English Language Assessment
for Prospective International Graduate Students:
Promoting Greater Access While Ensuring Valid and Secure Results

March 25, 2021

Webinar sponsored by

duolingo english test
Technical Support

• Webinar **recording and slides** will be **emailed** to participants and **posted** on the CGS website

• Please **submit questions** through the GoToWebinar **control panel**

Audio Troubleshooting

• Having trouble hearing us? Try switching to a different audio connection. You can change from Telephone to Mic & Speakers or vice versa without leaving the session.

• If you experience trouble with a telephone connection, click “Problem dialing in?” for an alternate phone number to dial.
Julia Kent
Vice President, Best Practices and Strategic Initiatives
CGS
Hello!👋

Ryan Munson
Graduate Engagement Manager

Jennifer Spirer
Senior Associate Director of Admissions and Recruitment
Carnegie Mellon University
Information Networking Institute
Agenda

● International Education in 2021
● Duolingo English Test background and overview
● Research and Security
● Use in practice
● Q&A
International Education in 2021
What we are hearing

● App completion
● Secondary school exit requirements
● Visas
● Travel restrictions
● Economic distress
What we’re seeing

+1,500

New accepting institutions in 2020. Over 2,500 programs now accept the Duolingo English Test

+1,500%

YTD increase in test volume. Large increases coming from China, Korea, Brazil, Mexico, India, Kazakhstan
How we are responding

Unlimited test “seats”

Around-the-clock support

100% uptime
Duolingo Background

Duolingo’s mission is to make education accessible to all!

Language learning app

- 30+ distinct languages
- iTunes + Google Play “App of the Year”
- Most downloaded education app
- Over 300 million users
Behind the Mission

Luis von Ahn, PhD: Duolingo’s co-founder and CEO

- Born and raised in Guatemala
- Inventor of CAPTCHA, reCAPTCHA
- Former CS professor at CMU
- MacArthur Fellow
- Lemelson-MIT Recipient
Test Overview
Accessible

No test centers. No appointments. Accessible online, on demand for only $49 with unlimited sharing, and completely free for schools.
Accessible
Comprehensive

Measures speaking, writing, reading, and listening. Integrates a proficiency score, video interview, and writing sample.
Take a test in ~1 hour, and students receive results in under 2 days.
Secure

Rigorous security protocols, individual test proctoring, and computer vision + data forensics help prevent and detect rule breaking.
Accurate

Reliability measures and correlation with other tests support the use of test for university admissions.
New model, different format

- Machine-learning supported test item pool
- Administered and scored efficiently online
- Highly predictive of English skills
### Efficient and Predictive

<table>
<thead>
<tr>
<th>Item Format</th>
<th>Skills</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Zimmerman, Broder, Shaughnessy, and Underwood (1977)</td>
</tr>
<tr>
<td>Dictation</td>
<td>L,W</td>
<td>Reichert, Keller, and Martin (2010)</td>
</tr>
</tbody>
</table>

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5:00

Write for 3 to 5 minutes about the topic below

Agree or disagree with this statement: “New technologies improve lives.” Explain your reasoning.

---

3:00

Speak for 1 to 3 minutes about the topic below

Choose a plant or animal that you have learned about and that you think is interesting. Describe some of the challenges or dangers the organism faces and explain how it has adapted for survival.

---

1:32

Type the missing letters to complete the text below

Sam bought a new coat yesterday. He is often cold and he chose a coat that is warmer than his old jacket. His coat is gray and it is good for his hat. He is going to wear it every day this winter.
Research and security
## Relationship to other tests

<table>
<thead>
<tr>
<th>Relationship</th>
<th>r</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>*TOEFL ↔ IELTS</td>
<td>.73</td>
<td>1,153</td>
</tr>
<tr>
<td>Duolingo ↔ IELTS</td>
<td>.78</td>
<td>991</td>
</tr>
</tbody>
</table>

*ETS, 2010*
## Correlation

### Relationship to other tests

<table>
<thead>
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<th>Relationship</th>
<th>r</th>
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<td>991</td>
</tr>
<tr>
<td>Duolingo ↔ TOEFL</td>
<td>.77</td>
<td>2,319</td>
</tr>
</tbody>
</table>

*ETS, 2010

[englishtest.duolingo.com/scores](https://englishtest.duolingo.com/scores)
## Scale and concordance

<table>
<thead>
<tr>
<th>Scale</th>
<th>CEFR</th>
<th>Descriptors</th>
<th>Duolingo</th>
<th>TOEFL</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 - 55</td>
<td>A1</td>
<td>Can understand very basic English words and phrases. Can understand straightforward information and express themselves in familiar contexts.</td>
<td>90</td>
<td>62-67</td>
</tr>
<tr>
<td></td>
<td>A2</td>
<td></td>
<td>95</td>
<td>68-73</td>
</tr>
<tr>
<td>60 - 85</td>
<td>B1</td>
<td>Can understand the main points of concrete speech or writing on routine matters such as work and school. Can describe experiences, ambitions, opinions, and plans, although with some awkwardness or hesitation.</td>
<td>100</td>
<td>74-79</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>105</td>
<td>80-85</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>110</td>
<td>86-91</td>
</tr>
<tr>
<td>90 - 115</td>
<td>B2</td>
<td>Can fulfill most communication goals, even on unfamiliar topics. Can understand the main ideas of both concrete and abstract writing. Can interact with proficient speakers fairly easily.</td>
<td>115</td>
<td>92-96</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>120</td>
<td>97-102</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>125</td>
<td>103-107</td>
</tr>
<tr>
<td>120 - 160</td>
<td>C1</td>
<td>Can understand a variety of demanding written and spoken language including some specialized language use situations. Can grasp implicit, figurative, pragmatic, and idiomatic language. Can use language flexibly and effectively for most social, academic, and professional purposes.</td>
<td>130</td>
<td>108-112</td>
</tr>
<tr>
<td></td>
<td>C2</td>
<td></td>
<td>135</td>
<td>113-115</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>140</td>
<td>116-118</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>145</td>
<td>119</td>
</tr>
</tbody>
</table>
Evaluating ML Scoring

3,000+ speaking and writing samples rated by computers and ESL experts

<table>
<thead>
<tr>
<th></th>
<th>Student A</th>
<th>Student B</th>
<th>Student C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rater 1</td>
<td>90</td>
<td>135</td>
<td>100</td>
</tr>
<tr>
<td>Rater 2</td>
<td>95</td>
<td>130</td>
<td>105</td>
</tr>
<tr>
<td>Computer</td>
<td>90</td>
<td>130</td>
<td>100</td>
</tr>
</tbody>
</table>
Peer-reviewed paper
Transactions of the Association for Computational Linguistics
Vol. 8, 2020

Provides evidence supporting the ML-facilitated design of the computer adaptive test (CAT) items
Psychometric Modeling

- Collaborated with Gunter Maris at ACTNext for external psychometric research
- Evaluated how well our data fit a psychometric model
- Investigated item pool for bias: no substantial bias exists

englishtest.duolingo.com/research
Test Administration

- Computer adaptive test ensures virtually unique test experience
- Draws from an extremely large question pool
  - Questions generated by language assessment experts and machine learning
- Monitor test item exposure and retire questions as necessary
Computer Adaptive Testing

Note: item types are equally represented in the test, to represent all skills. Each format is shown 3–7 times (6 on average).
Security: item exposure rate

- % tests that use a given item (Way, 1998)
  - 0.10% (~1 in 1000 tests)

- % items shared between any two test administrations (Chen et. al, 2003)
  - 0.43% (< 1 in 100 items shared)

Most high-stakes CATs are significantly higher (e.g., GRE is 14%)
Test Item Security

1000+
Number of tests a student would need to take in order to see a single repeated question

~41 Years
Time for a test taker to see a single repeated question...by then, it would be long retired
Certification Process

We record every test experience via:
- Webcam
- Microphone
- Screen
- Keyboard
- Mouse

Machine learning, biometrics authentication, and computer vision analyze the test for irregular response patterns and suspicious behavior to help identify rule breaking and generate a "risk index".

Independent, anonymous proctors are assigned to the test session and are trained to look for 75 different behaviors such as eye movement and background noise.

A second independent, anonymous proctor reviews the same session for over 75 different behaviors. Tier 2 is comprised of professional, certified ESL or English language educators.

As needed, an additional round of review is added for tests where there is disagreement between the earlier rounds or further examination is needed.

Based on this process, the results are certified or not certified.
Computer Vision and Biometrics

We use computer vision and biometrics to help verify examinee identity and ensure test integrity.

- Face detection & ID verification
- Voice recognition
- Keystroke/mouse biometrics
- Eye tracking, lip syncing
Proctor : Test Taker Ratio

1:25

- Varies depending on the test and center, but on average, 1 proctor supervises over 25 test takers
  
- Proctors are often contracted locally so they are vulnerable to bias or conflict of interest
  
2+:1

- Since there are multiple independent rounds of proctoring, each test session is individually reviewed by two, and sometimes three, different proctors
  
- Proctors are anonymous and have no interaction with test takers
In practice
Graduate Education Use Case:
CMU Information Networking Institute

- Networking, Security and Mobile & IoT Engineering
- Slate CRM
- Holistic, Faculty-led Application Review

1400 apps
85% International
Fall 2021 Cycle

www.cmu.edu/ini
Graduate Education Use Case:
CMU Information Networking Institute

- Improve Accessibility
- Increase Flexibility
- Easy to Use

“Duolingo was one of those capabilities I didn't know I wanted until I had it. As soon as I'd used it for a few students I found myself asking for it time and again for students who did not have Duolingo scores available but showed possible English language challenges in their essay and free text responses.”

– Faculty Reviewer

505 Submissions in Fall 2021 Cycle

www.cmu.edu/ini
Receiving Results

- **Dashboard**: Log in to your Duolingo account to see results immediately. 
  englishtest.duolingo.com/dashboard

- **Slate Integration**: Plug-and-play integration that pulls results daily.

- **Other CRMs**: Public API can be configured by your CRM administrator
# Receiving Results

<table>
<thead>
<tr>
<th>Surname(s)</th>
<th>Given Name(s)</th>
<th>Test Taken</th>
<th>Score Sent</th>
<th>Score</th>
<th>Interview</th>
<th>Certificate</th>
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</thead>
<tbody>
<tr>
<td>Kachmar</td>
<td>Pavlo</td>
<td>Jul 15, 2019, 12:24 PM</td>
<td>Jul 17, 2019, 10:29 AM</td>
<td>125</td>
<td>VIEW</td>
<td>VIEW</td>
</tr>
<tr>
<td>Ogita</td>
<td>Malachi</td>
<td>Jul 15, 2019, 12:14 PM</td>
<td>Jul 17, 2019, 10:29 AM</td>
<td>125</td>
<td>VIEW</td>
<td>VIEW</td>
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<tr>
<td>mandanka</td>
<td>tanvi</td>
<td>Jul 15, 2019, 12:28 PM</td>
<td>Jul 17, 2019, 10:29 AM</td>
<td>100</td>
<td>VIEW</td>
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<tr>
<td>Gito</td>
<td>Christian</td>
<td>Jul 15, 2019, 11:57 AM</td>
<td>Jul 17, 2019, 10:29 AM</td>
<td>125</td>
<td>VIEW</td>
<td>VIEW</td>
</tr>
</tbody>
</table>

**Notes:**
- Email: christiangito.freelancer@gmail.com
- DOB: 1989-10-28
- Coupon: VERSIONTHREE

Add notes... (Max 255 characters.)
Li, David
September 15, 2019

VIDEO INTERVIEW
Describe the last place you visited with your family or close friends. What did you like most about this place? How could the place be improved for the people who visit there?

RESPONSE
Money isn’t always the only motivation for having a job. Other important reasons include the desire to be productive and to contribute to society. Many people truly enjoy utilizing their skills and serving people who need their assistance. I would keep a job even if I didn’t need one to live so that I could remain connected to the world.
Receiving Results
Start receiving results!

- Becoming an accepting institution is easy, fast, and free
- Take 2 minutes: go.duolingo.com/receiveresults
- Receive dashboard access within 1 business day
- Getting started guide, email templates, social media assets
Thanks!
Questions?

Ryan Munson | ryan@duolingo.com
Jennifer Spirer | jenniferspirer@cmu.edu
Research Questions | englishtest-research@duolingo.com
Upcoming Events

Supporting Graduate Student Mental Health and Wellbeing Report Release

• April 29, 2021
• Webinar from 2:00-3:00 PM ET

For other upcoming CGS webinars as well as the links to recent webinar recordings visit https://cgsnet.org/cgs-webinars