

Lowering barriers to education

How technology makes
increased global access a reality



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 duolingo english test

Foreword

A lot of people talk about education as a social equalizer, but I always saw it as the opposite: something that can create inequality. I'm from Guatemala City, where you can be in front of a mansion and then drive half a mile to be in one of the poorest neighborhoods in the world. What happens in practice – especially in poor countries – is that people who are wealthy buy the best education available while the poor barely learn to read and write, thus perpetuating inequality.

We started Duolingo with a mission: to develop the best education in the world and make it universally available.

There are many places in the world where people don't have access to a classroom. But most of them do have access to an internet-connected smartphone. And that's why we want to teach as effectively as possible through technology.

Teachers will never be replaced by technology. But technology can make teaching more effective and provide better access to education to those who can't access great teachers. We need to leverage the best of both worlds. When we do that, great things will happen.

LUIS VON AHN

CEO and co-founder,
Duolingo



About Luis

Luis von Ahn is the co-founder and CEO of Duolingo, an online education platform, with the mission to develop the best education in the world and make it universally available. Previously, he has served as the Chief Executive Officer of reCAPTCHA from 2007 - 2009, until its acquisition by Google in 2009. As a former international student from Guatemala, Luis holds a B.S. in Mathematics from Duke University and Ph.D. in Computer Science from Carnegie Mellon University.

Preface

In June, Duolingo hosted “We Rise Together,” a forum on lowering barriers to education, at its headquarters in Pittsburgh, PA. Representatives from colleges and universities in the US, UK, Canada and Australia attended, representing a spectrum of key higher education functions including recruitment, admissions and enrollment management. Higher education advocates, humanitarian aid workers and international students also participated. A highlight of the forum was a panel discussion examining how the current social and geopolitical landscape is impacting higher education access and the way innovative models, technology, and institutional investments could offer solutions. The four panelists—a university advisor, a retired college provost, a university president, and a global non-profit education officer—were diverse in their areas of expertise but united in their goal: to reduce barriers to education. The Duolingo English Test—a digital English proficiency test—is being used by the students they serve and viewed as facilitating a pathway to educational opportunities.

The insights explored in this paper reflect and build on the conversations among the panelists and participants at the forum.



Reinventing the traditional higher education model

The impact of the Covid-19 pandemic on colleges and universities profoundly and permanently altered customary models of teaching and learning. As campuses locked down, traditional education models were unable to provide face-to-face teaching. Technology provided a lifeline, offering an alternative mode of delivery that allowed learning to continue. In many institutions sizable portions of the curricula, as well as examinations and administrative functions, were provided entirely online for the first time, and students and faculty acquired new digital skills at record speed. The process was not without its challenges, but for some, the availability of digital learning — which opened the possibilities of an unbundled, personalized model — called into question the notion of “place-based” education overseen by tenured professors and set schedules altogether.

With this shift in the university education experience, recruitment, admission, and enrollment professionals—charged with identifying best-fit applicants for their institutions—had to essentially reframe what “fit” meant overnight. What institutions communicated to prospective students, the methods they used to connect with potential applicants, and how they evaluated learners had to evolve. Technological solutions, such as virtual college fairs, provided a way to meet prospective students without physically traveling that eliminated geographic limitations, expanded an institution’s reach to connect with students in new markets, and was conducted at a fraction of the cost. At-home English tests, delivered digitally, provided an alternative to traditional center-based testing in order for institutions to evaluate language proficiency—an often-non-negotiable admission requirement.

As we emerge from being fully virtual, it is likely that universities will retain some of the digital strategies and tools that kept higher education afloat through the pandemic. The benefits are myriad: online and hybrid programs are thriving; due to cost effectiveness, virtual recruitment will feature more prominently despite a return to in-person events; and assessment models will continue to evolve to measure outcomes from technologically-mediated education delivery. A new prototype has emerged.

A look back: A strained model further challenged by the pandemic

The rising costs of higher education had already put universities under scrutiny well before the pandemic. Many students were questioning the value of a university degree, as employers cited a so-called “skills gap,” meaning university graduates did not have the skills that hiring managers were seeking to build a competitive workforce. In some countries, domestic enrollments declined as young people opted to work in a strong economy rather than go into debt to pay university tuition. An aging demographic in the US and other developed countries further limited the pool of university applicants.

With return on investment in question, justifying international study was even harder.

International enrollments were also under pressure prior to 2020. Geopolitical tension, led by the increasingly contentious relationship between the US and China during the Trump presidency, was capping student mobility.¹ BREXIT detracted European Union students from studying in the UK as their tuition fees would rise to those of non-EU international students once the UK pulled out of the EU in January 2020.²

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1 <https://www.cnn.com/2021/08/06/asia/china-united-states-students-visa-ban-intl-hnk-dst/index.html>

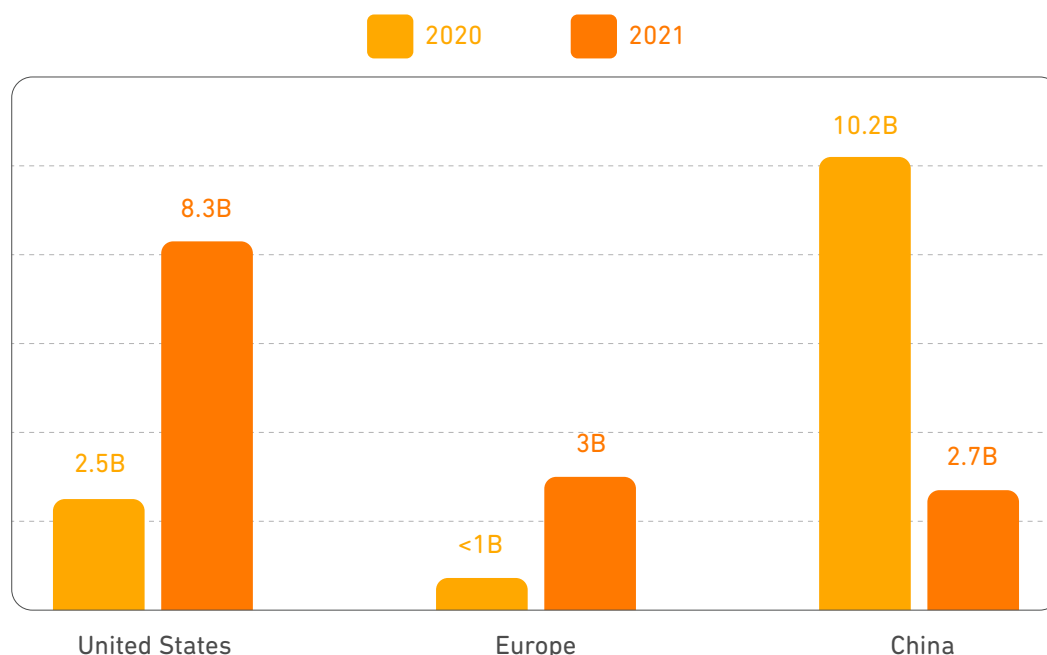
2 <https://www.timeshighereducation.com/student/advice/what-has-changed-international-students-brexite>

Anti-Asian hate incidents, in particular, dampened interest in study in the West among East and South Asians, on whose tuition payments many universities had grown reliant.³ Parents increasingly looked to destinations in their own regions as alternatives.

The pandemic deflated US international student numbers to below one million for the first time since 2014-2015. Australia kept its borders closed for two years, and the value of its international education sector has fallen by as much as half.⁴ Covid-19 at least temporarily shelved China’s goal of becoming a major study destination. The mainland government’s “zero-Covid” policy prohibited most visitors from freely entering the country.

Colleges and universities in the US alone are estimated to have lost around \$183 billion due to the pandemic, according to a recent analysis.⁵ As a result, university recruiters are under intensified pressure to generate revenue via international student tuition fees. Fortunately, there have been promising signs. Two-thirds of colleges participating in the Institute for International Education’s Spring 2022 Snapshot⁶ survey reported an uptick in international applications. Similarly, the UK has drawn 600,000 international students to its universities this academic year, hitting an ambitious national goal⁷ nearly a decade early in the process. By providing innovative solutions and low-cost online alternatives, technology can continue to lower barriers and open pathways for traditionally underserved student populations to study internationally.

Figure 1: Edtech Investment



Source: HolonIQ

3 <https://www.chronicle.com/article/after-anti-asian-incidents-colleges-seek-to-reassure-fearful-international-students>

4 Mia Castigoni and Tan, S-L., Australia’s education industry facing US\$15 billion loss as frustrated, worried students ponder futures, South China Morning Post, 1 Sep 2021, <https://www.scmp.com/economy/global-economy/article/3147109/australias-education-industry-facing-us15-billion-loss>

5 Emma Whitford, Colleges Could Lose \$183 Billion During Pandemic, Inside Higher Ed, 9 Feb 2021, <https://www.insidehighered.com/quicktakes/2021/02/09/colleges-could-lose-183-billion-during-pandemic>

6 Mirka Martel and Baer, J., Spring 2022 Snapshot on International Educational Exchange, June 2022, IEE, <https://www.iie.org/Research-and-Insights/Publications/Spring22-Snapshot-International-Educational-Exchange>

7 <https://www.gov.uk/government/publications/international-education-strategy-2022-update/international-education-strategy-2022-progress-update>

A paradigm shift and the success of edtech

The paradigm shift during the pandemic to virtual education delivery and student engagement saw a boom in the edtech industry as investment soared to unprecedented levels. Globally, investment in education technology topped \$20 billion in 2021; in the US venture funding for edtech surged from \$2.5 billion in 2020 to \$8.3 billion in 2021, and in Europe investment rose from less than \$1 billion in 2020 to \$3 billion in 2021 (see Figure 1). India alone invested \$3.8 billion – more than the whole of Europe – in 2021. In contrast, investment in edtech in China shrank from \$10.2 billion in 2020 to \$2.7 billion in 2021, constrained by the implementation of new regulations banning foreign learning materials.⁸ Currently valued at a total of some \$85 billion, the edtech sector is forecast to grow to a staggering \$230 billion by 2028.⁹

Though a digital divide still exists, the increased proficiency in digital literacy and the everyday use of technology for work and social interactions made the tilt to digital learning a natural progression, simply accelerated by the social distancing constraints of the pandemic.

Despite the recent focus on ed tech, technology has been used in education for decades for a variety of purposes aimed at lowering barriers and increasing access. The UK's Open University, founded in 1969, and Canada's University of British Columbia are two notable early users of interactive technology for the delivery of learning materials. More recently many institutions, including selective private universities such as Stanford and MIT, have been making their courses available online. Many institutions use edtech platforms like edX, Coursera, Udemy, or Udacity to distribute their courses. The proliferation of MOOCs about 10 years ago had been heralded by access advocates as an alternative to traditional modes of education that better suited learners who wish to curate their own programs or are balancing work and family arrangements that preclude them from full-time study. Despite the advantages, the uptake of using technology to deliver education to more diverse learners prior to the pandemic had been slower than one might have assumed a decade ago.¹⁰

As a result of the pandemic necessitating a shift, however, the accessibility benefits of virtual tools have been further realized. Looking ahead, a hybrid model of online learning paired with an in-person class component might be an ideal combination of convenience, cost-effectiveness and traditional education.

Developments in multimedia sources and better video conferencing platforms have also made edtech both more accessible and more effective. Though a digital divide still exists, the increased proficiency in digital literacy and the everyday use of technology for work and social interactions made the tilt to digital learning a natural progression, simply accelerated by the social distancing constraints of the pandemic. The versatility and flexibility offered by digital delivery means that apps provide a personalized experience to suit the learning style and pace of individual users.

8 Emma Kate Fittes, Global Venture Capital Investment in Ed-Tech Soared in 2021, Hitting \$20B, 10 January 2022, <https://marketbrief.edweek.org/marketplace-k-12/global-venture-capital-investment-ed-tech-soared-2021-hitting-20b/>

9 Cision PR Newswire, EdTech Market Will Reach USD 230 Billion By 2028 Growing At A CAGR of 15% - Valuates Reports, 31 Mar 2022, <https://www.prnewswire.com/news-releases/edtech-market-will-reach-usd-230-billion-by-2028-growing-at-a-cagr-of-15---valuates-reports-301514836.html>

10 <https://publications.iadb.org/publications/english/document/What-Technology-Can-and-Cant-Do-for-Education-A-Comparison-of-5-Stories-of-Success.pdf>

Edtech leaders: Advancing learning for all

Duolingo—the most downloaded education app in the world—is best known for its language learning programs that have made it a market leader. The unique game-based model upon which Duolingo apps are based rose to prominence during the pandemic. As countries across the globe began implementing stay-at-home orders in March 2020, closing businesses and schools, global traffic on Duolingo soared. In 2020, the company had 40 million active users, 1.5 million premium subscribers and revenue of over \$190 million.¹¹ Even though the game environment intends to spur the user on in an entertaining experience, the company’s teaching method is effective. According to research, “proficiency scores of Duolingo learners were comparable with the proficiency outcomes of university students at the end of fourth semester in language programs.”¹²

The digitally-delivered Duolingo English Test (DET), which was developed in 2016 in response to Duolingo’s English language learners’ desire to prove their proficiency, was prepared to support higher education’s language assessment needs at a time when traditional testing models were crippled by the pandemic. The DET launched with a goal of providing students with a lower-cost, online test with no in-person component and this proved essential the past few years. Just before the pandemic closed testing centers in March 2020, the DET was accepted by just over 1,000 programs; currently nearly 4,000 programs globally accept the DET for admission. The use of technology-powered solutions by other English proficiency test providers to offer online alternatives to center-based exams is pushing the industry as a whole toward greater accessibility for students.

Other key edtech players include Korea’s Riiid, a developer of test-prep apps for companies like Kaplan, and Holberton, a company that offers universities and other organizations the tools to build their own education programs. According to YJ Jang, Riiid’s founder and CEO,¹³ “traditional education institutions weren’t that much interested in AI just a few years ago, but now they all want to integrate AI.”

The pandemic also had a profound impact on the workplace, with many employees forced to work from home, some finding themselves newly unemployed, and many companies canceling leases on now redundant, hugely expensive prime real estate. The experience has led employers and employees to reevaluate their working practices and their work-life balance. Edtech is at the core of re-skilling and up-skilling employees, as well as helping to address the long-standing problem of an increasing skills gap, particularly in the tech space, which is not met by many educational institutions.¹⁴

Many apps are also catering to the growing trend for lifelong learning. As with Duolingo’s language app, edtech is often applied to present information in bite-sized pieces for users on the go. Also, among the top apps for lifelong learning are Blinklist’s award-winning app¹⁵, which explains nonfiction books in fifteen minutes with the option of audio clips to listen to on a daily commute or at the gym, and TED talks, which presents innovative ideas in bite-sized presentations.

11 Annie Siebert, Eldon, E, Extra Crunch Roundup: How Duolingo became an edtech leader, Tech Crunch, 7 May 2021, <https://techcrunch.com/2021/05/07/extra-crunch-roundup-how-duolingo-became-an-edtech-leader/>

12 <https://duolingo-papers.s3.amazonaws.com/reports/duolingo-efficacy-whitepaper.pdf>

13 Emma Kate Fittes, Global Venture Capital Investment in Ed-Tech Soared in 2021, Hitting \$20B, 10 January 2022, <https://marketbrief.edweek.org/marketplace-k-12/global-venture-capital-investment-ed-tech-soared-2021-hitting-20b/>

14 Matt Asay, Education tech investments boom in 2020 focused on AI solutions, 7 April 2021, Techrepublic.com, <https://www.techrepublic.com/article/education-tech-investments-boom-in-2020-focused-on-ai-solutions/>

15 Rob Gillham, According to Apple This is One of the Best Apps for Lifelong Learning. Apple thinks Blinklist is one of the best apps for lifelong learning. Let’s take a look at what makes it so useful. Blinklist Magazine, 3 Dec 2021, <https://www.blinklist.com/magazine/posts/apple-thinks-app-one-top-20-lifelong-learning-heres/>

Breaking down barriers to extend edtech's reach

While investment in edtech prompted a boom in start-ups the past few years, showing initial signs of the positive impacts on learning and assessment, there is potential for longer-term benefits on democratizing education globally. AI-powered solutions, which are often delivered to the user free of charge,¹⁶ can play a critical role in dismantling the traditional barriers to education such as inflated costs, geographic constraints, and fixed timetables.

At the recent Duolingo forum, delegates examined ways to lower barriers to education. Joan Liu, University Advisor at United World College of Southeast Asia, noted that even when low income students earn scholarships, universities do not cover indirect costs, such as visa processing services and flights. Even taking the standardized English language tests that many universities require for non-native English speakers can be a financial burden big enough to dissuade applicants.

"One thing universities don't understand is the backbreaking costs of just applying to school," she said.

Liu is also the founder of Second Chance, an organization that helps high-achieving, low-income students who do not get a full scholarship at a US university a "second chance" at receiving one from a university elsewhere in the world. She said students often "geo-swerve" away from expensive universities in the West to counterparts in countries with cheaper tuition fees and more comprehensive financial support.

Similarly, Dr. Jing Luan, Provost Emeritus at San Mateo Colleges of Silicon Valley, said that "community colleges can provide opportunities to international students of limited financial means," noting that tuition is cheaper than at four-year universities. These students can earn two years' worth of course credits and then potentially transfer to more prestigious universities, providing value in terms of academic pedigree at a lower cost, he added. Many of these students choose home stays over dormitories or apartments, which lets them further reduce expenses and more quickly assimilate into US culture.

Duolingo is advocating for wider adoption of online English language testing in the UK, which not only cuts costs but adds convenience - many students live long distances from the UK's Secure English language testing centers and 80 countries do not host a center at all - and is pushing for more digitization of other processes required for international student mobility, such as visa applications.¹⁷ The shift to digital testing and e-visas is rightly tempered by the need to provide secure processes, and in the past high-profile cases of fraudulent test-taking, for example, have made the news. But such changes could make a huge difference in streamlining bureaucracy and reducing costs, making mobility possible for population groups who currently face some of the greatest difficulties converting an offer of a university place into enrollment.

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¹⁶ Matt Asay, Education tech investments boom in 2020 focused on AI solutions, 7 April 2021, Techrepublic.com, <https://www.techrepublic.com/article/education-tech-investments-boom-in-2020-focused-on-ai-solutions/>

¹⁷ Duolingo English Test, Unlocking the global talent pool, a digital approach to secure English language testing in the UK, Public First, 2022,

Barriers are even higher for displaced populations. Over two-thirds of refugees come from Syria, Venezuela, Afghanistan, South Sudan and Myanmar, according to the UNHCR.¹⁸ Around 22 percent of the refugee population, or 6.6 million people, live in refugee camps,¹⁹ with limited access to formal education or work opportunities. Today, the war in Ukraine has displaced a further fourteen million people,²⁰ creating Europe's largest refugee crisis since World War II.²¹

Humanitarian response to the crisis initially focused on meeting immediate needs, with an emphasis on providing primary education. Secondary education was an afterthought. However, protracted refugee situations have proliferated, in which the displaced may spend decades living outside their home countries, and generations have been forced to grow up in camps. Access to higher education is crucial to resolving the situation.

"When we're talking about higher education for refugees, we're talking about investing in years with the highest return in terms of long-term socio-economic outcomes," said Manal Stulgaitis, Education Officer in the Division of Resilience and Solutions at the UNHCR, during the Duolingo event. "Refugee students don't want to be reliant on humanitarian aid. There is a new focus on building self-reliance."

Shai Reshef, President of the University of the People, believes an answer to the access problem is a tuition-free, no-frills, accredited university education delivered virtually. The University of the People has a roster of world-class professors teaching pro bono, utilizes open educational resources, and currently enrolls more than 117,000 students from over two hundred countries. To streamline teaching and encourage employability, students only study in four academic areas. There's no football team, no library—but there are also no tuition fees.

"We show that higher education can be more accessible and affordable," said Reshef, adding that the University of the People currently enrolls more than 10,500 refugees. "Because of our flexibility," he added, "we also have people who lost their jobs during the pandemic and felt like they needed to finish their degrees to be reintegrated into an evolving workforce."

A call to action

The pandemic exacerbated existing education inequalities. In low- to middle-income countries, as many as 70 percent of children aged ten have no reading skills to understand a simple story, up from 53 percent before the pandemic, a situation labeled "learning poverty" by the World Bank.²² At the recent Education World Forum, education

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18 <https://www.unhcr.org/refugee-statistics/>

19 <https://www.unrefugees.org/news/refugee-camps-explained/#:~:text=outbreaks%20of%20disease-,How%20many%20refugees%20live%20in%20refugee%20camps%3F,sheltered%20in%20self%2Dsettled%20camps.>

20 <https://www.unrefugees.org/emergencies/ukraine/>

21 <https://www.atlanticcouncil.org/blogs/ukrainealert/un-ukraine-refugee-crisis-is-europes-biggest-since-wwii/#:~:text=As%20the%20war%20in%20Ukraine,the%20border%20into%20neighboring%20Poland.>

22 World Bank, The State of Global Learning Poverty: 2022 Update, <https://thedocs.worldbank.org/en/doc/e52f55322528903b27f-1b7e61238e416-0200022022/original/Learning-poverty-report-2022-06-21-final-V7-0-conferenceEdition.pdf>

was described as “in its worst crisis in a century.”²³ With this, the pipeline to higher education—where investments have shown to make the greatest returns on the lives of the most disadvantaged—is even more grim.

However, because of edtech’s investments, the industry was well positioned to offer innovative education solutions to universities to engage students during the pandemic. The sweeping learning disruptions of the past few years brought issues of education access and the solutions offered by edtech companies and universities into the forefront of public consciousness.

Perhaps one of the most important outcomes of the pandemic is that resistance to online education on the part of both students, faculty, and administrators was effectively eliminated, creating fertile ground for the education and technology industries to continue exploring alternatives to in-person learning. The ability to scale audiences at lower costs has the potential to lower barriers, both geographic and financial.

Perhaps one of the most important outcomes of the pandemic is that resistance to online education on the part of both students, faculty, and administrators was effectively eliminated, creating fertile ground for the education and technology industries to continue exploring alternatives to in-person learning.

A recent government report for England highlighted the need for edtech businesses and the education sector to collaborate on driving innovation capable of meeting specific challenges such as using data to target student learning interventions. The report identified five broad opportunities where the most benefit could be derived from the implementation of technology:

- administration processes – reducing the burden of ‘non-teaching’ tasks;
- assessment processes – making assessment more effective and efficient;
- teaching practices – supporting access, inclusion, and improved educational outcomes for all;
- flexible continuing professional development for teachers, lecturers and education leaders;
- and lifelong learning – supporting the acquisitions of skills for work or further study choices by those outside the formal education system.²⁴

For institutions, acquiring new technology to serve students into the future is a necessity but can be expensive in terms of infrastructure, software and training. Therefore it must be a strategic long-term investment that requires due diligence. The edtech landscape is developing apace and where suitable technology has been absent, industry has offered solutions. Evaluating the impact of edtech in meeting the education sector’s needs is a hot topic for re-

23 Viggo Stacey, Global education in “worst crisis in a century” following pandemic, The Pie News, 24 May 2022, <https://thepienews.com/news/global-education-in-worst-crisis-in-a-century-following-pandemic/>

24 Department for Education, Realising the potential of technology in education: A strategy for education providers and the technology industry, 2019, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/791931/DfE-Education_Technology_Strategy.pdf

search, and information on good practice must be widely shared.²⁵

Edtech is not a silver bullet, nor a replacement for the teacher; its scalable, cost-saving and flexible solutions cannot replace the benefits of face-to-face interaction at schools and colleges. But, used wisely, it can be an integral and powerful tool to support excellent teaching, increase efficiency, reduce teacher workload, improve student outcomes, drive innovation, reduce the skills gap, and improve accessibility and inclusion.

But tech alone is not enough – the goodwill and efforts of individuals and universities are necessary to create sector-level buy-in. We all need to do our part at a grassroots level, whether it be finding funding for a single scholarship to a student in need, or offering an online course to a wider, more diverse group of learners. Forum panelists indicated that university leadership is often unaware of on-the-ground education needs, so there are potential benefits to be reaped by simply conveying that information. These efforts would be investments in the future, rather than acts of charity, with outcomes that could be shared within the sector and celebrated.

What is needed is a truly collaborative partnership between higher education and edtech, where the strengths of both are complementary. Only then can we collectively and constructively address the world’s pressing social and economic problems.

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About the Authors

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Lindsay Addington joined the Duolingo English Test in 2021. She brings her vast experience as a university admission officer and higher education association professional to the team where she focuses on recognition of the exam among U.S. graduate programs. Lindsay holds her master’s and doctorate in higher education administration from the George Washington University and a bachelor’s in communication from the University of Delaware.

25 Department for Education, Realising the potential of technology in education: A strategy for education providers and the technology industry, 2019, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/791931/DfE-Education_Technology_Strategy.pdf