2019
Researcher-Academic Town Meeting
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ASHA Journals Awards
Kawana Award for Lifetime Achievement in Publications

• Named in memory of the late Alfred K. Kawana, former director of ASHA publications, this award acknowledges the exceptional educational, scientific, or clinical value of the awardees’ scholarly contributions.

• This award is reserved for outstanding researchers and scholars who have a sustained history of publication in the ASHA journals of at least 10 years.
This Year’s Winner

Robert E. Hillman

- Professor of Surgery at Harvard Medical School
- Co-Director and Research Director of the Center for Laryngeal Surgery and Voice Rehabilitation at the Massachusetts General Hospital (MGH Voice Center)
- Director of the Interdisciplinary PhD Program in Rehabilitation Sciences at the MGH Institute of Health Professions
- Specialist in voice and voice disorders
- Over 35 contributions to the ASHA Journals
- ASHA Honors (2011)
- ASHA Fellow
- ASHA Journals Editor’s Award (1996)
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- Selected by the editors and editor-in-chief of each journal or journal section
- Awarded annually to the authors of the most meritorious article published in the preceding year

Past winners pubs.asha.org/journals/editors_awards
Predictive Factors for Vestibular Loss in Children With Hearing Loss

Authors
Kristen L. Janky
Megan L. A. Thomas
Robin R. High
Kendra K. Schmid
Oluwaseye Ayoola Ogun

Editor-in-Chief
Sumit Dhar
Acoustic Predictors of Pediatric Dysarthria in Cerebral Palsy

Authors
Kristen M. Allison
Katherine C. Hustad

Editor-in-Chief
Bharath Chandrasekaran
Spontaneous Otoacoustic Emissions Reveal an Efficient Auditory Efferent Network

Authors
Viorica Marian
Tuan Q. Lam
Sayuri Hayakawa
Sumitrajit Dhar

Editor-in-Chief
Frederick Gallun
Language, Speech, and Hearing Services in Schools

The Impact of Dialect Density on the Growth of Language and Reading in African American Children

Authors
Julie A. Washington
Lee Branum-Martin
Congying Sun
Ryan Lee-James

Editor-in-Chief
Holly Storkel
2019
Researcher-Academic Town Meeting
Disclosure
Robert Augustine
Council of Graduate Schools

Financial Disclosure:
• I am employed by the Council of Graduate Schools, and it publishes documents that I co-author.

Non-financial Disclosure:
• I publish with the co-authors who work at the Council of Graduate Schools.
Disclosure
Patrick Finn
University of Georgia

Financial Disclosure:
• I do not have any financial disclosures related to this presentation.

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• Editor-in-Chief, Group 4 Perspectives of the ASHA Special Interest Groups
• Chair, CAPCSD Task Force on Critical Thinking
Disclosure
Ou Lydia Liu
Educational Testing Service (ETS)

Financial Disclosure:
• I am employed by Educational Testing Service (ETS)
• I received a travel stipend for participating in this presentation.

Non-financial Disclosure:
• I do not have any non-financial disclosures related to this presentation.
Master’s Admissions
Transparency, Guidance, and Training

Findings from the 2018 Study on
Master’s Degree Admissions
Robert M. Augustine
Council of Graduate Schools
Washington, DC
Project Overview

- CGS & ETS Collaboration
  - January 2017

- Regional Focus Groups
  - October 2017

- Survey Advisory Board
  - January - April 2018

- Colloquium
  - September 2018

- Publication
  - December 2018

- Webinar
  - 2019
Master’s Admissions Research Questions

1. What is the focus of *success* in a master’s program during admissions?
2. What admission *attributes* predict that success?
3. What admission *evidence* evaluates the attributes?
4. What are the *barriers and limitations*?
5. What guidelines and training inform *admission practices*?
6. What are the implications for *admission practices and future research*?
Question 1
What is the focus of success in a master’s program at the time of admission?

Rate 17 Success Options Distributed Among 3 Categories

1. Degree Completion Success
   • Completion of Coursework
   • Fulfill Internship Requirements, Etc.

2. Program Fit Success
   • Adhere to Professional Norms and Ethics
   • Contribute to Diversity, Etc.

3. Post Graduate Success
   • Earn the License
   • Secure Employment, Etc.
Potential for Completing the Degree Aligned with Completion of Coursework

Rated as the most Important Success Milestone that Master’s Programs Look for in Their Applicants during Master’s Admission

Key Finding 1
Professionally Focused Master’s Programs

- Completing Course Work: 84.4% (12.8%)
- Completing the Capstone Req.: 64.8% (17.3%)
- Research Supervisor: 48.1% (31.3%)
- Timely Completion: 66.1% (21.9%)
- Professional Norms and Ethics: 50.7% (29.3%)
- Related Employment: 6.0% (15.5%)
- Contributions to the Scholarship: 51.7% (25.7%)
- Diverse Groups of People: 37.1% (33.9%)
- Program Culture: 31.1% (33.9%)
- Diversity of This Program: 25.3% (17.0%)
- Practicum/Internship Supervisor: 50.0% (11.7%)
- Internship/Practicum Requirement: 23.0% (33.3%)
- Pursuing a Doctorate: 23.6% (33.4%)
- Leadership Roles in the Field: 17.5% (27.3%)
- Contributing to Community: 38.9% (10.6%)
- Potential for Receiving Job... Licensure Req.:
## Research Focused Master’s Programs

<table>
<thead>
<tr>
<th>Category</th>
<th>2021</th>
<th>2020</th>
<th>Increase/Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completing Course Work</td>
<td>79.4%</td>
<td>75.2%</td>
<td>Increase</td>
</tr>
<tr>
<td>Completing the Capstone Req.</td>
<td>75.2%</td>
<td>77.7%</td>
<td>Decrease</td>
</tr>
<tr>
<td>Research Supervisor</td>
<td>49.5%</td>
<td>52.5%</td>
<td>Decrease</td>
</tr>
<tr>
<td>Timely Completion</td>
<td>47.4%</td>
<td>51.4%</td>
<td>Decrease</td>
</tr>
<tr>
<td>Professional Norms and Ethics</td>
<td>47.1%</td>
<td>50.0%</td>
<td>Decrease</td>
</tr>
<tr>
<td>Related Employment</td>
<td>31.1%</td>
<td>34.7%</td>
<td>Decrease</td>
</tr>
<tr>
<td>Contributions to the Scholarship</td>
<td>28.8%</td>
<td>30.1%</td>
<td>Decrease</td>
</tr>
<tr>
<td>Diverse Groups of People</td>
<td>28.4%</td>
<td>30.0%</td>
<td>Decrease</td>
</tr>
<tr>
<td>Program Culture</td>
<td>26.5%</td>
<td>33.0%</td>
<td>Decrease</td>
</tr>
<tr>
<td>Diversity of this Program</td>
<td>24.7%</td>
<td>37.2%</td>
<td>Decrease</td>
</tr>
<tr>
<td>Practicum/Internship Supervisor</td>
<td>16.9%</td>
<td>12.6%</td>
<td>Increase</td>
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<tr>
<td>Internship/Practicum Requirement</td>
<td>14.7%</td>
<td>11.2%</td>
<td>Increase</td>
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<tr>
<td>Pursuing a Doctorate</td>
<td>13.1%</td>
<td>21.8%</td>
<td>Decrease</td>
</tr>
<tr>
<td>Leadership Roles in the Field</td>
<td>11.6%</td>
<td>26.5%</td>
<td>Decrease</td>
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<tr>
<td>Contributing to Community</td>
<td>10.7%</td>
<td>16.2%</td>
<td>Decrease</td>
</tr>
<tr>
<td>Potential for Receiving Job...</td>
<td>9.7%</td>
<td>16.2%</td>
<td>Decrease</td>
</tr>
<tr>
<td>Licensure Req.</td>
<td>8.5%</td>
<td>10.7%</td>
<td>Decrease</td>
</tr>
</tbody>
</table>
Question 2
What admission attributes predict this success?

Rate 22 Attributes in Two Categories

1. Cognitive Attribute Examples
   - Critical Thinking
   - Analytical Thinking
   - Written Communication

2. Non-Cognitive Attribute Examples
   - Professionalism
   - Integrity
   - Leadership
Critical Thinking and Analytical Thinking

Are the Most Important Attributes and Qualities of Applicants that Master’s Programs Associate with Applicants’ Potential to Meet Key Success Milestones for Master’s Education

Key Finding 2
<table>
<thead>
<tr>
<th>Proficiency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytical Thinking Ability</td>
<td>58.9%</td>
</tr>
<tr>
<td>Critical Thinking Ability</td>
<td>64.2%</td>
</tr>
<tr>
<td>Written Communication Skill</td>
<td>62.4%</td>
</tr>
<tr>
<td>Persistence</td>
<td>50.9%</td>
</tr>
<tr>
<td>Integrity</td>
<td>64.6%</td>
</tr>
<tr>
<td>Time Management</td>
<td>54.4%</td>
</tr>
<tr>
<td>Knowledge of the Discipline/Profession</td>
<td>48.3%</td>
</tr>
<tr>
<td>Dependability</td>
<td>50.6%</td>
</tr>
<tr>
<td>Oral Communication Skill</td>
<td>50.8%</td>
</tr>
<tr>
<td>Past Academic Performance</td>
<td>38.4%</td>
</tr>
<tr>
<td>Professionalism</td>
<td>60.3%</td>
</tr>
<tr>
<td>Ability to Work Under Stress</td>
<td>47.6%</td>
</tr>
<tr>
<td>Curiosity</td>
<td>23.9%</td>
</tr>
<tr>
<td>Adaptability/Flexibility</td>
<td>43.3%</td>
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<tr>
<td>Creativity</td>
<td>19.8%</td>
</tr>
<tr>
<td>Collegiality, Collaboration, Cooperation</td>
<td>45.4%</td>
</tr>
<tr>
<td>Past Research Experience</td>
<td>1.9%</td>
</tr>
<tr>
<td>Multicultural Competency</td>
<td>26.3%</td>
</tr>
<tr>
<td>Concern for Others</td>
<td>35.6%</td>
</tr>
<tr>
<td>Past Work Experience</td>
<td>9.1%</td>
</tr>
<tr>
<td>Leadership</td>
<td>21.6%</td>
</tr>
<tr>
<td>Social Orientation</td>
<td>17.9%</td>
</tr>
<tr>
<td>Skill</td>
<td>Percentage</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Analytical Thinking Ability</td>
<td>68.0%</td>
</tr>
<tr>
<td>Critical Thinking Ability</td>
<td>67.7%</td>
</tr>
<tr>
<td>Written Communication Skill</td>
<td>67.0%</td>
</tr>
<tr>
<td>Persistance</td>
<td>53.4%</td>
</tr>
<tr>
<td>Integrity</td>
<td>46.7%</td>
</tr>
<tr>
<td>Time Management</td>
<td>45.2%</td>
</tr>
<tr>
<td>Knowledge of the Discipline/Profession</td>
<td>41.9%</td>
</tr>
<tr>
<td>Dependability</td>
<td>39.9%</td>
</tr>
<tr>
<td>Oral Communication Skill</td>
<td>39.8%</td>
</tr>
<tr>
<td>Persistence</td>
<td>39.3%</td>
</tr>
<tr>
<td>Professionalism</td>
<td>36.4%</td>
</tr>
<tr>
<td>Ability to Work Under Stress</td>
<td>33.6%</td>
</tr>
<tr>
<td>Curiosity</td>
<td>30.3%</td>
</tr>
<tr>
<td>Adaptability/Flexibility</td>
<td>29.1%</td>
</tr>
<tr>
<td>Creativity</td>
<td>24.9%</td>
</tr>
<tr>
<td>Colleagiality, Collaboration, Cooperation</td>
<td>23.5%</td>
</tr>
<tr>
<td>Past Research Experience</td>
<td>18.3%</td>
</tr>
<tr>
<td>Multicultural Competency</td>
<td>13.7%</td>
</tr>
<tr>
<td>Concern for Others</td>
<td>10.4%</td>
</tr>
<tr>
<td>Past Work Experience</td>
<td>8.6%</td>
</tr>
<tr>
<td>Leadership</td>
<td>6.9%</td>
</tr>
<tr>
<td>Social Orientation</td>
<td>5.9%</td>
</tr>
</tbody>
</table>
Question 3
What admission evidence evaluates the attributes that predict this success?

Align 7 Types of Evidence with the 22 Attributes
1. Academic Transcripts
2. Upper Division GPA
3. Standardized Test Scores
4. Resume or CV
5. Personal Statements
6. Letters of Recommendation
Letters of Recommendations and Personal Statements Are Used to Weigh a Wide Range of Cognitive and Non-cognitive Attributes During the Admissions Process

Key Finding 3
Past academic...
Past research experience
Past work experience
Creativity
Social orientation
Leadership
Integrity
Dependability
Persistence
Professionalism
Adaptability/flexibility
Ability to work under...
Time management
Multicultural...
Critical thinking ability
Analytical thinking ability
Written...
Oral communication skill
Knowledge of the...
Collegiality,
Concern for others
Curiosity
Academic transcripts
GPA
Standardized test scores
CV or resume
Personal statement
Letter of Recommendation
Other Materials
Question 4
What are the limitations or barriers for predicting this success?

Rate 10 Options + “Write In”

1. Limited Resources – Staff and Faculty Time
2. Inadequate Data
3. Lack of Training
4. Lack of Formal Rubrics & Guidelines
5. Limited Resources – Technology Support
6. Concerns for Rankings
7. Concerns for Regional Accreditation
8. Other Concerns
9. Other Resource Concerns
10. Compliance with Legal Requirements
Limitations & Barriers

Resources -- Staff & Faculty Time Needed to Develop Linkages to Strengthen the Relationships Between Attributes and Success.

Inadequate Data Predictive Linkages Between Non-Cognitive Attributes and Success

Lack of Training Use Best Practices

Key Finding 4
Limitations & Barriers

- Limited Resources: Staff and Faculty Time (70.9%)
- Inadequate University Data Correlating Admissions Criteria and Student Success (43.5%)
- Lack of Training (30.5%)
- Lack of Formal Rubrics or Guidelines (30.0%)
- Limited Resources: Technology Support (23.8%)
- Concern About Rankings (14.8%)
- Concern About Regional Accreditation Standards (13.5%)
- Additional Concern (11.7%)
- Limited Resources: Others (7.2%)
- Compliance With Legal Requirements (7.2%)
Question 5
What guidelines and training inform admission practices?

Align Standard Credential Interpretation Guidelines with Guideline and Training Providers
1. Institutional Guidelines and Training
2. Program Guidelines and Training
3. No Guidelines and Training
4. Not Applicable
Lack of Training
Few Graduate Schools or Programs Offer Training in the Use of Guidelines, Rubrics, Algorithms or Practices for Obtaining and Interpreting Data to Support Preparation for Admission Review

30% of Master’s Programs have no Formal Application Review Guidelines

Key Finding 5
Question 6
What are the implications for admission practices and future research?

Practices & Research

• Master’s Admissions Okahana, Augustine & Zhou (2017)
• Kent & McCarthy (2016)
• Other sources
Promising Practices

Transparency
Guidance: Countering Biasing Elements Training

Key Findings 6
Future Admissions Research

• Non-Cognitive Attributes
  • Predictive Potential of Non-Cognitive Attributes

• Evidence Centered Design Effects
  • Adjusting Admission Practices Following Each Admission Cycle: Continuous Review

• Cohort Admission Effects (“Posse Initiative”)
  • Admission of Cohorts vs. Individuals

• Career Outcomes Study
  • Connecting Admission Decisions to Long Term Career Outcomes
Assessing Critical Thinking in Higher Education

Lydia Liu, Ph.D.
Senior Research Director
Academic to Career Research Center
ETS

Orlando, Florida
November 20 2019
Survey of Higher Education Institutions

- Survey of 1,001 American institutions

<table>
<thead>
<tr>
<th>Intellectual Skills</th>
<th>2008 %</th>
<th>2015 %</th>
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<tbody>
<tr>
<td>Writing skills</td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td>Critical thinking and analytic reasoning skills</td>
<td>95</td>
<td>98</td>
</tr>
<tr>
<td>Quantitative reasoning skills</td>
<td>91</td>
<td>94</td>
</tr>
<tr>
<td>Oral communication skills</td>
<td>88</td>
<td>82</td>
</tr>
<tr>
<td>Intercultural skills and abilities</td>
<td>79</td>
<td>79</td>
</tr>
<tr>
<td>Information literacy skills</td>
<td>76</td>
<td>76</td>
</tr>
<tr>
<td>Ethical reasoning skills</td>
<td>75</td>
<td>75</td>
</tr>
</tbody>
</table>

Exhibit 4

Social and emotional skills will grow rapidly, along with technological skills and some advanced cognitive skills, while basic cognitive and manual skills will decline.

Based on McKinsey Global Institute workforce skills model

<table>
<thead>
<tr>
<th>Category</th>
<th>United States, all sectors</th>
<th>Western Europe, all sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours worked in 2016, billion</td>
<td>Change in hours worked by 2030, %</td>
</tr>
<tr>
<td><strong>Physical and manual skills</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General equipment operation and navigation</td>
<td>-24</td>
<td>-27</td>
</tr>
<tr>
<td>General equipment repair and mechanical skills</td>
<td>-9</td>
<td>-11</td>
</tr>
<tr>
<td>Craft and technician skills</td>
<td>-2</td>
<td>-21</td>
</tr>
<tr>
<td>Fine motor skills</td>
<td>-8</td>
<td>-15</td>
</tr>
<tr>
<td>Gross motor skills and strength</td>
<td>-9</td>
<td>-10</td>
</tr>
<tr>
<td>Inspecting and monitoring skills</td>
<td>-20</td>
<td>-25</td>
</tr>
<tr>
<td><strong>Basic cognitive skills</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic literacy, numeracy, and communication</td>
<td>-6</td>
<td>-8</td>
</tr>
<tr>
<td>Basic data input and processing</td>
<td>-10</td>
<td>-23</td>
</tr>
<tr>
<td><strong>Higher cognitive skills</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced literacy and writing</td>
<td>-10</td>
<td>-8</td>
</tr>
<tr>
<td>Quantitative and statistical skills</td>
<td>-2</td>
<td>2</td>
</tr>
<tr>
<td>Critical thinking and decision making</td>
<td>17</td>
<td>8</td>
</tr>
<tr>
<td>Project management</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Complex information processing and interpretation</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Creativity</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td><strong>Social and emotional skills</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced communication and negotiation skills</td>
<td>27</td>
<td>26</td>
</tr>
<tr>
<td>Interpersonal skills and empathy</td>
<td>30</td>
<td>21</td>
</tr>
<tr>
<td>Leadership and managing others</td>
<td>33</td>
<td>27</td>
</tr>
<tr>
<td>Entrepreneurship and initiative-taking</td>
<td>33</td>
<td>32</td>
</tr>
</tbody>
</table>
Master’s Admissions: Transparency, Guidance, and Training (2018)

Figure 6. Percentage Shares of Master’s Programs Indicating Applicants’ Attributes as “Very Important” in Determining their Potential for Degree Completion by Selected Field of Study

Figure 7. Percentage Shares of Master’s Programs Indicating the Use of Selected Application Materials to Weigh Applicants’ Attributes
What’s Critical Thinking?

• Multidimensional
• Complex
From Frameworks to Assessment
ETS HEIghten Research and Assessment Initiative

- Research Synthesis
- Qualitative and quantitative market research
- Leverage existing R&D capabilities
- Critical thinking
- Written communication
- Quantitative literacy
- Civic competency and engagement
- Intercultural competency and diversity
- Input from HEIs and organizations

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A Research-Driven Approach to Assessment Design

- Review of influential frameworks
- Review of existing assessments
- Operational definition
- Assessment considerations
<table>
<thead>
<tr>
<th>Framework</th>
<th>Author</th>
<th>Critical Thinking (or equivalent) Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment &amp; Teaching of 21st Century Skills (ATC21S)</td>
<td>Collaboration among Cisco, Intel, and Microsoft</td>
<td>Reason effectively, use systems thinking and evaluate evidence: understand systems and strategies for tackling unfamiliar problems; understand the importance of evidence in belief formation; reevaluate beliefs when presented with conflicting evidence (Binkley et al., 2009)</td>
</tr>
<tr>
<td>Degree Qualifications Profile (DQP)</td>
<td>The Lumina Foundation</td>
<td>Analytic Inquiry – identifies, categorizes and distinguishes among ideas, concepts, theories and practical approaches to problems; differentiates and evaluates theories and approaches to complex standard and non-standard problems within his/her major field; disaggregates, adapts, reformulates and employs in an essay or project principal ideas, techniques or methods at the forefront of the field (Adelman, Ewell, Gaston, &amp; Scheinder, 2011)</td>
</tr>
<tr>
<td>The Employment and Training Administration (ETA) Industry Competency Model Clearinghouse</td>
<td>U.S. Department of Labor (USDOL)</td>
<td>One who possesses sufficient inductive and deductive reasoning ability to perform job successfully; critically reviews, analyzes, synthesizes, compares and interprets information; draws conclusions from relevant and/or missing; understands the principles underlying the relationship among facts and applies the information in understanding when solving problems (USDOL, 2013)</td>
</tr>
<tr>
<td>Framework for Higher Education Qualifications (QAA-FHEQ)</td>
<td>Quality Assurance Agency for Higher Education</td>
<td>Ability to evaluate the appropriateness of different approaches to solving problems related to area(s) of study and/or work; use a range of techniques to initiate and undertake critical analysis of information, and to propose solutions to problems arising from that analysis; critically evaluate arguments, assumptions, abstract concepts and data (that may be incomplete), to make judgments, and to frame appropriate questions to achieve a solution – or identify a range of solutions – to a problem (QAA, 2008)</td>
</tr>
<tr>
<td>Framework for Learning and Development Outcomes (CAS Standards)</td>
<td>The Council for the Advancement of Standards in Education</td>
<td>Identifies important problems, questions, and issues; analyzes, interprets, and makes judgments of the relevance and quality of information; assesses assumptions and considers alternative perspectives and solutions (CAS Board of Directors, 2008)</td>
</tr>
<tr>
<td>Liberal Education and America’s Promise (LEAP)</td>
<td>Association of American Colleges and Universities</td>
<td>A habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion (Rhodes, 2010)</td>
</tr>
</tbody>
</table>
**Operational Definition: HEIghten Critical Thinking Assessment**

### Analytical Dimensions

<table>
<thead>
<tr>
<th><strong>Evaluate evidence and its use</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluate the evidence itself, including its larger context, its relevance to the argument, appropriateness of sources, and possibilities of bias.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Analyze and evaluate arguments</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Understand/assess the structure of the argument, independent of the evidence offered. Identify stated and unstated premises, conclusions, intermediate steps. Understand the language of argumentation, recognizing linguistic cues. Distinguish valid from invalid arguments, including recognizing structural flaws that may be present in an invalid argument, e.g., “holes” in reasoning.</td>
</tr>
</tbody>
</table>

### Synthetic Dimensions

<table>
<thead>
<tr>
<th><strong>Understand implications and consequences</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify unstated conclusions or implications and consequences that go beyond the original argument.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Develop sound and valid arguments</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Students should be able not only to understand and evaluate arguments made by others, but to develop their own arguments which are valid (based on good reasoning) and sound (valid and based on good evidence).</td>
</tr>
</tbody>
</table>

### Causation / Explanation

<table>
<thead>
<tr>
<th><strong>Generate or Evaluate causal claims / Generate or Evaluate explanations</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable to and works with all of the analytical and synthetic dimensions: it can involve considerations of evidence, implications, argument structure, as well as either evaluation or argument production.</td>
</tr>
</tbody>
</table>
Iterative Process of Assessment Development

- Field test
- Pilot test
- Prototype
- Context
- Item type
- Validation

The process involves iterative validation at different stages, moving from prototype to pilot test to field test, and then back for refinement.
Other Important Components

Score reports

• Total score and subscale scores
• Proficiency levels

Others

• No more than 45 mins
• Modular
• Online
• Accessibility
Validation

- Carefully designed framework
- Items mapped to construct

- Intended and unintended consequences
- New use cases

- Consequences of testing

- Relation to GPA, SAT, self-evaluation, similar measures, relevant experience, etc.

- Response Process
  - Cognitive interviews
  - Student survey
  - Response time
  - Delivery mode
  - Motivation

- Internal Structure
  - Item analysis
  - Dimensionality analysis
  - Reliability
  - International scale

- Test Content
- Validity

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Gneezy et al. (2017)

Figure 2: Average test score by group and treatment: U.S. vs. Shanghai

Notes: Average score for students who received no incentives (Control) and for students who received incentives (Treatment) by school and track.
Validation

- Carefully designed framework
- Items mapped to construct

- Intended and unintended consequences
- New use cases

- Consequences of testing

- Relation to GPA, SAT, self-evaluation, similar measures, relevant experience, etc.

- Test Content

- Response Process

- Internal Structure

- Item analysis
- Dimensionality analysis
- Reliability
- International scale

- Cognitive interviews
- Student survey
- Response time
- Delivery mode
- Motivation

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Measuring the Power of Learning.
Self-Rated Critical Thinking Skills and HEIghten Critical Thinking Scores

- Excellent (n = 345): 14.54
- Good (n = 1150): 13.93
- Average (n = 533): 13.82
- Poor (n = 52): 13.17
International Partnerships

HEighten Critical Thinking

Canada

India

Ireland

China

Russia

Colombia

South Korea
Next Steps of Research
Learning and Development of Critical Thinking

Help institutions equip students with critical thinking

Help students increase awareness and demonstrate

Integrating critical thinking into instruction and daily activities

Create an Ecosystem
Thank you!

lliu@ets.org
Guidelines for Enhancing Critical Thinking

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UNIVERSITY OF GEORGIA
ATHENS, GA
1. Motivate your students to think critically
Tell them “good intentions” are not good enough

- Because
- “Good intentions”
- Don’t equal
- “Good thinking”
And also tell them, critical thinking...

- Is an essential complement to evidence-based practice (Finn, 2011)
As well as, critical thinking...

- Is an essential foundation for scientific thinking (Murtonen & Balloo, 2019)
Plus, critical thinking...

- Reduces likelihood of developing false beliefs and making poor choices (Lilienfeld et al., 2014)
And finally, critical thinking...

- Is a highly desired skill by their future employers (Bourn, 2018)
2. Define critical thinking for your students
Don’t assume you and your students share the same understanding of critical thinking.
Provide definition that is practical and instructive (Finn, Brundage, & DiLollo, 2016)

- Example:
- “Critical thinking is reasonable, reflective thinking focused on deciding what to believe or do” (Ennis, 2003, p. 295)
3. Model “open-mindedness” for your students and encourage them to do the same
Because it includes elements relevant to clinic and research including the fact that (Stenhouse et al., 2018):

- Sometimes you will be wrong
- Thus, you should seek and be open to alternative views
- Examine them with undue bias
- And be willing to modify your beliefs
- IF the evidence warrants so

The answer is clearly NO!
And these elements will shape the quality of your students’ critical thinking (Baron, 2008)
4. Provide students with many opportunities to actively practice critical thinking (Harris & Bacon, 2019)

- In class
- In clinic
- In lab
- And perhaps
- In their lives
Take-Home Point: It’s not just what your students think that matters, but HOW they think
References

Panel Question & Answer Session
2019 Researcher-Academic Town Meeting

Thank you for coming! Enjoy the rest of Convention!
Thank you to our contributing sponsor, ExQ!