacher Practice Briefs. Continuing our work of developing teacher practice briefs focused on problems of practice, we will create new Teacher Practice Briefs in partnership with the Computer Science Teachers Association. These will be focused on levels of engagement, confidence, and interactions for girls and historically marginalized groups studying computer science, with applicable implementation focused on learning programming or other CS concepts through games. Ubisoft's logo will appear on the teacher briefs produced and disseminated.

K-12 CS Education Research Capacity Building Pilot Project. We will pilot the development, implementation, and evaluation focused on free, publicly available training aimed at increasing and creating capacity for K-12 education research. Participants will include those who are interested in CS education research. The impact of this project is worldwide. As a pilot project, we intend to measure its success and apply for additional funding.

Meta-Synthesis Study on K-12 Girls learning Computing. Continuing our interest and passion to introduce more girls to computing, we will create a meta-synthesis study focused on the lack of K-12 girls entering and sustaining longevity in computer science, examining pathways and obstacles in each grade as informed by existing research. This will increase knowledge in the field in order to create a transformative environment where girls feel as if they belong in the field of CS. This landmark study will lead to a white paper and a webinar that will be disseminated among researchers, partners, and other organizations interested in learning more where the needs are. This will influence future studies around the world.

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