

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-Q

(Mark One)

QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the quarterly period ended March 31, 2023
OR

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from ___ to ___
Commission file number 001-40653

Duolingo, Inc.

(Exact name of registrant as specified in its charter)

Delaware

(State or other jurisdiction of incorporation or organization)

45-3055872

(I.R.S. Employer Identification No.)

**5900 Penn Avenue
Pittsburgh, Pennsylvania 15206
(412) 567-6602**

(Address, Including Zip Code, and Telephone Number, Including
Area Code, of Registrant's Principal Executive Offices)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Class A common stock, \$0.0001 per share	DUOL	The Nasdaq Stock Market LLC

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports); and (2) has been subject to such filing requirements for the past 90 days.

Yes No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).

Yes No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer

Non-accelerated filer

Accelerated filer

Smaller reporting company

Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes No

As of May 8, 2023, 34,735,032 shares of the registrant's Class A common stock were outstanding, and 6,317,657 shares of the registrant's Class B common stock were outstanding.

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Special Note Regarding Forward-Looking Statements

This Quarterly Report on Form 10-Q contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. We intend such forward-looking statements to be covered by the safe harbor provisions for forward-looking statements contained in Section 27A of the Securities Act of 1933, as amended (the "Securities Act") and Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). All statements other than statements of historical facts contained in this Quarterly Report on Form 10-Q, including without limitation, statements regarding our business model and strategic plans, including the introduction of new brands or products, and our implementation thereof; statements regarding our expectations, beliefs, plans, objectives, prospects, assumptions, future events or expected performance, including our ability to compete in our industry; the sufficiency of our cash, cash equivalents and investments; and the plans and objectives of management for future operations and capital expenditures are forward-looking statements.

Without limiting the generality of the foregoing, you can identify forward-looking statements because they contain words such as "may," "will," "shall," "should," "expects," "plans," "anticipates," "could," "intends," "target," "projects," "contemplates," "believes," "estimates," "predicts," "potential," "goal," "objective," "seeks," or "continue" or the negative of these words or other similar terms or expressions that concern our expectations, strategy, plans, or intentions. Such forward-looking statements are neither promises nor guarantees, but involve a number of known and unknown risks, uncertainties and assumptions that may cause our actual results, performance or achievements to differ materially from those expressed or implied in the forward-looking statements due to various factors, including, but not limited to:

- our ability to retain and grow our users and sustain their engagement with our products;
- competition in the online language learning industry;
- our limited operating history;
- our ability to achieve profitability;
- our ability to manage our growth and operate at such scale;
- the success of our investments;
- our reliance on third-party platforms to store and distribute our products and collect revenue;
- our reliance on third-party hosting and cloud computing providers;
- our ability to compete for advertisements;
- acceptance by educational organizations of technology-based education;
- changes in business and macroeconomic conditions; and
- those identified in Part I, Item 2. "Management's Discussion and Analysis of Financial Condition and Results of Operations and Part II, Item 1A. "Risk Factors" in this Quarterly Report on Form 10-Q, and in Part II, Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our Annual Report on Form 10-K for the fiscal year ended December 31, 2022 (the "Annual Report on Form 10-K").

We caution you that the foregoing list does not contain all of the forward-looking statements made in this Quarterly Report on Form 10-Q.

You should not rely upon forward-looking statements as predictions of future events. We have based the forward-looking statements contained in this Quarterly Report on Form 10-Q primarily on our current expectations, estimates, forecasts, and projections about future events and trends that we believe may affect our business, results of operations, financial condition, and prospects. These statements are based upon information available to us as of the date of this Quarterly Report on Form 10-Q and, although we believe that we have a reasonable basis for each forward-looking statement contained in this Quarterly Report on Form 10-Q, such information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all potentially available relevant information. We cannot guarantee that the future results, levels of activity, performance, or events and circumstances reflected in the forward-looking statements will be achieved or occur at all. Moreover, we operate in a very competitive and rapidly changing environment. New risks and uncertainties emerge from time to time, and it is not possible for us to predict all risks and uncertainties that could have an impact on the forward-looking statements contained in this Quarterly Report on Form 10-Q. The results, events, and circumstances reflected in the forward-looking statements may not be achieved or occur, and actual results, events, or circumstances could differ materially from those described in the forward-looking statements. You should not place undue reliance on our forward-looking statements.

The forward-looking statements made in this Quarterly Report on Form 10-Q relate only to events as of the date on which the statements are made. While we may elect to update such forward-looking statements at some point in the future, we disclaim any obligation to do so, even if subsequent events cause our views to change.

You should read this Quarterly Report on Form 10-Q and the documents that we reference in this Quarterly Report on Form 10-Q completely and with the understanding that our actual future results may be materially different from what we expect. We qualify all of the forward-looking statements in this Quarterly Report on Form 10-Q by these cautionary statements.

Unless the context otherwise requires, all references in this Quarterly Report on Form 10-Q to “Duolingo,” the “Company”, “we,” “our,” “us,” or similar terms refer to Duolingo, Inc. and its subsidiaries.

Special Note Regarding Key Operating Metrics

We manage our business by tracking several operating metrics, including monthly active users (MAUs), daily active users (DAUs), paid subscribers, and subscription and total bookings. We believe each of these operating metrics provides useful information to investors and others. For information concerning these metrics as measured by us, see Part I, Item 2. "Management's Discussion and Analysis of Financial Condition and Results of Operations - Key Operating Metrics and Non-GAAP Financial Measures."

While these metrics are based on what we believe to be reasonable estimates of our user base for the applicable period of measurement, there are inherent challenges in measuring how our platform is used. These metrics are determined by using internal data gathered on an analytics platform that we developed and operate and have not been validated by an independent third party. This platform tracks user account and session activity. If we fail to maintain an effective analytics platform, our metrics calculations may be inaccurate.

We believe that these metrics are reasonable estimates of our user base for the applicable period of measurement, and that the methodologies we employ and update from time-to-time to create these metrics are reasonable bases to identify trends in user behavior. Because we update the methodologies we employ to create metrics, our operating metrics may not be comparable to those in prior periods. See the section titled "Risk Factors—Our user metrics and other estimates are subject to inherent challenges in measurement, and real or perceived inaccuracies in those metrics may negatively affect our reputation and our business". Other companies, including companies in our industry, may calculate these metrics differently.

Risk Factors Summary

The following is a summary of the principal risks that could materially adversely affect our business, results of operations, and financial condition, all of which are more fully described in Part II, Item 1A. "Risk Factors." This summary should be read in conjunction with Part II, Item 1A. "Risk Factors" and should not be relied upon as an exhaustive summary of the material risks facing our business.

- If we fail to keep existing users or add new users, or if our users decrease their level of engagement with our products or do not convert to paying users, our revenue, financial results and business may be significantly harmed.
- The online language learning industry is highly competitive, with low switching costs and a consistent stream of new products and entrants and innovation by our competitors may disrupt our business.
- Changes to our existing brand and products, or the introduction of a new brand or products, could fail to attract or keep users or generate revenue and profits.
- We have a limited operating history and, as a result, our past results may not be indicative of future operating performance.
- Our costs are continuing to grow, and some of our investments have the effect of reducing our operating margin and profitability. If our investments are not successful, our business and financial performance could be harmed.
- Our quarterly and annual operating results and other operating metrics may fluctuate from period to period, which makes these metrics difficult to predict.
- Our operating metrics are subject to inherent challenges in measurement, and real or perceived inaccuracies in those metrics may negatively affect our reputation and our business.

- We rely on third-party platforms such as the Apple App Store and the Google Play Store to distribute our products and collect payments. If we are unable to maintain a good relationship with such platform providers, if their terms and conditions or pricing changed to our detriment, if we violate, or if a platform provider believes that we have violated, the terms and conditions of its platform, or if any of these platforms loses market share or falls out of favor or is unavailable for a prolonged period of time, our business will suffer.
- We rely on third-party hosting and cloud computing providers, like Amazon Web Services (“AWS”) and Google Cloud, to operate certain aspects of our business. A significant portion of our product traffic is hosted by a limited number of vendors, and any failure, disruption or significant interruption in our network or hosting and cloud services could adversely impact our operations and harm our business.
- Our business is subject to complex and evolving US and international laws and regulations. Many of these laws and regulations are subject to change and uncertain interpretation, and could result in claims, changes to our business practices, monetary penalties, increased cost of operations, or declines in user growth or engagement, or otherwise harm our business.
- Our success depends, in part, on our ability to access, collect, protect, and use personal data about our users and payers, and to comply with applicable data privacy laws.
- The varying and rapidly-evolving regulatory framework on privacy and data protection across jurisdictions could result in claims, changes to our business practices, monetary penalties, increased cost of operations, brand damage, or declines in user growth or engagement, or otherwise harm our business.
- Regulatory and legislative developments on the use of artificial intelligence and machine learning could adversely affect our use of such technologies in our products and services.
- From time to time, we may be party to intellectual property-related litigation and proceedings that are expensive and time consuming to defend, and, if resolved adversely, could materially adversely impact our business, financial condition and results of operations.
- We may fail to adequately obtain, protect and maintain our intellectual property rights or prevent third parties from making unauthorized use of such rights.
- The dual class structure of our common stock has the effect of concentrating voting control with those stockholders who held our capital stock prior to the listing of our Class A common stock on the Nasdaq Global Select Market, including our directors, executive officers, and 5% stockholders and their respective affiliates, who held in the aggregate 82.5% of the voting power of our outstanding capital stock as of March 31, 2023. This ownership will limit or preclude your ability to influence corporate matters, including the election of directors, amendments of our organizational documents, and any merger, consolidation, sale of all or substantially all of our assets, or other major corporate transaction requiring stockholder approval.

Part I Financial Information

Item 1. Financial Statements (Unaudited)

DUOLINGO, INC. AND SUBSIDIARIES
UNAUDITED CONDENSED CONSOLIDATED BALANCE SHEETS
(Amounts in thousands, except par value amounts)

	March 31, 2023	December 31, 2022
ASSETS		
Current assets		
Cash and cash equivalents	\$ 641,091	\$ 608,180
Accounts receivable	52,509	46,728
Deferred cost of revenues	40,137	35,041
Prepaid expenses and other current assets	7,497	7,234
Total current assets	741,234	697,183
Property and equipment, net	12,842	12,969
Goodwill	4,050	4,050
Intangible assets, net	8,475	8,497
Operating lease right-of-use assets	21,779	22,508
Deferred tax assets	633	633
Other assets	1,366	1,507
Total assets	\$ 790,379	\$ 747,347
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities		
Accounts payable	\$ 986	\$ 1,177
Deferred revenues	181,942	157,550
Income tax payable	925	1,069
Accrued expenses and other current liabilities	18,960	21,970
Total current liabilities	202,813	181,766
Long-term obligation under operating leases	22,378	23,503
Total liabilities	225,191	205,269
Commitments and contingencies (Note 8)		
Stockholders' equity		
Class A common stock, \$0.0001 par value; 2,000,000 shares authorized as of March 31, 2023 and December 31, 2022; 33,800 and 31,899 issued and outstanding at March 31, 2023 and December 31, 2022, respectively	4	4
Class B common stock, \$0.0001 par value; 30,000 shares authorized as of March 31, 2023 and December 31, 2022; 7,218 and 8,462 issued and outstanding at March 31, 2023 and December 31, 2022, respectively		
Additional paid-in capital	798,254	772,562
Accumulated deficit	(233,070)	(230,488)
Total stockholders' equity	565,188	542,078
Total liabilities and stockholders' equity	\$ 790,379	\$ 747,347

See accompanying notes to the Unaudited Condensed Consolidated Financial Statements.

DUOLINGO, INC. AND SUBSIDIARIES
UNAUDITED CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS
(Amounts in thousands, except per share amounts)

	Three Months Ended March 31,	
	2023	2022
Revenues	\$ 115,661	\$ 81,220
Cost of revenues	31,492	21,490
Gross profit	84,169	59,730
Operating expenses:		
Research and development	45,844	29,781
Sales and marketing	16,601	14,940
General and administrative	30,243	26,856
Total operating expenses	92,688	71,577
Loss from operations	(8,519)	(11,847)
Other income (expense), net	182	(312)
Loss before interest income and (benefit) provision for income taxes	(8,337)	(12,159)
Interest income	5,639	33
Loss before (benefit) provision for income taxes	(2,698)	(12,126)
(Benefit) provision for income taxes	(116)	28
Net loss and comprehensive loss	\$ (2,582)	\$ (12,154)
Net loss per share attributable to Class A and Class B common stockholders, basic	\$ (0.06)	\$ (0.31)
Net loss per share attributable to Class A and Class B common stockholders, diluted	\$ (0.06)	\$ (0.31)

See accompanying notes to the Unaudited Condensed Consolidated Financial Statements.

DUOLINGO, INC. AND SUBSIDIARIES
UNAUDITED CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(Amounts in thousands)

	Common Stock		Additional Paid-In Capital	Accumulated Deficit	Total
	Shares	Amount			
BALANCE—January 1, 2022	38,272	\$ 4	\$ 683,966	\$ (170,914)	\$ 513,056
Stock-based compensation	—	—	14,586	—	14,586
Stock options exercised	756	—	5,226	—	5,226
Release of restricted stock units	49	—	—	—	—
Net loss	—	—	—	(12,154)	(12,154)
BALANCE—March 31, 2022	39,077	\$ 4	\$ 703,778	\$ (183,068)	\$ 520,714
BALANCE—January 1, 2023	40,361	\$ 4	\$ 772,562	\$ (230,488)	\$ 542,078
Stock-based compensation	—	—	21,073	—	21,073
Stock options exercised	542	—	4,619	—	4,619
Release of restricted stock units	115	—	—	—	—
Net loss	—	—	—	(2,582)	(2,582)
BALANCE—March 31, 2023	41,018	\$ 4	\$ 798,254	\$ (233,070)	\$ 565,188

See accompanying notes to the Unaudited Condensed Consolidated Financial Statements.

DUOLINGO, INC. AND SUBSIDIARIES
UNAUDITED CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(Amounts in thousands)

	Three Months Ended March 31,	
	2023	2022
Cash flows from operating activities:		
Net loss	\$ (2,582)	\$ (12,154)
Adjustments to reconcile net loss to net cash provided by operating activities:		
Depreciation and amortization	1,762	774
Stock-based compensation	21,073	14,586
Gain on sale of capitalized software	(100)	—
Changes in assets and liabilities:		
Deferred revenue	24,392	20,834
Accounts receivable	(5,781)	4,590
Deferred cost of revenues	(5,096)	(3,561)
Prepaid expenses and other current assets	(263)	66
Accounts payable	(345)	(5,800)
Accrued expenses and other current liabilities	(3,201)	1,265
Noncurrent assets and liabilities	(255)	27
Net cash provided by operating activities	<u>29,604</u>	<u>20,627</u>
Cash flows from investing activities:		
Capitalized software expense and purchases of intangible assets	(731)	(1,117)
Purchase of property and equipment	(681)	(1,327)
Proceeds from sale of capitalized software	100	—
Net cash used for investing activities	<u>(1,312)</u>	<u>(2,444)</u>
Cash flows from financing activities:		
Proceeds from exercise of stock options	4,619	5,226
Net cash provided by financing activities	<u>4,619</u>	<u>5,226</u>
Net increase in cash and cash equivalents	32,911	23,409
Cash and cash equivalents - Beginning of period	608,180	553,922
Cash and cash equivalents - End of period	<u>\$ 641,091</u>	<u>\$ 577,331</u>

See accompanying notes to the Unaudited Condensed Consolidated Financial Statements.

DUOLINGO, INC. AND SUBSIDIARIES
SUPPLEMENTAL DISCLOSURE OF CASH FLOW INFORMATION
(Amounts in thousands)

	Three Months Ended March 31,	
	2023	2022
Supplemental disclosure of cash flow information:		
Cash paid for interest	\$ —	\$ —
Cash paid for income taxes	\$ 28	\$ 3
Supplemental disclosure of noncash operating activities:		
Implementation costs for cloud computing included in Current liabilities	\$ —	\$ 153
Supplemental disclosure of noncash investing activities:		
Capitalized software and purchases of intangible assets included in Current liabilities	\$ —	\$ 14
Property and equipment included in Current liabilities	\$ 201	\$ 178
Landlord incentive included in Prepaid expenses and other current assets	\$ —	\$ 1,102

See accompanying notes to the Unaudited Condensed Consolidated Financial Statements.

DUOLINGO, INC. AND SUBSIDIARIES

NOTES TO THE UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS

1. DESCRIPTION OF THE BUSINESS AND BASIS OF PRESENTATION

Duolingo, Inc. (the “Company” or “Duolingo”) was formed on August 18, 2011, and the Duolingo app was launched to the general public on June 19, 2012. The Company’s headquarters are located in Pittsburgh, Pennsylvania.

Duolingo is a US-based mobile learning platform, as well as a digital language proficiency assessment exam. The Company has a freemium business model: the app and the website are accessible free of charge, although Duolingo also offers premium services for a subscription fee. As of the date of this filing, Duolingo offers courses in over 40 different languages, including Spanish, English, French, German, Italian, Portuguese, Japanese and Chinese. We have locations in the United States, China and Germany.

Principles of Consolidation—The Unaudited Condensed Consolidated Financial Statements include the accounts of the Company and subsidiaries over which the Company has control. All intercompany transactions and balances have been eliminated.

Basis of Presentation—The accompanying Unaudited Condensed Consolidated Financial Statements have been prepared in accordance with generally accepted accounting principles in the United States (“GAAP”) from the Company’s accounting records and reflect the consolidated financial position and results of operations for the three months ended March 31, 2023 and 2022. Unless otherwise specified, all dollar amounts are referred to in thousands.

The Unaudited Condensed Consolidated Financial Statements have been prepared pursuant to the rules and regulations of the Securities and Exchange Commission (“SEC”). Certain information and note disclosures normally included in financial statements prepared in accordance with GAAP have been condensed or omitted pursuant to such SEC rules. We believe that the disclosures made are adequate to make the information presented not misleading. In our opinion, all adjustments considered necessary for a fair presentation of the financial statements have been included, and all adjustments are of a normal and recurring nature. We consistently applied the accounting policies consistent with the annual Unaudited Condensed Consolidated Financial Statements elsewhere in this Quarterly Report on Form 10-Q, in preparing these Unaudited Condensed Consolidated Financial Statements. These Unaudited Condensed Consolidated Financial Statements should be read in conjunction with the audited financial statements and the notes for the fiscal year ended December 31, 2022 included in the Annual Report on Form 10-K and filed with the SEC.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Accounting Principles—The Unaudited Condensed Consolidated Financial Statements and accompanying notes are prepared in accordance with GAAP.

Use of Estimates—The preparation of Unaudited Condensed Consolidated Financial Statements in conformity with GAAP requires management to make estimates and assumptions that affect the amounts reported in the Unaudited Condensed Consolidated Financial Statements and accompanying notes. Significant estimates and assumptions reflected in the Unaudited Condensed Consolidated Financial Statements include, but are not limited to, useful lives of property and equipment, valuation of deferred tax assets and liabilities, stock-based compensation, common stock valuation, operating lease right-of-use assets and liabilities, capitalization of internally developed software and associated useful lives and contingent liabilities. Actual results may differ materially from such estimates. Management believes that the estimates, and judgments upon which they rely, are reasonable based upon information available to

them at the time that these estimates and judgments are made. To the extent that there are material differences between these estimates and actual results, the Company's Unaudited Condensed Consolidated Financial Statements will be affected.

Cash and Cash Equivalents—Cash consists primarily of cash on hand and bank deposits. Cash equivalents consist primarily of money market accounts with maturities of three months or less at the date of acquisition and are stated at cost, which approximates fair value. The Company maintains cash deposits with financial institutions that may exceed federally insured limits at times. The following table shows the breakout between cash and money market funds.

	March 31, 2023	December 31, 2022
Cash	\$ 48,462	\$ 91,189
Money market funds	592,629	516,991
Total	<u>\$ 641,091</u>	<u>\$ 608,180</u>

The Money market funds are considered Level 1 financial assets. Level 1 financial assets use inputs that are the unadjusted, quoted prices in active markets for identical assets or liabilities at the measurement date.

Advertising Costs— Advertising costs were approximately \$11,093 and \$10,954 for the three months ended March 31, 2023 and 2022, respectively, and are included within Sales and marketing in the Unaudited Condensed Consolidated Statements of Operations and Comprehensive Loss.

Income Taxes—The Company's provision for income taxes is computed by using an estimate of the annual effective tax rate, adjusted for discrete items taken into account in the relevant period, if any. Each quarter, the annual effective income tax rate is recomputed and if there are material changes in the estimate, a cumulative adjustment is made.

Concentration of Credit Risk—The Company's concentration of credit risk relates to financial institutions holding the Company's cash and cash equivalents and platforms with significant accounts receivable balances and revenue transactions.

The Company maintains cash deposits with financial institutions that may exceed federally insured limits at times. Management believes that the financial institutions that hold the Company's deposits are financially credit worthy and, accordingly, minimal credit risk exists with respect to those balances.

The majority of our revenue comes through our subscriptions and advertising streams and payments are made to Duolingo through service providers. The top three service providers, Apple, Google and Stripe accounted for 66.9%, 19.3% and 10.0% of total Accounts receivable as of March 31, 2023, respectively. The top two service providers, Apple and Google, accounted for 56.2% and 27.5% of total Accounts receivable as of December 31, 2022, respectively.

Three service providers, Apple, Google and Stripe processed 57.1%, 26.2% and 11.9% of total Revenues for the three months ended March 31, 2023, respectively. Two services providers, Apple and Google, processed 51.1% and 29.1% of total Revenues for the three months ended March 31, 2022, respectively.

Impairment of long-lived assets— The Company reviews its long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. If the sum of the estimated undiscounted future cash flows expected to result from the use and eventual disposition of an asset is less than the carrying amount of the asset, an impairment loss is recognized. Measurement of an impairment loss is based on the fair value of the asset. No assets were impaired during the three months ended March 31, 2023 and 2022.

Recently Issued Pronouncements Not Yet Adopted

There are no recently issued accounting pronouncements that the Company has not yet adopted that they believe are applicable or would have a material impact on the financial statements of the Company.

Recently Adopted Accounting Pronouncements

There are no recently adopted accounting pronouncements.

3. REVENUE

The Company has three predominant sources of revenues; time-based subscriptions, in-app advertising placement by third parties, and the Duolingo English Test. Revenue is recognized upon transfer of control of promised products or services to users in an amount that reflects the consideration the Company expects to receive in exchange for those services. The Company does not enter into contracts with a customer that contain multiple promises that result in multiple performance obligations. Revenue is recorded net of taxes assessed by a government authority that are both imposed on and concurrent with specific revenue transactions between us and our users.

Revenue from time-based subscriptions includes a stand-ready obligation to provide hosting services that are consumed by the customer over the subscription period. Users can purchase Duolingo monthly or they can purchase a six-month or year-long subscription and pay for the subscription at the time of purchase. Under the year-long subscription, users can also purchase a single plan or a family plan. The family plan includes up to six users on one subscription. Such payments are initially recorded to deferred revenue. The user has the ability to download limited content offline. However, as there is a significant level of integration and interdependency with the online functionality, the Company considers the service to be a single performance obligation for the online and offline content.

The Company enters into arrangements with advertising networks to monetize the in-app advertising inventory. Revenue from in-app advertising placement is recognized at a point in time when the advertisement is placed and is based upon the amount received.

Duolingo English Test revenue is generally recognized once the tests have gone through the proctoring process and a certification decision has been made. This process usually takes less than 48 hours after the test has been completed and uploaded. Customers have 21 days from the date of purchase to take the exam or their purchase will expire and revenue will be recognized. Virtually all customers complete their exams prior to expiration. Sometimes organizations may purchase tests in bulk via coupons with a one year expiration date. The Company will defer revenue from all tests that have neither been proctored nor expired.

The Company's users have the option to purchase consumable in-app virtual goods. The Company recognizes revenue over the period in which the user consumes the virtual good, which is generally within a month.

The Company also recognizes revenue from *Duo's Taquería*, a restaurant that opened during 2022, in the space adjacent to our headquarters in Pittsburgh. Revenue from *Duo's Taquería* is recognized at a point in time when the sales are made.

Principal Agent Considerations—The Company makes its application available to be downloaded through third-party digital distribution service providers. Users who purchase subscriptions also pay through the respective app stores. The Company evaluates the purchases via third-party payment processors to determine whether its revenues should be reported gross or net of fees retained by the payment processor. The Company is the principal in the transaction with the end user as a result of

controlling, hosting, and integrating the delivery of the virtual items to the end user. The Company records revenue gross as a principal and records fees paid to third-party payment processors as Cost of revenues.

Contract Balances—Deferred revenue mostly consists of payments we receive in advance of revenue recognition, and is mostly related to time-based subscriptions, which will be recognized into revenue over the course of the upcoming year (recognized over 12 months or less). Additionally, the Duolingo English Test has deferred revenue related to tests that have been purchased, but will not be recognized until the tests have been proctored.

Disaggregation of Revenue

In accordance with ASC 606, *Revenue from Contracts with Customers*, the Company disaggregates revenue from contracts with customers into revenue stream, which most closely depicts how the nature, amount, timing and uncertainty of revenue and cash flows are affected by economic factors.

	Three Months Ended March 31,	
	2023	2022
Revenues:		
Subscription	\$ 86,185	\$ 58,010
Advertising	11,635	11,748
Duolingo English Test	9,972	8,080
Other (1)	7,869	3,382
Total revenues	\$ 115,661	\$ 81,220

(1) Other revenue is mainly comprised of in-app purchases of virtual goods.

Changes in deferred revenues were as follows:

	Three Months Ended March 31,	
	2023	2022
Beginning balance—January 1	\$ 157,550	\$ 98,267
Amount from beginning balance recognized into revenue	(65,492)	(40,474)
Recognition of deferred revenue	(30,129)	(22,195)
Deferral of revenue	120,013	83,503
Ending balance—March 31	\$ 181,942	\$ 119,101

4. PROPERTY and EQUIPMENT, net

Property and equipment consists of the following as of March 31, 2023 and December 31, 2022:

	2023	2022
Leasehold improvements	\$ 16,693	\$ 15,983
Furniture, fixtures and equipment	5,376	5,204
Total property and equipment	22,069	21,187
Less: accumulated depreciation	(9,227)	(8,218)
Total property and equipment, net	\$ 12,842	\$ 12,969

Depreciation expense is included within the following financial statement line items within the Company's Unaudited Condensed Consolidated Statements of Operations and Comprehensive Loss.

<i>(In thousands)</i>	Three Months Ended March 31,	
	2023	2022
Research and development	\$ 407	\$ 134
Sales and marketing	48	19
General and administrative	554	412
Total	\$ 1,009	\$ 565

5. INTANGIBLE ASSETS AND GOODWILL

Intangible assets consist mostly of capitalized software, with \$18 of other intangible assets as of March 31, 2023 and December 31, 2022.

	2023	2022
Intangible assets	\$ 17,250	\$ 16,827
Less: accumulated amortization	(8,775)	(8,330)
Intangible assets, net	\$ 8,475	\$ 8,497

The Company capitalized \$731 and \$1,131 of software development costs during the three months ended March 31, 2023 and 2022, respectively. Amortization expense is included within the following financial statement line items within the Company's Unaudited Condensed Consolidated Statements of Operations and Comprehensive Loss

<i>(In thousands)</i>	Three Months Ended March 31,	
	2023	2022
Cost of revenues	\$ 403	\$ —
Sales and marketing	350	209
Total	\$ 753	\$ 209

Goodwill was \$4,050 at March 31, 2023 and December 31, 2022. As of March 31, 2023 and December 31, 2022, \$3,915 and \$3,983 of goodwill is deductible for tax purposes, respectively.

6. INCOME TAXES

Year-to-date income tax expense or benefit is the product of the most current projected annual effective tax rate ("PAETR") and the actual year-to-date pretax income (loss) adjusted for any discrete items. The income tax expense or benefit for a particular quarter, is the difference between the year-to-date calculation of income tax expense or benefit and the year-to-date calculation for the prior quarter. Items unrelated to current period ordinary income or (loss) are recognized entirely in the period identified as a discrete item of tax.

The Company's PAETR was lower than the US federal statutory rate of 21.0% during the three months ended March 31, 2023 and 2022 primarily due to the impact of maintaining a US valuation allowance provided on US deferred tax assets.

The Company continues to maintain a full valuation allowance on US federal and state net deferred tax assets for the period ending March 31, 2023 as a result of pre-tax losses incurred since the Company's inception in early 2012. The Company is projecting pre-tax loss in 2023.

Current and Prior Period Tax Expense

The Company's income before taxes, income tax provision or benefit and effective tax rates were as follows:

<i>(In thousands, except percentages)</i>	Three Months Ended March 31,	
	2023	2022
Loss before (benefit) provision for income taxes	\$ (2,698)	\$ (12,126)
(Benefit) provision for income taxes	(116)	28
Effective tax rate	4.3 %	(0.2)%

The change in the effective tax rate from the prior year was primarily due to increased tax benefits related to stock-based compensation.

The tax benefit recorded for the current period is primarily attributable to the excess tax benefits of stock-based compensation, which have been recognized discretely. This benefit was partially offset by non-deductible compensation.

7. STOCK-BASED COMPENSATION

Prior to the IPO, the Company granted options to purchase shares of the Company's common stock and restricted stock units ("RSU") in respect of shares of the Company's common stock to employees, directors and consultants under the Company's 2011 Equity Incentive Plan. In July 2021, Duolingo adopted the 2021 Incentive Award Plan ("2021 Plan") and the 2021 Employee Stock Purchase Plan ("ESPP"), each of which became effective on July 26, 2021 in connection with the IPO. An aggregate of 7,946 shares and 1,119 shares of Class A common stock were made available for future issuance under the 2021 Plan and ESPP, respectively. On each January 1, the number of shares of the Company's Class A common stock available for issuance under the 2021 Plan have been, and through January 1, 2031, will be, increased by the lesser of (i) 5% of the shares outstanding on the preceding December 31 (calculated on an as-converted basis) and (B) such smaller number of shares of common stock as determined by the Board or the Committee (as defined in the 2021 Plan). On January 1, 2023, the 2021 Plan and ESPP were increased by 2,018 shares and 319 shares, respectively.

The Company's stock options vest based on terms in the stock option agreements, which generally provide for vesting over four years based on continued service to the Company and its subsidiaries. Each option has a term of ten years. Stock options granted under the 2021 Plan must generally have an exercise price of not less than the estimated fair market value of the underlying Class A common stock at the date of the grant. No options have been granted under the 2021 Plan.

A summary of stock option activity under the Plans was as follows:

	Number of options	Weighted- average exercise price	Weighted- average remaining contractual life (years)	Aggregate intrinsic value
Options outstanding at January 1, 2023	4,410	\$ 14.04	6.25	\$ 251,832
Granted (1)	—			
Exercised	(542)	8.57		
Forfeited and expired	(3)	22.37		
Options outstanding at March 31, 2023	<u>3,865</u>	<u>\$ 14.80</u>	<u>6.17</u>	<u>\$ 493,610</u>
Options exercisable at March 31, 2023	3,297	\$ 14.05	6.00	\$ 423,829

(1) There were no stock options granted during the three months ended March 31, 2023 and 2022.

The total intrinsic value of options exercised was approximately \$55,062 and \$60,334 for the periods ended March 31, 2023 and 2022, respectively.

A summary of RSU activity under the Plans was as follows:

	Restricted stock units	Weighted-average grant date fair value per share
Outstanding at January 1, 2023	2,036	\$ 85.74
Granted	185	97.62
Released	(115)	84.18
Forfeited	(58)	97.80
Outstanding at March 31, 2023	2,048	\$ 86.56

As of March 31, 2023, there was approximately \$4,522 of unrecognized compensation cost related to stock options granted under the plans with a weighted-average period of approximately one year. The amount of unrecognized compensation expense for RSUs as of March 31, 2023 was \$163,373 with a weighted-average period of approximately three years, for a total unrecognized compensation expense of \$167,895.

There were 10,011 shares available for grant at March 31, 2023.

Performance-based RSUs

In June 2021, the Company granted an aggregate of 1,800 performance-based RSUs (the "Founder Awards") to the Company's founders. The Founder Awards vest upon the satisfaction of both a service-based condition and a performance-based condition and generally are settled one year after vesting. The service-based condition is satisfied as to 25% of the Founder Awards on each anniversary of the completion of the IPO, subject to the continuous service of the founders through the applicable date. The performance-based condition will be satisfied with respect to each of 10 equal tranches only if the trailing 60-calendar day volume-weighted-average closing trading price of the Company's Class A common stock reaches certain stock-price hurdles for each such tranche, as set forth below, over a period of 10 years from the date of grant.

Any RSUs associated with stock-prices hurdle not achieved by the tenth anniversary of the date of grant will terminate and be canceled for no additional consideration to the founders. The stock-price hurdles and number of RSUs eligible to vest will be adjusted to reflect any stock splits, stock dividends, combinations, reorganizations, reclassifications, or similar events under the 2021 Plan. The Founder Awards will be settled in shares of the Company's Class B common stock.

Tranche	Company Stock Price Hurdle	Number of RSUs Eligible to Vest
1	\$ 127.50	90
2	\$ 153.00	90
3	\$ 178.50	90
4	\$ 204.00	180
5	\$ 255.00	180
6	\$ 306.00	180
7	\$ 357.00	180
8	\$ 408.00	180
9	\$ 612.00	270
10	\$ 816.00	360

The Company estimated the grant date fair value of the Founder Awards using a model based on multiple stock-price paths developed through the use of a Monte Carlo simulation that incorporates into the valuation the possibility that the stock-price hurdles may not be satisfied. The weighted-average grant date fair value of the Founder Awards was estimated to be \$61.56 per share and the Company estimates that it will recognize total stock-based compensation expense of approximately \$110,817 over the derived service period of each of the ten separate tranches which is between 3.58 – 5.92 years. If the stock-price hurdles are met sooner than the requisite service period, the stock-based compensation expense will be adjusted to prospectively recognize the remaining expense over the remaining derived service period. Provided that the founders continue to provide services to the Company, stock-based compensation expense is recognized over the derived service period, regardless of whether the stock-price hurdles are achieved. The stock-price hurdles for the first two tranches were met during 2021. No additional stock-price hurdles have been met since. The Company recognized \$7,140 and \$8,019 of stock-based compensation expense related to these awards for the three months ended March 31, 2023 and 2022, respectively, which is included within General and administrative in the Unaudited Condensed Consolidated Statements of Operations and Comprehensive Loss. As of March 31, 2023, there is \$56,217 of unrecognized compensation expense related to these awards.

Total stock-based compensation expense was \$21,073 and \$14,586 for the three months ended March 31, 2023 and 2022, respectively.

Stock based compensation expense is included in the Unaudited Condensed Consolidated Statements of Operations and Comprehensive Loss as shown in the following table:

	Three Months Ended March 31,	
	2023	2022
Cost of revenues	\$ 11	\$ 6
Research and development	9,346	3,632
Sales and marketing	779	348
General and administrative	10,937	10,600
Total	\$ 21,073	\$ 14,586

Nominal amounts of stock based compensation expense is capitalized into intangible assets for the three months ended March 31, 2023 and 2022.

8. COMMITMENTS AND CONTINGENCIES

Legal Proceedings— From time to time, the Company may become involved in various legal proceedings in the ordinary course of its business and may be subject to third-party infringement claims. The outcome of any such claims or proceedings, regardless of the merits, is inherently uncertain. The Company is not currently party to any material legal proceedings.

Related Parties— The Company has determined that there were no transactions with related parties as of or during the three months ended March 31, 2023 and 2022.

9. ACCRUED EXPENSES AND OTHER CURRENT LIABILITIES

Accrued expenses and other current liabilities consisted of the following:

	March 31, 2023	December 31, 2022
Obligations under current leases	\$ 5,524	\$ 4,903
Marketing related accruals	2,726	3,464
Sales and VAT tax accrual	2,421	2,396
Employee-related costs	1,938	4,233
Other	6,351	6,974
Total	<u>\$ 18,960</u>	<u>\$ 21,970</u>

10. EMPLOYEE BENEFIT PLAN

The Company sponsors a profit sharing plan with a 401(k) feature, the Duolingo Retirement Plan, (the "Plan") for eligible employees. The current Plan, effective January 1, 2021, provides for Company safe harbor matching contributions of 100% of the first 4% of the employees' elective deferrals and 50% of the next 2%, with vesting starting upon the first day of employment. The Company also has the option to make discretionary matching or profit sharing contributions. The Company made safe harbor matching contributions of approximately \$1,397 and \$983 for the three months ended March 31, 2023 and 2022, respectively. The Company did not make any discretionary matching or profit sharing contributions during the three months ended March 31, 2023 and 2022.

11. LOSS PER SHARE

Basic and diluted net loss per share attributable to common stockholders is presented in conformity with the two-class method required for participating securities.

Basic net loss per share attributable to common stockholders is calculated by dividing the net loss by the weighted-average number of shares of common stock outstanding during the period, less shares subject to repurchase. The diluted net loss per share attributable to common stockholders is calculated by giving effect to all potential dilutive common stock equivalents outstanding for the period.

<i>(In thousands, except per share data)</i>	Three Months Ended March 31,	
	2023	2022
Numerator:		
Net loss attributable to Class A and Class B common stockholders	\$ (2,582)	\$ (12,154)
Denominator:		
Weighted-average shares in computing net loss per share attributable to Class A and Class B common stockholders, basic and diluted	40,618	38,590
Basic loss per common share	<u>\$ (0.06)</u>	<u>\$ (0.31)</u>
Diluted loss per common share	<u>\$ (0.06)</u>	<u>\$ (0.31)</u>

The rights, including the liquidation and dividend rights, of the holders of Class A and Class B common stock are identical, except with respect to voting and conversion. Each share of Class A common stock is entitled to one vote per share and each share of Class B common stock is entitled to 20 votes per share. Each share of Class B common stock is convertible into a share of Class A common stock voluntarily at any time by the holder, and automatically upon certain events. The Class A common stock has no conversion rights. As the liquidation and dividend rights are identical for Class A and Class B common stock, the undistributed earnings are allocated on a proportional basis and the resulting net loss per share attributable to common stockholders will, therefore, be the same for both Class A and Class B common stock on an individual or combined basis.

Since the Company was in a net loss position for the three months ended March 31, 2023 and 2022, there is no difference between the number of shares used to calculate basic and diluted loss per share. The potential shares of common stock that were excluded from the computation of diluted net loss per share attributable to common stockholders for the period presented because including them would have been antidilutive are as follows:

<i>(in thousands)</i>	Three Months Ended March 31,	
	2023	2022
Founder awards where performance has been met	180	180
Stock options outstanding (1)	3,865	5,435
RSUs outstanding (1)	2,048	756
Total	<u>6,093</u>	<u>6,371</u>

(1) Prior year amounts were adjusted in the current year table to include unvested options and RSUs.

Founder awards of 1,620, where the performance criteria has not been satisfied, are excluded from the above table because the stock-price hurdles for those awards had not been met as of March 31, 2023 and 2022.

12. SUBSEQUENT EVENTS

None.

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our Unaudited Condensed Consolidated Financial Statements and related notes included elsewhere in this Quarterly Report on Form 10-Q, the audited consolidated financial statements and related notes included in our Annual Report on Form 10-K and in Part II, Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations" of our Annual Report on Form 10-K. The following discussion contains forward-looking statements, such as those relating to our plans, objectives, expectations, intentions, and beliefs, that involve risks, uncertainties and assumptions. Our actual results could differ materially from these forward-looking statements as a result of many factors, including those discussed in Part II, Item 1A. "Risk Factors," "Special Note Regarding Forward-Looking Statements," included elsewhere in this Quarterly Report on Form 10-Q, and in Part II, Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations" of our Annual Report on Form 10-K. Our historical results are not necessarily indicative of the results that may be expected for any periods in the future.

Amounts reported in millions are rounded based on the amounts in thousands. As a result, the sum of the components reported in millions may not equal the total amount reported in millions due to rounding. In addition, percentages presented are calculated from the underlying numbers in thousands and may not add to their respective totals due to rounding.

Overview

Our flagship app has organically become the world's most popular way to learn languages and the top-grossing Education app in the App Stores, offering courses in over 40 languages to over 70 million monthly active users for the three months ended March 31, 2023. We believe that we have become the preeminent online destination for language learning due to our beautifully designed products, exceptional user engagement, and demonstrated learning efficacy.

Key Operating Metrics and Non-GAAP Financial Measures

We regularly review a number of key operating metrics and non-GAAP financial measures to evaluate our business, measure our performance, identify trends, prepare financial projections and make business decisions. The measures set forth below should be considered in addition to, not as a substitute for or in isolation from, our financial results prepared in accordance with GAAP. Monthly active users (MAUs) and daily active users (DAUs), along with paid subscribers, are operating metrics that help inform management about the underlying growth in users of our platform, and are a measure of our monetization efforts. To calculate the year-over-year change in MAUs and DAUs for a given period, we subtract the average for the same period in the previous year from the average for the same period in the current year and divide the result by the average for the same period in the previous year. Other companies, including companies in our industry, may calculate these measures differently or not at all, which reduces their usefulness as comparative measures.

<i>(Operating metrics are in millions)</i>	Three Months Ended March 31,	
	2023	2022
Operating Metrics		
Monthly active users (MAUs)	72.6	49.2
Daily active users (DAUs)	20.3	12.5
Paid subscribers (at period end)	4.8	2.9

	Three Months Ended March 31,	
	2023	2022
Operating Metrics		
Subscription bookings	\$ 110,122	\$ 78,539
Total bookings	\$ 140,054	\$ 102,054
Non-GAAP Financial Measures		
Net loss (GAAP)	\$ (2,582)	\$ (12,154)
Adjusted EBITDA	\$ 15,111	\$ 3,946
Net cash provided by operating activities (GAAP)	\$ 29,604	\$ 20,627
Free cash flow	\$ 28,792	\$ 18,928

Operating Metrics

Monthly active users (MAUs). MAUs are defined as unique Duolingo users who engage with our mobile language learning application or the language learning section of our website each month. MAUs are reported for a measurement period by taking the average of the MAUs for each calendar month in that measurement period. The measurement period for MAUs is the three months ended March 31, 2023 and the same period in the prior year where applicable, and the analysis of results is based on those periods. MAUs are a measure of the size of our global active user community on Duolingo.

We had approximately 72.6 million and 49.2 million MAUs for the three months ended March 31, 2023 and 2022, respectively, representing an increase of 47% from the prior year period. We grew MAUs through product initiatives designed to make the app more social and engaging, through marketing, and

through improving our courses, all of which we believe helped us attract new users, retain existing users, and reengage the millions of former users who return to our language learning app.

Daily active users (DAUs). DAUs are defined as unique Duolingo users who engage with our mobile language learning application or the language learning section of our website each calendar day. DAUs are reported for a measurement period by taking the average of the DAUs for each day in that measurement period. The measurement period for DAUs is the three months ended March 31, 2023 and the same period in the prior year where applicable, and the analysis of results is based on those periods. DAUs are a measure of the consistent engagement of our global user community on Duolingo.

We had approximately 20.3 million and 12.5 million DAUs for the three months ended March 31, 2023 and 2022, respectively, representing an increase of 62% from the prior year period. The DAU / MAU ratio, which we believe is an indicator of user engagement, increased to 28.0% from 25.4% a year ago. We grew DAUs through many of the same product initiatives as we grew MAUs, such as making the product more fun and engaging.

Paid Subscribers. Paid subscribers are defined as users who pay for access to any Duolingo subscription offering and had an active subscription as of the end of the measurement period. Each unique user account is treated as a single paid subscriber regardless of whether such user purchases multiple subscriptions, and the count of paid subscribers does not include users who are currently on a free trial or who are non-paying members of a family plan.

As of March 31, 2023 and 2022, we had approximately 4.8 million and 2.9 million paid subscribers, respectively, representing an increase of 63% from the prior year period. We grew paid subscribers through product improvements that led to higher subscriber conversion and steady subscriber retention.

Subscription Bookings and Total Bookings. Subscription bookings represent the amounts we receive from a purchase of any Duolingo subscription offering. Total bookings represent the amounts we receive from a purchase of any Duolingo subscription offering, a purchase of a Duolingo English Test, an in-app purchase of a virtual good, and from advertising networks for advertisements served to our users. We believe bookings provide an indication of trends in our operating results, including cash flows, that are not necessarily reflected in our revenues because we recognize subscription revenues ratably over the lifetime of a subscription, which is generally from one to twelve months.

For the three months ended March 31, 2023 and 2022, we generated \$110.1 million and \$78.5 million of subscription bookings, respectively, representing an increase of 40% from the prior year period. We grew subscription bookings by selling more first-time and renewal subscriptions.

For the three months ended March 31, 2023 and 2022, we generated \$140.1 million and \$102.1 million of total bookings, respectively, representing an increase of 37% from the prior year period. We grew total bookings through the growth in subscription bookings noted above, in addition to growth in the Duolingo English Test and other bookings, primarily related to in-app purchases.

Non-GAAP Financial Measures

We use certain non-GAAP financial measures to supplement our Unaudited Condensed Consolidated Financial Statements, which are presented in accordance with GAAP. These non-GAAP financial measures include Adjusted EBITDA and free cash flow. We use these non-GAAP financial measures for financial and operational decision-making and as a means to evaluate period-to-period comparisons. By excluding certain items that may not be indicative of our recurring core operating results, we believe that Adjusted EBITDA and free cash flow provide meaningful supplemental information regarding our performance. Accordingly, we believe these non-GAAP financial measures are useful to investors and others because they allow for additional information with respect to financial measures used by management in its financial and operational decision-making and they may be used by our institutional

investors and the analyst community to help them analyze the health of our business. However, there are a number of limitations related to the use of non-GAAP financial measures, and these non-GAAP measures should be considered in addition to, not as a substitute for or in isolation from, our financial results prepared in accordance with GAAP. Other companies, including companies in our industry, may calculate these non-GAAP financial measures differently or not at all, which reduces their usefulness as comparative measures.

The Company also uses non-GAAP constant currency revenues and non-GAAP percentage change in constant currency revenues, which exclude the impact of fluctuations in foreign currency exchange rates, for financial and operational decision-making and as a means to evaluate period-to-period comparisons. The effect of currency exchange rates on our business is an important factor in understanding period to period comparisons and we believe this information is useful to investors to facilitate comparisons and better identify trends in our business. The impact of changes in foreign currency may vary significantly from period to period, and such changes generally are outside of the control of our management. We calculate constant currency revenues by using current period foreign currency revenues and translating them to constant currency using prior year comparable period exchange rates. Constant currency revenue percentage change is calculated by determining the change in current period revenues over prior year comparable period revenues where current period foreign currency revenues are translated using prior year comparable period exchange rates.

Adjusted EBITDA. Adjusted EBITDA is defined as net loss excluding interest income, income tax provision, depreciation and amortization, stock-based compensation expenses related to equity awards, IPO and public company costs, acquisition earn-out costs and gain on sale of capitalized software. Adjusted EBITDA is used by management to evaluate the financial performance of our business and we present Adjusted EBITDA because we believe it is helpful in highlighting trends in our operating results and that it is frequently used by analysts, investors and other interested parties to evaluate companies in our industry. The following table presents a reconciliation of our net loss, the most directly comparable financial measure presented in accordance with GAAP, to Adjusted EBITDA.

<i>(In thousands)</i>	Three Months Ended March 31,	
	2023	2022
Net loss	\$ (2,582)	\$ (12,154)
Interest income	(5,639)	(33)
(Benefit) provision for income taxes	(116)	28
Depreciation and amortization	1,762	774
Stock-based compensation expenses related to equity awards (1)	21,673	15,100
IPO and public company costs (2)	—	231
Acquisition earn-out costs (3)	113	—
Gain on sale of capitalized software (4)	(100)	—
Adjusted EBITDA	\$ 15,111	\$ 3,946

- (1) In addition to stock-based compensation expense of \$21.1 million and \$14.6 million for the three months ended March 31, 2023 and 2022, respectively, this includes costs incurred related to taxes paid on equity transactions as follows:

<i>(In thousands)</i>	Three Months Ended March 31,	
	2023	2022
Research and development	\$ 240	\$ 226
Sales and marketing	14	15
General and administrative	346	273
Total	<u>\$ 600</u>	<u>\$ 514</u>

- (2) IPO and public company costs include costs associated with the establishment of our public company structure and processes, including consultant costs, a one-time fee associated with the set-up of our initial proxy statement, and fees paid to consultants and Deloitte for work in connection with remediation of the material weakness disclosed in our Annual Report on Form 10-K. These costs are included in General and administration expense within our Unaudited Condensed Consolidated Statements of Operations and Comprehensive Loss.
- (3) Represent costs incurred related to the earn-out payment on an acquisition, which is included within General and administrative within our Unaudited Condensed Consolidated Statements of Operations and Comprehensive Loss.
- (4) Represents proceeds from a sale of capitalized software, which is included within Other income (expense), net within our Unaudited Condensed Consolidated Statements of Operations and Comprehensive Loss.

For the three months ended March 31, 2023 and 2022, we generated a net loss of \$2.6 and \$12.2, respectively. Net loss decreased due to a combination of our growth in revenue and reduction in operating expenses as a percentage of revenue as compared to the prior year periods.

For the three months ended March 31, 2023 and 2022, we generated Adjusted EBITDA of \$15.1 million and \$3.9 million, respectively. Adjusted EBITDA increased due to the same reasons as net loss discussed above.

Free Cash Flow: Free cash flow represents net cash provided by operating activities, reduced by capitalized software development costs and purchases of property and equipment and increased by IPO and public company costs and taxes paid related to stock-based compensation equity awards, as we believe they are not indicative of future liquidity. We believe that free cash flow is a measure of liquidity that provides useful information to our management, investors, and others in understanding and evaluating the strength of our liquidity and future ability to generate cash that can be used for strategic opportunities or investing in our business. Free cash flow has certain limitations in that it does not represent our residual cash flow for discretionary expenditures and our non-discretionary commitments. The following table presents a reconciliation of net cash provided by operating activities, the most directly comparable financial measure calculated in accordance with GAAP, to free cash flow:

<i>(In thousands)</i>	Three Months Ended March 31,	
	2023	2022
Net cash provided by operating activities	\$ 29,604	\$ 20,627
Less: Capitalized software development costs and purchases of intangible assets	(731)	(1,117)
Less: Purchases of property and equipment	(681)	(1,327)
Plus: IPO and public company costs (1)	—	231
Plus: Taxes paid related to stock-based compensation equity awards (2)	600	514
Free cash flow	\$ 28,792	\$ 18,928

(1) IPO and public company costs include costs associated with the establishment of our public company structure and processes, including consultant costs, a one-time fee associated with the set-up of our initial proxy statement, and fees paid to consultants and Deloitte for work in connection with remediation of the material weakness disclosed in our Annual Report on Form 10-K for the fiscal year ended December 31, 2022.

(2) Includes taxes paid on equity transactions.

For the three months ended March 31, 2023 and 2022, we generated \$29.6 million and \$20.6 million of net cash provided by operating activities, respectively. The increase in net cash provided by operating activities was mainly due to the decrease in net loss in addition to an increase in stock-based compensation expense.

For the three months ended March 31, 2023 and 2022, we generated \$28.8 million and \$18.9 million of free cash flow, respectively. The increase in free cash flow was mainly attributable to the increase in net cash provided by operating activities and slight decreases in capitalized software and purchases of property and equipment.

Constant Currency: The effect of currency exchange rates on our business is an important factor in understanding period to period comparisons. We use non-GAAP constant currency revenues and non-GAAP percentage change in constant currency revenues for financial and operational decision-making and as a means to evaluate period-to-period comparisons.

Total revenues were \$115.7 million for the three months ended March 31, 2023, an increase of 42% over the three months ended March 31, 2022 on a reported basis, and 47% on a constant currency basis. Subscription revenues totaled \$86.2 million for the three months ended March 31, 2023, an increase of 49% over the three months ended March 31, 2022 on a reported basis, and 53% on a constant currency basis.

Results of Operations

Comparison for the three months ended March 31, 2023 and 2022

Revenue

We generate revenues primarily from the sale of subscriptions. The term-length of our subscription agreements are primarily monthly or annual. We began to roll out a family plan during the second half of 2021 and as of March 31, 2023 offer it exclusively as an annual subscription. We have historically had a six-month subscription plan, but during the fourth quarter of 2020, we began to phase it out. We also generate revenue from advertising, the in-app sale of virtual goods, and the Duolingo English Test.

Cost of Revenues

Cost of revenues predominantly consists of third-party payment processing fees charged by various distribution channels, and also includes hosting fees. To a much lesser extent, cost of revenues includes costs for contractors, wages and stock-based compensation for certain employees in the capacity of customer support, amortization of revenue generating capitalized software, and depreciation of certain property and equipment.

We intend to continue to invest additional resources in our infrastructure and our customer support and success organization to expand the capabilities of our platform and ensure that our users are realizing the full benefit of our products. The level, timing, and relative investment in these areas could affect our cost of revenues in the future.

Gross Profit and Gross Margin

Gross profit represents revenues less cost of revenues. Gross margin is gross profit expressed as a percentage of revenues. Our gross profit may fluctuate from period to period as our revenues fluctuate, and also as a result of the timing and amount of investments we make in items related to cost of revenues.

Operating Expenses

Our operating expenses consist of research and development, sales and marketing, and general and administrative expenses. Personnel costs are the most significant component of operating expenses and consist of salaries, benefits, and stock-based compensation expense. Operating expenses also include overhead costs for facilities, including depreciation expense.

Research and Development. We invest heavily in research and development in order to drive user engagement and customer satisfaction on our platform, which we believe helps to drive organic growth of new users. This, in turn, drives additional growth in, and better lifetime value of, our paid subscribers, as well as increased advertising revenue from impressions from our free users. Expenses are primarily made up of costs incurred for the development of new and improved products and features in our applications. Such expenses include employee-related compensation, including stock-based compensation, of engineers, designers, and product managers, in addition to materials, travel and direct costs associated with the design and required testing of our platform. We expect engineers, designers, and product managers to represent a significant portion of our employees for the foreseeable future. We regularly test product improvements with our users. Many of these tests start by making small changes in the product that affect small numbers of users. As the tests evolve, they can require increasing investment and can impact more users. This process of constant testing is how we implement many of our new products and improvements to our platform and, in total, require large investments and involve substantial time and risks to develop and launch. Some of these products and product improvements may not be well received or may take a long time for users to adopt. As a result, the benefits of our research and development investments may be difficult to forecast. We expect to continue to spend a significant portion of our revenues on research and development in the future.

Sales and Marketing. Sales and marketing expenses are expensed as incurred and consists primarily of brand advertising, marketing, digital and social media spend, field marketing, travel, trade show sponsorships and events, conferences, and employee-related compensation, including stock-based compensation for personnel engaged in sales and marketing functions, and amortization of non-revenue generating capitalized software used to promote Duolingo. We expect our sales and marketing expenses will decline as a percentage of revenues over the long-term.

General and Administrative. General and administrative expenses primarily consist of employee-related compensation, including stock-based compensation, for management and administrative functions, including our finance and accounting, legal, and people teams. General and administrative expenses also include certain professional services fees, general corporate and director and officer insurance, our facilities costs, public company costs to comply with the rules and regulations of the SEC and the Listing Rules of the Nasdaq Global Select Market, and other general overhead costs that support our operations. We expect that our general and administrative expenses will increase in absolute dollars as our business grows. However, we expect that our general and administrative expenses will remain steady or decrease as a percentage of our revenues as our revenues grow faster than these expenses over the long-term.

Interest Income

Interest income consists of income earned on our money market funds included in cash and cash equivalents and on our marketable securities.

Other income (expense), net

Other income (expense), net consists primarily of foreign currency exchange losses and gains losses.

(Benefit) provision for income taxes

The provision for income taxes represents the income tax (benefit) provision associated with our operations based on the tax laws of the jurisdictions in which we operate. These foreign jurisdictions have different statutory tax rates than the United States. Our effective tax rates will vary depending on the relative proportion of foreign to domestic income, changes in the valuation of our deferred tax assets and liabilities, and changes in tax laws.

The following table sets forth our Unaudited Condensed Consolidated Statements of Operations and Comprehensive Loss data, including year-over-year change, for the periods indicated:

<i>(in thousands)</i>	Three Months Ended March 31,		% Change
	2023	2022	
Revenues	\$ 115,661	\$ 81,220	42 %
Cost of revenues (1) (2)	31,492	21,490	47
Gross profit	84,169	59,730	41
Operating expenses:			
Research and development (1) (2)	45,844	29,781	54
Sales and marketing (1) (2)	16,601	14,940	11
General and administrative (1) (2)	30,243	26,856	13
Total operating expenses	92,688	71,577	29
Loss from operations	(8,519)	(11,847)	(28)
Other income (expense), net	182	(312)	<100%
Loss before interest income and (benefit) provision for income taxes	(8,337)	(12,159)	(31)
Interest income	5,639	33	>100%
Loss before (benefit) provision for income taxes	(2,698)	(12,126)	(78)
(Benefit) provision for income taxes	(116)	28	<100%
Net loss and comprehensive loss	\$ (2,582)	\$ (12,154)	(79)%

(1) Includes stock-based compensation expenses as follows:

<i>(In thousands)</i>	Three Months Ended March 31,	
	2023	2022
Cost of revenues	\$ 11	\$ 6
Research and development	9,346	3,632
Sales and marketing	779	348
General and administrative	10,937	10,600
Total	\$ 21,073	\$ 14,586

(2) Includes amortization of capitalized software and depreciation of property and equipment as follows:

<i>(In thousands)</i>	Three Months Ended March 31,	
	2023	2022
Cost of revenues (a)	\$ 403	\$ —
Research and development	407	134
Sales and marketing (a)	398	228
General and administrative	554	412
Total	\$ 1,762	\$ 774

(a) Amortization of capitalized software is recorded to Cost of revenue and Sales and marketing for revenue and non-revenue generating capitalized software, respectively.

The following table sets forth the components of our Unaudited Condensed Consolidated Statements of Operations and Comprehensive Loss for each of the periods presented as a percentage of revenue.

	Three Months Ended March 31,	
	2023	2022
Revenues	100 %	100 %
Cost of revenues	27	26
Gross profit	73	74
Operating expenses:		
Research and development	40	37
Sales and marketing	14	18
General and administrative	26	33
Total operating expenses	80	88
Loss from operations	(7)	(15)
Other income (expense), net	—	—
Loss before interest income and (benefit) provision for income taxes	(7)	(15)
Interest income	5	—
Loss before (benefit) provision for income taxes	(2)	(15)
(Benefit) provision for income taxes	—	—
Net loss and comprehensive loss	(2)%	(15)%

Revenues

Revenues increased \$34.4 million, or 42%, to \$115.7 million during the three months ended March 31, 2023, from revenues of \$81.2 million during the three months ended March 31, 2022. The main drivers of the increase were:

- Subscription revenue increased \$28.2 million during the three months ended March 31, 2023, primarily due to an increase in the average number of paid subscribers during the periods presented;
- Duolingo English Test revenue increased by \$1.9 million during the three months ended March 31, 2023 due to an increase in the number of international students taking the Duolingo English Test, driven in part by marketing efforts; and
- Other revenue increased \$4.5 million during the three months ended March 31, 2023, primarily due to increase in DAUs and average in-app purchase revenue per user.

The increases noted above were partially offset by a decrease in advertising revenue of \$0.1 million during the three months ended March 31, 2023. This decrease was driven by advertising pricing declines during the period, partially offset by the increase in DAUs, which resulted in increased advertisements served.

The following table provides the changes in revenues by product type:

<i>(in thousands)</i>	Three Months Ended March 31,		Change	% Change
	2023	2022		
Subscription	\$ 86,185	\$ 58,010	\$ 28,175	49 %
Advertising	11,635	11,748	(113)	(1)
Duolingo English Test	9,972	8,080	1,892	23
Other	7,869	3,382	4,487	133
Total revenues	\$ 115,661	\$ 81,220	\$ 34,441	42 %

Cost of Revenues and Gross Margin. Total gross margin decreased to 72.8% during the three months ended March 31, 2023 from 73.5% during the three months ended March 31, 2022, respectively. This is primarily due to lower advertising margin driven by lower average revenue per DAU in addition to increased amortization of capitalized software. This was partially offset by higher subscription margins as a higher proportion of our subscriber base has been paying longer than one year, driving a reduction in third-party payment processing fees per subscriber.

The following table provides the change in cost of revenues, along with related gross margins:

<i>(in thousands)</i>	Three Months Ended March 31,			
	2023		2022	
	Costs	Gross Margin	Costs	Gross Margin
Total cost of revenues	\$ 31,492	72.8 %	\$ 21,490	73.5 %

Operating Expenses

Research and Development. Research and development expense increased \$16.1 million, or 54%, to \$45.8 million during the three months ended March 31, 2023 from \$29.8 million during the three months ended March 31, 2022. The increase was mainly due to:

- Increased employee costs from headcount growth of \$14.3 million, including stock-based compensation of \$5.7 million,
- Increased web services and technology costs of \$1.4 million,
- Increased travel and meal costs of \$0.6 million

- Increased other costs of \$0.2 million incurred as our headcount grows and we expand our facilities footprint.
- These increases were partially offset by decreased contractor costs of \$0.4 million.

Research and development continues to be our largest operating expense as we invest in it in order to drive user engagement with and customer satisfaction in our platform. This engagement and satisfaction, we believe, helps to drive organic growth in MAUs and DAUs, growth in, and better retention of, paid subscribers, as well as increased advertising opportunities with free users.

Sales and Marketing. Sales and marketing expense increased \$1.7 million, or 11%, to \$16.6 million during the three months ended March 31, 2023 from \$14.9 million during the three months ended March 31, 2022. This increase was mainly due to an increase in employee costs of \$1.0 million due to the growth in headcount, including stock-based compensation of \$0.4 million, in addition to increased direct marketing and other expenses of \$0.7 million.

Direct marketing spend and other marketing expenses as a percentage of revenue decreased as a result of applying learnings from past years, which enabled us to spend marketing expenses more efficiently.

General and Administrative. General and administrative expense increased \$3.4 million, or 13%, to \$30.2 million during the three months ended March 31, 2023 from \$26.9 million during the three months ended March 31, 2022. The main drivers of this increase were related to the following:

- Increased net employee related costs of \$1.5 million, including stock-based compensation of \$0.4 million,
- Increased travel and meals expenses of \$0.9 million,
- Increased rent related costs incurred to expand to our facilities footprint of \$0.3 million,
- Other net increases of \$0.7 million, due to increased headcount, professional fees, contractor expense, insurance costs, transaction costs and sales and VAT taxes.

Interest Income

Interest income increased \$5.6 million during the three months ended March 31, 2023 due to an increase in interest rates earned on our money market funds.

Other income (expense), net

Other income (expense), net increased \$0.5 million, during the three months ended March 31, 2023, mainly from the impact from changes in foreign currency rates and proceeds from the sale of capitalized software.

(Benefit) provision for income taxes

For the three months ended March 31, 2023, the Company recorded an income tax benefit of \$0.1 million. The income tax benefit recorded in the current period is primarily attributable the excess tax benefits of stock-based compensation activity which occurred during the period.

Liquidity and Capital Resources

Since inception, we have financed operations primarily through revenues and the net proceeds we have received from the issuance of equity.

As of March 31, 2023, we had \$641.1 million in cash and cash equivalents. Our cash and cash equivalents primarily consist of bank deposits and money market funds. Our marketable securities consist of US government treasury and agency securities.

We believe that our existing cash and cash equivalents, and cash flow from operations will be sufficient to support working capital and capital expenditure requirements for at least the next 12 months. Our future capital requirements will depend on many factors, including our subscription growth rate and renewal activity, the timing of cash received from our payment processing platforms, the expansion of our sales and marketing activities, the introduction of new products and the enhancements to existing products, and the current uncertainty in the global markets. We may be required to seek additional equity. If we are unable to raise additional capital or generate cash flows necessary to expand our operations and invest in continued innovation, we may not be able to compete successfully, which would harm our business, operations and financial condition.

A substantial source of our cash from operations comes from deferred revenue, which is included in the liabilities section of our Unaudited Condensed Consolidated Balance Sheet. Deferred revenues consists of the unearned portion of customer billings, which is recognized as revenue in accordance with our revenue recognition policy. As of March 31, 2023, we had deferred revenues of \$181.9 million, which is recorded as a current liability and expected to be recognized as revenue in the next 12 months, provided all other revenue recognition criteria have been met.

The following table summarizes our cash flows for the periods presented:

<i>(in thousands)</i>	Three Months Ended March 31,	
	2023	2022
Net cash provided by operating activities	\$ 29,604	\$ 20,627
Net cash used for investing activities	(1,312)	(2,444)
Net cash provided by financing activities	4,619	5,226
Net increase in cash and cash equivalents	<u>\$ 32,911</u>	<u>\$ 23,409</u>

Operating Activities

Cash flows from operating activities can fluctuate significantly from period to period due to timing of payments and cash collections. Our largest source of operating cash is cash collection from sales of subscriptions to our users. Our primary uses of cash from operating activities are for personnel expenses, marketing expenses, hosting expenses, and overhead expenses.

Cash provided by operating activities for the three months ended March 31, 2023 increased \$9.0 million, or 44%, to \$29.6 million. This increase was mainly due to the decrease in net loss in addition to an increase in stock-based compensation expense.

Investing Activities

Cash used in investing activities decreased \$1.1 million, or 46%, to \$1.3 million for the three months ended March 31, 2023, from \$2.4 million for the three months ended March 31, 2022. The decrease is due to decreased capitalization of software development costs and capital expenditures to purchase property and equipment to support office space and site operations. Additionally, proceeds from the sale of capitalized software was included in the current period, but there was no such gain in the prior period.

Financing Activities

Cash provided by financing activities for the three months ended March 31, 2023 and 2022 was \$4.6 million and \$5.2 million, respectively, and was proceeds from exercises of stock options.

Critical Accounting Policies and Estimates

Our Unaudited Condensed Consolidated Financial Statements and the related notes thereto included elsewhere in this Quarterly Report on Form 10-Q are prepared in accordance with GAAP. The preparation of Unaudited Condensed Consolidated Financial Statements also requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue, costs and expenses, and related disclosures. We base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances. Actual results could differ significantly from the estimates made by management. To the extent that there are differences between our estimates and actual results, our future financial statement presentation, financial condition, results of operations, and cash flows will be affected.

There have been no material changes to our critical accounting policies and estimates as compared to those described in “Management’s Discussion and Analysis of Financial Condition and Results of Operations” set forth in our Annual Report on Form 10-K.

Recent Accounting Pronouncements

See Note 1, Basis of Presentation and Note 2, Summary of Significant Accounting Policies in the notes to our Unaudited Condensed Consolidated Financial Statements included in Part I, Item I of this Quarterly Report on Form 10-Q for a discussion of Recent Accounting Pronouncements.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

Interest Rate Risk

As of March 31, 2023, we had \$592.6 million of cash equivalents invested in money market funds. Our cash and cash equivalents are held for working capital purposes in addition to future investments in our product. We do not enter into investments for trading or speculative purposes. Our investments are exposed to market risk due to a fluctuation in interest rates, which may affect our interest income and the fair market value of our investments. As of March 31, 2023, a hypothetical 10% relative change in interest rates would not have a material impact on our Unaudited Condensed Consolidated Financial Statements.

Foreign Currency Exchange Risk

Our reporting currency and the functional currency of our wholly owned foreign subsidiaries is the US dollar. Certain of our payment providers translate our payments from local currency into USD at time of settlement, which means that during periods of a strengthening US dollar, our international receipts could be reduced. Our operating expenses are denominated in the currencies of the countries in which our operations are located, which are primarily in the United States and China. Our consolidated results of operations and cash flows are, therefore, subject to fluctuations due to changes in foreign currency exchange rates and may be adversely affected in the future due to changes in foreign exchange rates. In addition, as foreign currency exchange rates fluctuate, the translation of our international receipts into US dollars affects the period-over-period comparability of our operating results and can result in foreign currency exchange gains and losses. To date, we have not entered into any hedging arrangements with respect to foreign currency risk or other derivative financial instruments, although we may choose to do so in the future. A hypothetical 10% increase or decrease in the relative value of the US dollar to other currencies would not have a material effect on our operating results.

Inflation Risk

Inflationary factors such as increases in costs may adversely affect our results of operations. We do not believe that inflation has had a material effect on our business, financial condition or results of operations to date. If our costs were to become subject to significant inflationary pressures, we may not be able to fully offset such higher costs through price increases. Our inability or failure to do so could harm our business, financial condition or results of operations.

Item 4. Controls and Procedures

Limitations on Effectiveness of Controls and Procedures

Our disclosure controls and procedures and internal control over financial reporting are designed to provide reasonable assurance of achieving their desired objectives. Management does not expect, however, that our disclosure controls and procedures or our internal control over financial reporting will prevent or detect all error and fraud. Any control system, no matter how well designed and operated, is based upon certain assumptions and can provide only reasonable, not absolute, assurance that its objectives will be met. Further, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud, if any, within the company have been detected.

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our principal executive officer and principal financial officer, conducted an evaluation of the effectiveness of the design and operation of our disclosure controls and procedures, as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, as of the end of the period covered by this Quarterly Report on Form 10-Q. Based on that evaluation, our principal executive officer and principal financial officer have concluded that our disclosure controls and procedures were effective as of the end of the period covered by this Quarterly Report on Form 10-Q to provide reasonable assurance that information required to be disclosed by us in reports that we file or submit under the Exchange Act is (i) recorded, processed, summarized and reported within the time periods specified in the SEC rules and forms and (ii) accumulated and communicated to our management, including our principal executive officer and principal financial officer, as appropriate to allow timely decisions regarding required disclosure.

Changes in Internal Control Over Financial Reporting

There were no changes in our internal control over financial reporting, as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act, during the three months ended March 31, 2023 that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Part II Other Information

Item 1. Legal Proceedings

From time to time we may be involved in claims and proceedings arising in the course of our business. The outcome of any such claims or proceedings, regardless of the merits, is inherently uncertain. We are not currently party to any material legal proceedings.

Item 1A. Risk Factors

Our business, operations and financial results are subject to various risks and uncertainties, including those described below, that could materially adversely affect our business, results of operations, financial condition, and the trading price of our Class A common stock. You should carefully consider the risks and uncertainties described below, together with all of the other information contained in this Quarterly Report on Form 10-Q, including Part I, Item 2. "Management's Discussion and Analysis of Financial Condition and Results of Operations" and the financial statements and the related notes. If any of the following risks actually occur, it could harm our business, prospects, operating results, and financial condition and future prospects. In such event, the market price of our Class A common stock could decline and you could lose all or part of your investment. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also impair our business operations. This Quarterly Report on Form 10-Q also contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those anticipated in the forward-looking statements as a result of factors that are described below and elsewhere in this Quarterly Report.

Risks Related to Our Business and Industry

If we fail to keep existing users or add new users, or if our users decrease their level of engagement with our products or do not convert to paying users, our revenue, financial results and business may be significantly harmed.

The size of our user base and our users' level of engagement and paid conversion are critical to our success. Our financial performance has been and will continue to be significantly determined by our success in adding, keeping and engaging users of our products and converting them into paying subscribers. We expect that the size of our user base will fluctuate or decline in one or more markets from time to time. If people do not perceive our products to be useful, effective, reliable, and/or trustworthy, we may not be able to attract or keep users or otherwise maintain or increase the frequency and duration of their engagement or the percentage of users that are converted into paying subscribers. There is no guarantee that we will not experience an erosion of our user base or engagement levels. User engagement can be difficult to measure, particularly as we introduce new and different products and services. Any number of factors can negatively affect user stickiness, growth, engagement and conversion, including if:

- users increasingly engage with other competitive products or services instead of our own;
- user behavior on any of our products changes, including decreases in the frequency and duration of use of our products and services;
- users feel that their experience is diminished as a result of the decisions we make with respect to the frequency, prominence, format, size and quality of ads that we display;
- users become concerned about our user data practices or other matters related to privacy and the sharing of user data;

- users lose confidence in our ability to teach language or other subjects or have concerns related to security or other factors;
- users are no longer willing to pay for subscriptions or in-app purchases;
- users have difficulty installing, updating or otherwise accessing our products on mobile devices as a result of actions by us or third parties that we rely on to distribute our products and deliver our services;
- we fail to introduce new features, products or services that users find engaging or if we introduce new products or services, or make changes to existing products and services, that are not favorably received;
- initiatives designed to attract and keep users and increase engagement are unsuccessful or discontinued, whether as a result of actions by us, third parties or otherwise;
- there is a decrease in user stickiness as a result of users no longer being interested in pursuing online language learning or reaching a point where they feel our product cannot advance their language ability;
- third-party initiatives that may enable greater use of our products, including low-cost or discounted data plans, are discontinued;
- we adopt terms, policies or procedures related to areas such as user data or advertising that are perceived negatively by our users or the general public;
- we fail to combat inappropriate or abusive activity on our platform;
- we fail to provide adequate customer service to users, marketers or other partners;
- we fail to protect our brand image or reputation;
- we, our partners, or companies in our industry are the subject of adverse media reports or other negative publicity, including as a result of our or their user data practices;
- technical or other problems prevent us from delivering our products in a rapid and reliable manner or otherwise affect the user experience, such as unplanned site outages due to our failure or the failure of third-party systems we rely on, security breaches, distributed denial-of-service attacks or failure to prevent or limit spam or similar content;
- there is decreased engagement with our products as a result of internet shutdowns or other actions by governments that affect the accessibility of our products in any of our markets;
- there is decreased engagement with our products, or failure to accept our terms of service, as part of changes that we have implemented, or may implement, in the future in connection with regulations, regulatory actions or otherwise;
- there is decreased engagement with our products as a result of changes in prevailing social, cultural or political preferences in the markets where we operate; or
- there are changes mandated by legislation, regulatory authorities or litigation that adversely affect our products or users.

From time to time, certain of these factors have negatively affected user stickiness, growth and engagement to varying degrees. If we are unable to maintain or increase our user base and user engagement, our revenue and financial results may be materially adversely affected. In addition, we may not experience rapid user growth or engagement in countries that have high mobile device penetration, but due to the lack of sufficient cellular based data networks, consumers rely heavily on Wi-Fi and may

not access our products regularly throughout the day. Any decrease in user stickiness, growth or engagement could render our products less attractive to users, which is likely to have a material and adverse impact on our revenue, business, financial condition and results of operations. If our user growth rate slows or declines, we will become increasingly dependent on our ability to maintain or increase levels of user engagement and monetization in order to drive revenue growth.

The online language learning industry is highly competitive, with low switching costs and a consistent stream of new products and entrants, and innovation by our competitors may disrupt our business.

The online language learning industry is highly competitive, with a consistent stream of new products and entrants. As a result, new products, entrants and business models are likely to continue to emerge, both in the United States and abroad. It is possible that a new product could gain rapid scale at the expense of existing brands through harnessing a new technology, or a new or existing distribution channel, creating a new or different approach to connecting people or some other means. We compete for learners' time, attention, and share of wallet not only with other online and app-based language learning platforms, but also with offline forms of language learning. Because of the extensibility of the Duolingo platform beyond language learning, we also compete with language learning assessment providers and literacy platforms and may compete with other kinds of online learning platforms in the future.

Many of the current and potential competitors, both domestically and internationally, have substantially greater financial, technical, sales, marketing and other resources than we do, as well as in some cases, lower costs. Some competitors offer more differentiated products (for example, online learning as well as physical classrooms and textbooks) that may allow them to more flexibly meet changing customer preferences. Some of our competitors may enjoy better competitive positions in certain geographical regions, user demographics or other key areas that we currently serve or may serve in the future, or in their ability to teach certain languages or to teach speakers of certain languages other languages. These advantages could enable these competitors to offer products that are more appealing to users and potential users than our products, to respond more quickly and/or cost-effectively than us to new or changing opportunities, new or emerging technologies or changes in customer requirements and preferences, or to offer lower prices than ours or to offer free language-learning products or services.

There are a number of free online language-learning opportunities to learn grammar, pronunciation, vocabulary (including specialties in areas such as medicine and business), reading and conversation by means of podcasts and mobile applications, audio courses and lessons, videos, games, stories, news, digital textbooks, and through other means, which compete with our products. We estimate that there are thousands of free mobile applications for language learning; free products are provided in at least 50 languages by private companies, universities and government agencies. Low barriers to entry allow start-up companies with lower costs and less pressure for profitability to compete with us. Competitors that are focused more on user acquisition rather than profitability may be able to offer products at significantly lower prices or for free. As free online translation services improve and become more widely available and used, people may generally become less interested in language learning. If we cannot successfully attract users of these free products and convert a sufficient portion of these free users into paying users, our business could be adversely affected. If free products become more engaging and competitive or gain widespread acceptance by the public, demand for our products could decline or we may have to lower our prices, which could adversely impact our revenue and other results.

Potential competitors also include larger companies that could devote greater resources to the promotion or marketing of their products and services, take advantage of acquisition or other opportunities more readily or develop and expand their products and services more quickly than we do. For example, in 2020, Apple released "Translate," an iOS translation app developed by Apple for iOS devices, to translate

text sentences or speech between several languages. Potential competitors also include established social media companies that may develop products, features, or services that may compete with ours or operators of mobile operating systems and app stores. These social media and mobile platform competitors could use strong or dominant positions in one or more markets, and ready access to existing large pools of potential users and personal information regarding those users, to gain competitive advantages over us. These may include offering different product features, services or pricing models that users may prefer, which may enable them to acquire and engage users at the expense of our user growth or engagement.

If we are not able to compete effectively against our current or future competitors and products or services that may emerge, the size and level of engagement of our user base may decrease, which could materially adversely affect our business, financial condition and results of operations.

Changes to our existing brand and products, or the introduction of a new brand or products, could fail to attract or keep users or generate revenue and profits.

Our ability to keep, increase, and engage our user base and to increase our revenue depends heavily on our ability to continue to evolve our existing brand and products and to create successful new brands and products. We may introduce significant changes to our existing brand and products, or acquire or introduce new and unproven brands, products and product extensions, including using technologies with which we have little or no prior development or operating experience. In addition, we often introduce a new product and delay its monetization until the product is more mature and the user base is better established. We have also invested, and expect to continue to invest, significant resources in growing our products to support increasing usage as well as new lines of business, new products, new product extensions and other initiatives to generate revenue. For example, in 2020, we launched our Duolingo ABC app, which has not yet generated any revenue for us. There is no guarantee that investing in new lines of business, new products, new product extensions and other initiatives will succeed. If our new or enhanced brands, products or product extensions fail to engage users, we may fail to attract or keep users or to generate sufficient revenue, operating margin, or other value to justify our investments, and our business may be materially adversely affected.

We have a limited operating history and, as a result, our past results may not be indicative of future operating performance.

We have a limited operating history, which makes it difficult to forecast our future results. You should not rely on our past quarterly operating results as indicators of future performance. You should take into account and evaluate our prospects in light of the risks and uncertainties frequently encountered by companies in rapidly-evolving markets like ours.

We have had operating losses each year since our inception and we may not achieve or maintain profitability in the future.

We have incurred operating losses each year since our inception and we may not achieve or maintain profitability in the future. Although our revenue has increased each quarter since the first quarter of 2018, there can be no assurances that it will continue to do so. Our operating expenses may continue to increase in the future as we increase our sales and marketing efforts and continue to invest in the development of products and services. These efforts may be costlier than we expect and we cannot guarantee that we will be able to increase our revenue to offset our operating expenses. Our revenue growth may slow or our revenue may decline for a number of other possible reasons, including reduced demand for our products or services, increased competition, a decrease in the growth or reduction in size of our overall market, or if we fail for any reason to capitalize on our growth opportunities. If we do not

achieve or maintain profitability in the future, it could materially adversely affect our business, financial condition and results of operations.

We have grown rapidly in recent years and have limited operating experience at our current scale of operations. If we are unable to manage our growth effectively, our brand, company culture and financial performance may suffer.

We have experienced rapid growth and demand for our services since inception. We have expanded our operations rapidly and have limited operating experience at our current size. As we have grown, we have increased our employee headcount and we expect headcount growth to continue for the foreseeable future. From December 31, 2018 to March 31, 2023, our headcount grew from approximately 140 employees to over 650 employees. Further, as we grow, our business becomes increasingly complex. To effectively manage and capitalize on our growth, we must continue to expand our sales and marketing, focus on innovative product and content development, upgrade our management information systems and other processes, and obtain more space for our expanding staff. Our continued growth could strain our existing resources, and we could experience ongoing operating difficulties in managing our business across numerous jurisdictions, including difficulties in hiring, training, and managing a diffuse and growing employee base. Failure to scale and preserve our company culture with our growth could harm our future success, including our ability to retain and recruit personnel and to effectively focus on and pursue our corporate objectives. If our management team does not effectively scale with our growth, we may experience erosion to our brand, the quality of our products and services may suffer, and our company culture may be harmed. Moreover, we have been, and may in the future be, subject to legacy claims or liabilities arising from our systems and controls, content or workforce in earlier periods of our rapid development.

Because we have a limited history operating our business at its current scale, it is difficult to evaluate our current business and future prospects, including our ability to plan for and model future growth. Our limited operating experience at this scale, combined with the rapidly-evolving nature of the market in which we operate, substantial uncertainty concerning how these markets may develop, and other economic factors beyond our control, reduces our ability to accurately forecast quarterly or annual revenue. Failure to manage our future growth effectively could have a material adverse effect on our business, financial condition, and operating results.

Our costs are continuing to grow, and some of our investments have the effect of reducing our operating margin and profitability. If our investments are not successful, our business and financial performance could be harmed.

Historically, our costs have increased each year since 2011 and we anticipate that our expenses will continue to increase in the future as we broaden our user base, develop and implement new products, market new and existing products and promote our brands, continue to expand our technical infrastructure, and continue to hire additional employees and contractors to support our expanding operations, including our efforts to focus on privacy, safety, and security. In addition, from time to time we may be subject to settlements, judgments, fines, or other monetary penalties in connection with legal and regulatory developments that may be material to our business. We may also invest in new platforms and technologies. Some of these investments may generate only limited revenue and reduce our operating

margin and profitability. If these efforts are not successful, our ability to grow revenue will be harmed, which could materially adversely affect our business and financial performance.

Our quarterly operating results and other operating metrics may fluctuate from quarter to quarter, which makes these metrics difficult to predict.

Our quarterly operating results and other operating metrics have fluctuated in the past and may continue to fluctuate from quarter to quarter, which makes them difficult to predict. Our financial condition and operating results in any given quarter can be influenced by numerous factors, many of which we are unable to predict or are outside of our control, including, for example:

- the timing, size and effectiveness of our marketing efforts;
- the timing and success of new product, service and feature introductions by us or our competitors or any other change in the competitive landscape of our market;
- fluctuations in the rate at which we attract new users, the level of engagement of such users and the propensity of such users to subscribe to our brands or to purchase à la carte features;
- successful expansion into international markets;
- errors in our forecasting of the demand for our products and services, which could lead to lower revenue or increased costs, or both;
- increases in sales and marketing, product development or other operating expenses that we may incur to grow and expand our operations and to remain competitive;
- the diversification and growth of our revenue sources;
- our ability to maintain gross margins and operating margins;
- fluctuations in currency exchange rates and changes in the proportion of our expenses denominated in foreign currencies;
- changes in our effective tax rate;
- changes in accounting standards, policies, guidance, interpretations, or principles;
- our development and improvement of the quality of the Duolingo language app and Duolingo English Test, other Duolingo experiences, including, enhancing existing and creating new products, services, technology and features;
- the continued development and upgrading of our technology platform;
- system failures or breaches of security or privacy;
- our ability to obtain, maintain, protect and enforce intellectual property rights and successfully defend against claims of infringement, misappropriation or other violations of third-party intellectual property;
- adverse litigation judgments, settlements, or other litigation-related costs;
- changes in the legislative or regulatory environment, including with respect to privacy, intellectual property, consumer product safety, and advertising, or enforcement by government regulators, including fines, orders, or consent decrees; and
- changes in business or macroeconomic conditions, lower consumer confidence in our business or in the online learning industry generally, recessionary conditions, increased inflation, increased

interest rates, increased unemployment rates, stagnant or declining wages, political unrest, armed conflicts, or natural disasters.

Any one of the factors above or the cumulative effect of some of the factors above may result in significant fluctuations in our results of operations.

The variability and unpredictability of our quarterly operating results or other operating metrics could result in our failure to meet our expectations or those of analysts that cover us or investors with respect to revenue or other operating results for a particular period. If we fail to meet or exceed such expectations, the market price of our Class A common stock could fall substantially, and we could face costly lawsuits, including securities class action suits.

Our user metrics and other estimates are subject to inherent challenges in measurement, and real or perceived inaccuracies in those metrics may negatively affect our reputation and our business.

We track certain key operational metrics and non-GAAP financial measures, including MAUs, DAUs, paid subscribers, subscription bookings, total bookings, Adjusted EBITDA and free cash flow, to evaluate growth trends, measure our performance, and make strategic decisions. Our user metrics are calculated using internal company data gathered on an analytics platform that we developed and operate, have not been validated by an independent third party and may differ from estimates or similar metrics published by third parties due to differences in sources, methodologies, or the assumptions on which we rely. Our user metrics are also affected by technology on certain mobile devices that automatically runs in the background of our application when another phone function is used, and this activity can cause our system to miscount the user metrics associated with such an account. We continually seek to improve the accuracy of and our ability to track such data, but given the complexity of the systems involved and the rapidly changing nature of mobile devices and systems, we expect to continue to encounter challenges, particularly if we continue to expand in parts of the world where mobile data systems and connections are less stable. In addition, we may improve or change our methodologies for tracking these metrics over time, which could result in unexpected changes to our metrics, including the metrics we publicly disclose. As a result, while any future periods may benefit from such improvement or change, prior periods may not be as accurate or comparable, or we may need to adjust such prior periods. The methodologies used to measure these metrics require significant judgment and are also susceptible to algorithm or other technical errors. In addition, our methodologies for tracking these metrics may change over time, which could result in unexpected changes to our metrics, including the metrics we publicly disclose. If the internal systems and tools we use to track these metrics undercount or overcount performance or contain algorithmic or other technical errors, the data we report may not be accurate. While these numbers are based on what we believe to be reasonable estimates of our metrics for the applicable period of measurement, there are inherent challenges in measuring how our products are used across large populations globally.

Errors or inaccuracies in our metrics or data could also result in incorrect business decisions and inefficiencies. For instance, if a significant understatement or overstatement of active users were to occur, we may expend resources to implement unnecessary business measures or fail to take required actions to attract a sufficient number of users to satisfy our growth strategies. We continually seek to address technical issues in our ability to record such data and improve our accuracy, but given the complexity of the systems involved and the rapidly changing nature of mobile devices and systems, we expect these issues to continue, particularly if we continue to expand in parts of the world where mobile data systems and connections are less stable. If our operational metrics are not accurate representations of our business, or if investors do not perceive these metrics to be accurate, or if we discover material inaccuracies with respect to these figures, our reputation may be significantly harmed, our stock price

could decline, we may be subject to stockholder litigation, and our business, results of operations, and financial condition could be materially adversely affected.

We rely on third-party platforms such as the Apple App Store and the Google Play Store to distribute our products and collect revenue. If we are unable to maintain a good relationship with such platform providers, if their terms and conditions or pricing changes to our detriment, if we violate, or if a platform provider believes that we have violated, the terms and conditions of its platform, or if any of these platforms loses market share or falls out of favor or is unavailable for a prolonged period of time, our business will suffer.

Our products depend on mobile app stores and other third parties such as data center service providers, as well as third party payment aggregators, computer systems, internet transit providers and other communications systems and service providers. Our mobile applications are almost exclusively accessed through and depend on the Apple App Store and the Google Play Store. While our mobile applications are generally free to download from these stores, we offer our users the opportunity to purchase subscriptions and certain à la carte features through these applications. We determine the prices at which these subscriptions and features are sold. Purchases of these subscriptions and features via our mobile applications are mainly processed through the in-app payment systems provided by Apple and Google. As of March 31, 2023 we paid Apple and Google, as applicable, a meaningful share (generally 15-30%) of the revenue we receive from transactions processed through in-app payment systems. In the three months ended March 31, 2023, we derived 57% of our revenue and 60% of our total bookings from the Apple App Store, and 19% of our revenue and 19% of our total bookings from the Google Play Store. The timing of their payments also may change, which may negatively impact our cash receipts and working capital. While we do not anticipate any interruption in their distribution platforms or ability to accept customer payments, any such disruptions, even temporary, may have material impacts on our business and operations.

We are subject to the standard policies and terms of service of third-party platforms, which govern the promotion, distribution, content and operation generally of apps on the platform. Each platform provider has broad discretion to make changes to its operating systems or payment services or change the manner in which their mobile operating systems function and to change and interpret its terms of service and other policies with respect to us and other developers, and those changes may be unfavorable to us. For example, such changes could limit, eliminate or otherwise interfere with our products, our ability to distribute our applications through their stores, our ability to update our applications, including to make bug fixes or other feature updates or upgrades, the features we provide, the manner in which we market our in-app products, our ability to access native functionality or other aspects of mobile devices, and our ability to access information about our users that they collect. In addition, our distribution agreements with Apple and Google are generally terminable by Apple or Google without cause with 30 days prior written notice (to the extent allowed by applicable local law). Apple and Google may also terminate our agreements with them immediately (unless a longer period is required by applicable law) under certain circumstances, including upon our uncured breach of such agreements. To the extent Apple, Google or other third party platform providers on which we rely make such changes or terminate our agreements with them, our business, financial condition and results of operations could be materially adversely affected.

A platform provider may also change its fee structure, add fees associated with access to and use of its platform, alter how we are able to advertise on the platform, change how the personal information of its users is made available to application developers on the platform, limit the use of personal information for advertising purposes, or restrict how users can share information with their friends on the platform or across platforms. For example, in December 2017, Apple revised its App Store Guidelines to require the disclosure of the odds of receiving certain types of virtual items from “loot boxes” (or similar mechanisms

that offer a paid license to randomized virtual items) before customers purchase a license for the virtual items, and in May 2019 Google revised its Play Store policies to require similar disclosures. As another example, in April 2021 Apple released an update of iOS that requires its users, on an app-by-app basis, to explicitly opt-in to the use of identifier-for-advertising, a device identifier assigned by Apple to each of its devices and used by advertisers to attribute app installs to advertising campaigns, target users through user acquisition, and deliver targeted ads. This led to a reduction in the use of identifiers, and a more challenging environment for publishers and advertisers on iOS devices.

If we violate, or a platform provider believes we have violated, its terms of service (or if there is any change or deterioration in our relationship with these platform providers), that platform provider could limit or discontinue our access to the platform. A platform provider could also limit or discontinue our access to the platform if it establishes more favorable relationships with one or more of our competitors or it determines that we are a competitor. Any limit or discontinuation of our access to any platform could significantly reduce our ability to distribute our products to users, decrease the size of the user base we could convert into paying users, or decrease the revenues we derive from paying users or advertisers, each of which would materially and adversely affect our business, financial condition and results of operations.

We also rely on the continued popularity, customer adoption, and functionality of third-party platforms. In the past, some of these platform providers have been unavailable for short periods of time or experienced issues with their in-app purchasing functionality. If either of these events recurs on a prolonged, or even short-term, basis or other similar issues arise that impact users' ability to access our app or access social features, our business, financial condition, results of operations or reputation may be harmed.

We rely on third-party hosting and cloud computing providers, like Amazon Web Services ("AWS") and Google Cloud, to operate certain aspects of our business. A significant portion of our product traffic is hosted by a limited number of vendors, and any failure, disruption or significant interruption in our network or hosting and cloud services could adversely impact our operations and harm our business.

Our technology infrastructure is critical to the performance of our products and to user satisfaction, as well as our corporate functions. Our products and company systems run on a complex distributed system, or what is commonly known as cloud computing. We own, operate and maintain elements of this system, but significant elements of this system are operated by third-parties that we do not control and which would require significant time and expense to replace. We expect this dependence on third-parties to continue. We have suffered interruptions in service in the past, including when releasing new software versions or bug fixes, and if any such interruption were significant and/or prolonged it could adversely affect our business, financial condition, results of operations or reputation.

In particular, a significant portion, if not almost all, of our product traffic, data storage, data processing and other computing services and systems is hosted by AWS and Google Cloud. AWS and Google Cloud provide us with computing and storage capacity pursuant to an agreement that continues until terminated by either party. The agreements require AWS and Google Cloud to provide us their standard computing and storage capacity and related support in exchange for timely payment by us. We have experienced, and may in the future experience, disruptions, outages and other performance problems due to a variety of factors, including infrastructure changes, human or software errors and capacity constraints. If a particular application is unavailable when users attempt to access it or navigation through a product is slower than they expect, users may stop using the application and may be less likely to return to the application as often, if at all.

Any failure, disruption or interference with our use of hosted cloud computing services and systems provided by third-parties, like AWS or Google Cloud, could adversely impact our business, financial

condition or results of operations. For example, on December 7, 2021, an outage of the AWS platform caused Duolingo to go offline for over 5 hours. To the extent we do not effectively respond to any such interruptions, upgrade our systems as needed and continually develop our technology and network architecture to accommodate traffic, our business, financial condition or results of operations could be adversely affected. Furthermore, our disaster recovery systems and those of third-parties with which we do business may not function as intended or may fail to adequately protect our critical business information in the event of a significant business interruption, which may cause interruption in service of our products, security breaches or the loss of data or functionality, leading to a negative effect on our business, financial condition or results of operations.

In addition, we depend on the ability of our users to access the internet. Currently, this access is provided by companies that have significant market power in the broadband and internet access marketplace, including incumbent telephone companies, cable companies, mobile communications companies, government-owned service providers, device manufacturers and operating system providers, any of whom could take actions that degrade, disrupt or increase the cost of user access to our products or services, which would, in turn, negatively impact our business. The adoption or repeal of any laws or regulations that adversely affect the growth, popularity or use of the internet, including laws or practices limiting internet neutrality, could decrease the demand for, or the usage of, our products and services, increase our cost of doing business and adversely affect our results of operations.

We derive a portion of our revenues from advertisements. If we are unable to continue to compete for these advertisements, or if any events occur that negatively impact our relationships with advertising networks, our advertising revenues and operating results would be negatively impacted.

We generate advertising revenue from the sale of display and video advertising delivered through advertising impressions. In 2023, approximately 10.1% of our total revenues were derived from advertising. We generally enter into arrangements with the major programmatic advertising networks to monetize our advertising inventory. We need to maintain good relationships with these advertising networks to provide us with a sufficient inventory of advertisements. Online advertising, including through mobile applications, is an intensely competitive industry. Many large companies, such as Amazon, Facebook and Google, invest significantly in data analytics to make their websites and platforms more attractive to advertisers. Our advertising revenue is primarily a function of the number and hours of engagement of our free users and our ability to provide innovative advertising products that are relevant to our users, maintain or increase user engagement and satisfaction with our products, and enhance returns for our advertising partners. If our relationship with any advertising partners terminates for any reason, or if the commercial terms of our relationships are changed or do not continue to be renewed on favorable terms, or if we cannot source high-quality ads consistent with our brand or product experience, we would need to qualify new advertising partners, which could negatively impact our revenues, at least in the short term.

In addition, internet-connected devices and operating systems controlled by third parties increasingly contain features that allow device users to disable functionality that allows for the delivery of advertising on their devices or reduce the ability to provide personalized or targeted advertising, which results in less valuable ads. Device and browser manufacturers may include or expand these features as part of their standard device specifications. For example, when Apple announced that UDID, a standard device identifier used in some applications, was being superseded and would no longer be supported, application developers were required to update their apps to utilize alternative device identifiers such as universally unique identifier, or, more recently, identifier-for-advertising, which simplifies the process for Apple users to opt out of behavioral targeting. Furthermore, laws and regulations may also make it more difficult to deliver personalized or targeted advertising or impose requirements that result in more users

making elections to block our ability to deliver targeted ads. If users do not elect to participate in functionality that supports the delivery of targeted advertising on their devices, our ability to deliver effective advertising campaigns could suffer, which could cause our business, financial condition, or results of operations to suffer. While the described changes did not result in material adverse impacts to us, the impact of similar potential future operating systems changes or potential future regulation on targeted advertising is highly uncertain.

If we are not able to maintain the value and reputation of our brand, our ability to expand our base of users may be impaired, and our business and financial results may be harmed.

We believe that our brand has significantly contributed to our word of mouth virality, which has in turn contributed to the success of our business. We also believe that maintaining, protecting and enhancing our brand is critical to expanding our base of users and, if we fail to do so, our business, financial condition and results of operations could be materially adversely affected. We believe that the importance of brand recognition will continue to increase, given the growing number of language learning applications, or “apps,” and the low barriers to entry for companies offering language learning products and services. Many of our new users are referred by existing users. Maintaining our brand will depend largely on our ability to continue to provide useful, reliable, trustworthy and innovative products, which we may not do successfully.

Further, we may experience media, legislative, or regulatory scrutiny of our actions or decisions regarding user privacy, encryption, content, contributors, advertising and other issues, which may materially adversely affect our reputation and brand. In addition, we may fail to respond expeditiously or appropriately to objectionable content within our app or practices by users, or to otherwise address user concerns, which could erode confidence in our brand. Maintaining and enhancing our brand will require us to make substantial investments and these investments may not be successful.

Our growth and profitability rely, in part, on our ability to attract and keep users through cost-effective marketing efforts, including through our social media presence and use of social media influencers. Any failure in these efforts could materially adversely affect our business, financial condition and results of operations.

We have increased our marketing expenditures over time in order to attract and keep users and sustain our growth. For the three months ended March 31, 2023 and 2022, our Sales and marketing expenses were \$16.6 million and \$14.9 million, respectively. Evolving consumer behavior can affect the availability of profitable marketing opportunities. For example, as consumers communicate less via email and more via text messaging, messaging apps and other virtual means, the reach of email campaigns designed to attract new and repeat users (and keep current users) for our products is adversely impacted. To continue to reach potential users and grow our businesses, we must identify and devote our overall marketing activities and expenditures to newer advertising channels, such as mobile and online video platforms as well as targeted campaigns in which we communicate directly with potential, former and current users via new virtual means. For example, in 2021 and 2022, we expanded our activities on the TikTok platform. Generally, the opportunities in and sophistication of newer advertising channels are relatively undeveloped and unproven, and there can be no assurance that we will be able to continue to appropriately manage and fine-tune our marketing efforts in response to these and other trends in the advertising industry. Furthermore, these newer advertising channels often change rapidly and can be subject to disruptions for reasons beyond our control (for example potential US governmental restrictions on the TikTok platform). Any failure to successfully manage our marketing efforts on, or disruptions to,

social media channels that we have come to depend on for marketing could materially adversely affect our business, financial condition and results of operations.

We are subject to certain risks as a mission-based company.

We believe that a critical contributor to our success has been our commitment to make free language learning available worldwide in an effort to help people throughout the world improve their economic outcomes. The mission of Duolingo is a significant part of our business strategy and who we are as a company. We believe that Duolingo users value our commitment to our mission. However, because we hold ourselves to such high standards, and because we believe our users have come to have high expectations of us, we may be more severely affected by negative reports or publicity if we fail, or are perceived to have failed, to live up to Duolingo's mission. For example, maintaining a free version of the app that is both effective and enjoyable is central to Duolingo's mission. As a result, our brand and reputation may be negatively affected by actions we take that are viewed as contrary to that mission, such as features that are only available to paid subscribers or changes to the free offering that are viewed as undermining how fun or effective the free offering is. In these or other circumstances, the damage to our reputation may be greater than to other companies that do not share similar values with us, and it may take us longer to recover from such an incident and gain back the trust of our users.

We may make decisions regarding our business and products in accordance with Duolingo's mission and values that may reduce our short- or medium-term operating results if we believe those decisions are consistent with the mission and will improve the aggregate user experience. Although we expect that our commitment to Duolingo's mission will, accordingly, improve our financial performance over the long term, these decisions may not be consistent with the expectations of investors and any longer-term benefits may not materialize within the time frame we expect or at all, which could harm our business, revenue and financial results.

Unfavorable media coverage could materially adversely affect our business, brand image or reputation.

Unfavorable publicity or media reports regarding us, our privacy practices, our social media activities, data security compromises or breaches, product changes, product or service quality or features, litigation or regulatory activity or regarding the actions of our partners, our users, our employees or other companies in our industry, could materially adversely affect our brand image or reputation, regardless of the veracity of such publicity or media reports. If we fail to protect our brand image or reputation, we may experience material adverse effects to the size, demographics, engagement, and loyalty of our user base, resulting in decreased revenue, fewer app installs (or increased app uninstalls), or slower user growth rates. Damage to our brand or reputation could also adversely affect educational institutions' willingness to accept the Duolingo English Test, which in turn could slow the growth of, or reduce, our revenue from the Duolingo English Test. In addition, if securities analysts or investors perceive any media coverage of us to be negative, the price of our Class A common stock may be materially adversely affected. Any of the foregoing could materially adversely affect our business, financial condition and results of operations.

Our future success depends on the continuing efforts of our key employees and our ability to attract and retain highly skilled personnel and senior management.

We currently depend on the continued services and performance of our key personnel, including Luis von Ahn and Severin Hacker. If one or more of our executive officers or key employees were unable or unwilling to continue their employment with us, we might not be able to replace them easily, in a timely manner, or at all. The risk that competitors or other companies may poach our talent increases as we continue to build our brands and become more well-known. Our key personnel have been, and may continue to be, subject to poaching efforts by our competitors and other internet and high-growth companies, including well-capitalized players in the social media and consumer internet space. The loss

of key personnel, including members of management as well as key engineering, product development, design and marketing personnel, could disrupt our operations and have a material adverse effect on our business. The success of our brand also depends on the commitment of our key personnel to our mission. To the extent that any of our key personnel act in a way that does not align with our mission, our reputation could be materially adversely affected. See “—Our employees, consultants and third party providers could engage in misconduct that materially adversely affects us.”

Our future success will depend upon our continued ability to identify, hire, develop, motivate, and retain highly skilled individuals across the globe, with the continued contributions of our senior management being especially critical to our success. Competition for well-qualified, highly skilled employees in our industry is intense and our continued ability to compete effectively depends, in part, upon our ability to attract and retain new employees. While we have established programs to attract new employees and provide incentives to retain existing employees, particularly our senior management, we cannot guarantee that we will be able to attract new employees or retain the services of our senior management or any other key employees in the future. Additionally, we believe that our culture and core values have been, and will continue to be, a key contributor to our success and our ability to foster the innovation, creativity and teamwork we believe we need to support our operations. If we fail to effectively manage our hiring needs and successfully integrate our new hires, or if we fail to effectively manage remote work arrangements, our efficiency and ability to meet our forecasts and our ability to maintain our culture, employee morale, productivity and retention could suffer, and our business, financial condition and results of operations could be materially adversely affected.

Finally, effective succession planning is also important to our future success. If we fail to ensure the effective transfer of senior management knowledge and smooth transitions involving senior management across our various businesses, our ability to execute short and long term strategic, financial and operating goals, as well as our business, financial condition, and results of operations generally, could be materially adversely affected.

Our employees, consultants and third party providers could engage in misconduct that materially adversely affects us.

Our employees, consultants and third party providers could engage in misconduct that materially and adversely affects us. Misconduct by these parties could include intentional failures to comply with the applicable laws and regulations in the United States and abroad, report financial information or data accurately or disclose unauthorized activities to us. These laws and regulations may restrict or prohibit a wide range of pricing, discounting and other business arrangements. Such misconduct could result in legal or regulatory sanctions and cause serious harm to our reputation. It is not always possible to identify and deter misconduct by these parties, and any other precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses, or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to comply with these laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could result in the imposition of significant civil, criminal and administrative penalties, which could have a significant impact on our business. Whether or not we are successful in defending against such actions or investigations, if any of our employees, consultants or third party providers were to engage in or be accused of misconduct, we could be exposed to legal liability, incur substantial costs, our business and reputation could be materially adversely affected, and we could fail to retain key employees. See “—Unfavorable media coverage could materially adversely affect our business, brand image or reputation.”

If the recognition by schools, governments, and other institutions of the value of technology-based assessment does not continue to grow, or if such institutions reduce their reliance on the

Duolingo English Test or assessment in general, our ability to generate revenue from our assessment, including our Duolingo English Test, could be impaired.

The success of the Duolingo English Test depends in part upon the continued recognition and acceptance by schools, governments, and other institutions of technology-based assessment, such as the Duolingo English Test, and upon the continued utilization of assessment in general. As a result of the COVID-19 pandemic, in 2020, a number of universities waived standardized test requirements for admissions requirements and some universities plan to phase out requirements for standardized testing altogether. In addition, some have questioned the validity of language assessments taken online. If schools, governments, and other institutions reduce their reliance, or altogether cease to use standardized testing as part of admissions processes or otherwise, or reduce or eliminate reliance on standardized testing, it would have a material adverse effect on our Duolingo English Test business, which could adversely affect our revenues and results of operations.

Similarly, we continually seek to expand the number of schools, governments, and other institutions that accept the Duolingo English Test, including through direct engagement, government tenders, and other channels. If we are unable to do so, or if schools, governments, and other institutions rescind their acceptance of the Duolingo English Test, it may have a material adverse effect on our ability to grow the number of tests taken through the Duolingo English Test. For example, loss of confidence in the Duolingo English Test's validity, security, or other characteristics could lead to a reduction in the number of accepting institutions, which could in turn reduce the appeal of the Duolingo English Test to test takers and adversely affect our revenues and results of operations. See “—Unfavorable media coverage could materially adversely affect our business, brand image or reputation.”.

We operate in various international markets, including certain markets in which we have limited experience. As a result, we face additional risks in connection with certain of our international operations.

Both our language learning application and the Duolingo English Test are available all over the world. Operating internationally, particularly in countries in which we have limited experience, exposes us to a number of additional risks, including:

- operational and compliance challenges caused by distance, language and cultural differences;
- the cost and resources required to localize our platform and services, which often requires the translation of our platform into foreign languages and adaptation for local practices and regulatory requirements;
- difficulties in staffing and managing international operations;
- differing levels of social and technological acceptance of our products or lack of acceptance of them generally;
- foreign currency fluctuations, and in particular, decreases in the value of foreign currencies relative to the US dollar;
- restrictions on the transfer of funds among countries and back to the United States, as well as costs associated with repatriating funds to the United States;
- differing and potentially adverse tax laws, including resulting from the complexities of foreign corporate income tax systems, value added tax (“VAT”) regimes, tax withholding rules, and other indirect taxes, tax collection or remittance obligations, and restrictions on the repatriation of earnings;

- multiple, conflicting and changing laws, rules and regulations, and difficulties understanding and ensuring compliance with those laws, rules and regulations by both our employees and our users, over whom we exert no control;
- compliance challenges due to different laws and regulatory environments, particularly in the case of privacy, data security, and content, which are complex, sometimes inconsistent, and subject to unexpected changes;
- competitive environments that favor local businesses;
- reduced or varied protection for our intellectual property rights in some countries;
- low usage and/or penetration of internet-connected consumer electronic devices;
- political tension or social unrest and economic instability, particularly in countries in which we operate;
- trade sanctions, political unrest, terrorism, war, health and safety epidemics (such as the COVID-19 pandemic) or the threat of any of these events; and
- breaches or violation of any anti-corruption laws, rules or regulations applicable to our business, including but not limited to the Foreign Corrupt Practices Act of 1977, as amended.

Moreover, geopolitical tensions or regulatory uncertainty in countries in which we operate, such as China, may prevent us from operating in certain countries or increase our costs of operating in those countries. Additionally, if enforcement authorities demand access to our user data or require that we obtain hard to obtain local licenses, our failure to comply with those demands or obtain those licenses could lead to our inability to operate in such countries or other punitive acts.

In addition to the factors listed above, we have invested to expand our operations in China, which is an intensely competitive market, both on the consumer side and from a talent perspective. We expect to continue to incur significant expenses to operate our business in China, and we may not achieve profitability in that market. As we expand our operations in China, the above factors, sentiment of the workforce in China, and China's policy towards foreign direct investment and for profit educational technology companies may particularly impact our operations in China. Further, as we expand our operations in China, we expect to continue to make modifications to the way our website, mobile apps, offerings, and features function in China as compared to other countries. In addition, we need to ensure that our business practices in China are compliant with local laws and regulations, which may be interpreted and enforced in ways that are different from our interpretation, and/or create obligations on us that are costly to meet or conflict with laws in other jurisdictions. For instance, in the fall of 2021 our language learning application became unavailable for download on most app stores in China. While this was temporary and we were reinstated in May 2022, it serves as an example of how the Chinese regulatory regime could adversely impact our efforts in China. Our office of over 30 employees in Beijing makes it easier for the Chinese authorities to bring enforcement actions against us.

The occurrence or impact of any or all of the events described above could materially adversely affect our international operations, which could in turn materially adversely affect our business, financial condition and results of operations.

An economic downturn or economic uncertainty may adversely affect consumer discretionary spending and demand for our products and services.

Our products and services may be considered discretionary items for consumers. Factors affecting the level of consumer spending for such discretionary items include general economic conditions, and other factors, such as consumer confidence in future economic conditions, fears of recession, inflation, the

availability and cost of consumer credit, levels of unemployment, and tax rates. In recent years, the United States and other significant economic markets have experienced cyclical downturns and worldwide economic conditions remain uncertain. As global economic conditions continue to be volatile or economic uncertainty remains, trends in consumer discretionary spending also remain unpredictable and subject to reductions. To date, our business has operated almost exclusively in a relatively strong economic environment and, therefore, we cannot be sure the extent to which we may be affected by recessionary conditions. Unfavorable economic conditions may lead consumers to delay or reduce purchases of our products and consumer demand for our products may not grow as we expect. Our sensitivity to economic cycles and any related fluctuation in consumer demand for our products and services could materially adversely affect our business, financial condition, and results of operations. In addition, political instability or adverse political developments, could harm our business, financial condition and results of operations.

Security breaches of our networks, systems or applications, improper unauthorized access to or disclosure of our proprietary data or user-related data, including personal data, other hacking and phishing attacks on our systems or service, or other cyber incidents could disrupt our services or compromise sensitive information related to our business and/or personal data processed by us or on our behalf and expose us to liability, which could harm our reputation and materially adversely affect our business.

Our products and services and the operation of our business involve the collection, storage, processing, and transmission of data, including personal data. The information systems that store and process such data are susceptible to increasing threats of continually evolving cybersecurity risks. In particular, our industry is prone to cyber-attacks by third parties seeking unauthorized access to confidential or sensitive data, including user personal data, or to disrupt our ability to provide services. We face an ever-increasing number of threats to our information systems from a broad range of threat actors, including foreign governments, criminals, competitors, computer hackers, cyber terrorists and politically motivated groups or individuals, and we have previously experienced various attempts to access our information systems. These threats include physical or electronic break-ins, security breaches from inadvertent or intentional actions by our employees, contractors, consultants, and/or other third parties with otherwise legitimate access to our systems, website or facilities, or from cyber-attacks by malicious third parties which could breach our data security and disrupt our systems. The motivations of such actors may vary, but breaches that compromise our information technology systems or the personal data processed on such systems can cause interruptions, delays or operational malfunctions, which in turn could have a material adverse effect on our business, results of operations, financial condition and prospects.

In addition, the risks related to a security breach or disruption, including through ransomware, a distributed denial-of-service (“DDoS”) attack, computer malware, viruses, social engineering (predominantly spear phishing attacks), and general hacking, have become more prevalent in our industry and have generally increased as the number, intensity, and sophistication of attempted attacks and intrusions from around the world have increased.

Such security breaches or disruptions have occurred on our systems in the past and will occur on our systems in the future. We also regularly encounter attempts to create false or undesirable user accounts and ads or take other actions on our platform for objectionable ends. As a result of our prominence, the size of our user base, the volume of personal data on our systems, and the evolving nature of our products and services (including our efforts involving new and emerging technologies), we may be a particularly attractive target for such attacks, including from highly sophisticated, state-sponsored, or otherwise well-funded criminal actors.

Our efforts to address undesirable activity on our platform also increase the risk of retaliatory attacks. Such breaches and attacks on us or our third-party service providers may cause interruptions to the

services we provide, degrade the user experience, cause users or marketers to lose confidence and trust in our products and decrease the use of our products or stop using our products in their entirety, impair our internal systems, or result in financial harm to us. Any failure to prevent or mitigate security breaches and unauthorized access to or disclosure of our data or user data, including personal information, content, or payment information from users, or information from marketers, could result in the loss, modification, disclosure, destruction, or other misuse of such data, which could subject us to legal liability and penalties, harm our business and reputation and diminish our competitive position. We may incur significant costs in protecting against or remediating such incidents and as cybersecurity incidents continue to evolve, we may be required to expend significant additional resources to continue to modify or enhance our protective measures or to investigate and remediate any information security vulnerabilities. Our efforts to protect our confidential and sensitive data, the data of our users or other personal information we receive, and to prevent or disable undesirable activities on our platform, may also be unsuccessful due to software bugs or other technical malfunctions; employee, contractor, or vendor error or malfeasance, including defects or vulnerabilities in our service providers' information technology systems or offerings; government surveillance; breaches of physical security of our facilities or technical infrastructure; or other threats that may surface or evolve.

In addition, third parties may attempt to fraudulently induce employees or users to disclose information in order to gain access to our data or our users' data. Cyber-attacks, including account take over, have increased. Account take over attacks occur when users re-use passwords from other sites, those sites have data leaks, and attackers use the leaked credentials from the other site to log in as those users on our site. Cyber-attacks continue to evolve in sophistication and volume, and may be difficult to detect for long periods of time. Although we have developed systems and processes that are designed to protect our data and user data, to prevent data loss, to disable undesirable accounts and activities on our platform, and to prevent or detect security breaches, we cannot assure you that such measures will be successful, that we will be able to anticipate or detect all cyber-attacks or other breaches, that we will be able to react to cyber-attacks or other breaches in a timely manner, or that our remediation efforts will be successful. We may incur significant costs in connection with such remediation efforts, including the costs of notifying applicable regulators and affected users, or offering credit monitoring services. We may also incur significant legal and financial exposure, including legal claims, higher transaction fees and regulatory fines and penalties as a result of any compromise or breach of our systems or data security, or the systems and data security of our third party providers. In addition, even though some user accounts are compromised due to user error or breaches unrelated to our products or security (such as during an account take over attack), users or the general public may become less confident in our product as a result of such compromises. Any of the foregoing could have a material adverse effect on our business, financial condition, results of operations and prospects.

In addition, some of our partners may receive or store information provided by us or by our users through mobile or web applications integrated with our applications and we use third-party service providers to store, transmit and otherwise process certain confidential, sensitive or personal information on our behalf. If these third parties fail to adopt or adhere to adequate data security practices, or in the event of a breach of their networks, our data or our users' data may be improperly accessed, used, or disclosed, which could subject us to legal liability. We cannot control such third parties and cannot guarantee that a security breach will not occur on their systems. Although we may have contractual protections with our third-party service providers, contractors and consultants, any actual or perceived security breach could harm our reputation and brand, expose us to potential liability or require us to expend significant resources on data security and in responding to any such actual or perceived breach. Any contractual protections we may have from our third-party service providers, contractors or consultants may not be sufficient to adequately protect us from any such liabilities and losses, and we may be unable to enforce any such contractual protections.

While our insurance policies include liability coverage for certain of these matters, subject to retention amounts that could be substantial, if we experience a significant security incident, we could be subject to liability or other damages that exceed our insurance coverage and we cannot be certain that such insurance policies will continue to be available to us on economically reasonable terms, or at all, or that any insurer will not deny coverage as to any future claim. The successful assertion of one or more large claims against us that exceed available insurance coverage, or the occurrence of changes in our insurance policies, including premium increases or the imposition of large deductible or co-insurance requirements, could have a material adverse effect on our results of operations, financial condition and cash flows.

If the security of personal and confidential or sensitive user information that we maintain and store is breached, or otherwise accessed by unauthorized persons, it may be costly to remediate such breach, subject us to regulatory investigations or private party lawsuits, and our reputation could be harmed.

We receive, process, store, and transmit personal user and other confidential or sensitive information, including credit card information and personal information of our employees and users. In some cases, we engage third-party service providers to process or store this information. We continuously develop and maintain systems to protect the security, integrity and confidentiality of this information, but we have experienced past incidents (which to our knowledge were immaterial) and cannot guarantee that inadvertent or unauthorized use or disclosure of such information will not occur in the future or that third parties will not gain unauthorized access to such information despite our efforts. When such incidents occur, we may not be able to remedy them, we may be required by law to notify regulators and individuals whose personal information was used or disclosed without authorization, we may be subject to claims against us, including government enforcement actions or investigations, fines and litigation, and we may have to expend significant capital and other resources to mitigate the impact of such events, including developing and implementing protections to prevent future events of this nature from occurring. When breaches of our or our third-party service providers' and partners' information technology systems occur or unauthorized access to any of the confidential, sensitive or other personal information we collect or process occurs, the perception of the effectiveness of our security measures, the security measures of our partners and our reputation may be harmed, we may lose current and potential users and the recognition of our various brands and such brands' competitive positions may be diminished, any or all of which might materially adversely affect our business, financial condition and results of operations. In addition even if there has not been an actual breach, the mere allegation of a breach (such as when a third party aggregates publicly available data on our users via data-scraping for example and makes it available) can adversely affect the perception of the effectiveness of our security measures, how safe it is to use our applications and our reputation, which could have similar effects to an actual breach. See “—The varying and rapidly-evolving regulatory framework on privacy and data protection across jurisdictions could result in claims, changes to our business practices, monetary penalties, increased cost of operations, or declines in user growth or engagement, or otherwise harm our business.”

We are subject to a number of risks related to credit card payments, including data security breaches and fraud that we or third parties experience or additional regulation, any of which could materially adversely affect our business, financial condition and results of operations.

In addition to purchases through the Apple App Store and the Google Play Store, we accept payment from our users through credit card transactions, certain online payment service providers, and mobile payment platforms. The ability to access credit card information on a real-time basis without having to proactively reach out to the consumer each time we process an auto-renewal payment or a payment for the purchase of a premium feature on any of our products is critical to our success and a seamless experience for our users.

When we or a third party experiences a data security breach involving credit card information, affected cardholders will often cancel their credit cards. In the case of a breach experienced by a third party, the more sizable the third party's customer base and the greater the number of credit card accounts impacted, the more likely it is that our users would be impacted by such a breach. To the extent our users are ever affected by such a breach experienced by us or a third party, affected users would need to be contacted to obtain new credit card information and process any pending transactions. It is likely that we would not be able to reach all affected users, and even if we could, some users' new credit card information may not be obtained and some pending transactions may not be processed, which could materially adversely affect our business, financial condition and results of operations.

Our third party payment service providers utilize tokenization tools to replace sensitive cardholder information with a stand-in token to help secure individual cardholder bank account details in credit card transactions and to reduce the number of systems that have access to our customers' credit card information. While these tokenization tools can help limit the data security risks associated with credit card transactions, it does not eliminate those risks altogether.

Even if our users are not directly impacted by a given data security breach, they may lose confidence in the ability of service providers to protect their personal information generally, which could cause them to stop using their credit cards online and choose alternative payment methods that are not as convenient for us or restrict our ability to process payments without significant cost or user effort.

Additionally, if we fail to adequately prevent fraudulent credit card transactions, we may face litigation, fines, governmental enforcement action, civil liability, diminished public perception of our security measures, significantly higher credit card-related costs and substantial remediation costs, or refusal by credit card processors to continue to process payments on our behalf, any of which could materially adversely affect our business, financial condition and results of operations.

Finally, the passage or adoption of any legislation or regulation affecting the ability of service providers to periodically charge consumers for, among other things, recurring subscription payments may materially adversely affect our business, financial condition and results of operations. Legislation or regulation regarding the foregoing, or changes to existing legislation or regulation governing subscription payments, are being considered in many states in the US. While we monitor and attempt to comply with these legal developments, we have been in the past, and may be in the future, subject to claims under such legislation or regulation.

Our success depends, in part, on the integrity of our information technology systems and infrastructures and on our ability to enhance, expand and adapt these systems and infrastructures in a timely and cost-effective manner.

In order for us to succeed, our information technology systems and infrastructures must perform well on a consistent basis. Our products and systems rely on software and hardware that are highly technical and complex, and depend on the ability of such software and hardware to store, retrieve, process and manage immense amounts of data. We have in the past experienced, and we may from time to time in the future experience, system interruptions that make some or all of our systems or data temporarily unavailable and prevent our products from functioning properly for our users; any such interruption could arise for any number of reasons, including software bugs and human errors. Further, our systems and infrastructures are vulnerable to damage from fire, power loss, hardware and operating software errors, cyber-attacks, technical limitations, telecommunications failures, acts of God and similar events. While we have backup systems in place for certain aspects of our operations, not all of our systems and infrastructures are fully redundant. We do not have a formal disaster recovery plan, and system backups do not account for all possible eventualities and our property and business interruption insurance coverage may not be adequate to compensate us fully for any losses that we may suffer. Any interruptions or outages,

regardless of the cause, could negatively impact our users' experiences with our products, tarnish our brands' reputations and decrease demand for our products, any or all of which could materially adversely affect our business, financial condition and results of operations. Moreover, even if detected, the resolution of such interruptions may take a long time, during which customers may not be able to access, or may have limited access to, the service. See “—Security breaches of our networks, systems or applications, improper unauthorized access to or disclosure of our proprietary data or user-related data, including personal data, other hacking and phishing attacks on our systems or service, or other cyber incidents could disrupt our services or compromise sensitive information related to our business and/or personal data processed by us or on our behalf and expose us to liability, which could harm our reputation and materially adversely affect our business.”

We also continually work to expand and enhance the efficiency and scalability of our technology and network systems to improve the experience of our users, accommodate substantial increases in the volume of traffic to our various products, ensure acceptable load times for our products and keep up with changes in technology and user preferences. Any failure to do so in a timely and cost-effective manner could materially adversely affect our users' experience with our various products and thereby negatively impact the demand for our products, and could increase our costs, either of which could materially adversely affect our business, financial condition and results of operations.

We may experience operational and financial risks in connection with acquisitions.

We may seek potential acquisition candidates to add complementary companies, products or technologies. For example, in October 2022, we completed the acquisition for the assets of Gunner Made LLC (“Gunner”), a wholly owned entity of PNG Holdings LLC, a design and animation studio based in Detroit, Michigan. The identification of suitable acquisition candidates can be difficult, time-consuming and costly, and we may not be able to successfully complete identified acquisitions. We may experience operational and financial risks in connection with historical and future acquisitions if we are unable to:

- properly value prospective acquisitions, especially those with limited operating histories;
- accurately review acquisition candidates' business practices against applicable laws and regulations and, where applicable, implement proper remediation controls, procedures, and policies;
- successfully integrate the operations, as well as the accounting, financial controls, management information, technology, human resources and other administrative systems, of acquired businesses with our existing operations and systems;
- overcome cultural challenges associated with integrating employees from the acquired company into our organization;
- successfully identify and realize potential synergies among acquired and existing businesses;
- fully identify potential risks and liabilities associated with acquired businesses, including intellectual property infringement claims, violations of laws, commercial disputes, tax liabilities, litigation or other claims in connection with the acquired company, including claims from terminated employees, former stockholders or other third parties, and other known and unknown liabilities;
- retain or hire senior management and other key personnel at acquired businesses; and
- successfully manage acquisition-related strain on our management, operations and financial resources and those of the various brands in our portfolio

Furthermore, we may not be successful in addressing other challenges encountered in connection with our acquisitions. The anticipated benefits of one or more of our acquisitions may not be realized or the value of goodwill and other intangible assets acquired could be impacted by one or more continuing unfavorable events or trends, which could result in significant impairment charges. The occurrence of any of these events could have a material adverse effect on our business, financial condition and results of operations.

Additionally, the integration of acquisitions requires significant time and resources, and we may not manage these processes successfully. Our ability to successfully integrate complex acquisitions is unproven, particularly with respect to companies that have significant operations or that develop products with which we do not have prior experience. We may make substantial investments of resources to support our acquisitions, which would result in significant ongoing operating expenses and may divert resources and management attention from other areas of our business. We cannot assure you that these investments will be successful. If we fail to successfully integrate the companies we acquire, we may not realize the benefits expected from the transactions and our business may be harmed.

Foreign currency exchange rate fluctuations could adversely affect our results of operations.

Our functional currency is the US dollar, our operating expenses are denominated in the currencies of the countries in which our operations are located, which are primarily in the United States, China and Germany. Our consolidated results of operations and cash flows are, therefore, subject to fluctuations due to changes in foreign currency exchange rates and may be adversely affected in the future due to changes in foreign exchange rates. In addition, certain of our payment providers translate our payments from local currency into USD at time of settlement, which means that during periods of a strengthening US dollar, our international receipts could be reduced. In addition, as foreign currency exchange rates fluctuate, the translation of our international receipts into US dollars affects the period-over-period comparability of our operating results and can result in foreign currency exchange gains and losses. We have not entered into any hedging arrangements with respect to foreign currency risk or other derivative financial instruments, although we may choose to do so in the future. The use of such hedging activities may not offset any or more than a portion of the adverse financial effects of unfavorable movements in foreign exchange rates and may introduce additional risks if we are unable to structure effective hedges with such instruments.

The estimates of market opportunity and forecasts of market growth included in this Quarterly Report on Form 10-Q may prove to be inaccurate, and even if the market in which we compete achieves the forecasted growth, our business could fail to grow at similar rates, if at all.

Market opportunity estimates and expectations about market growth included in this Quarterly Report on Form 10-Q are subject to significant uncertainty and are based on assumptions and estimates that may not prove to be accurate. Even if the markets in which we compete meet the size estimates and growth expectations included in this Quarterly Report on Form 10-Q, our business could fail to grow for a variety of reasons, which could adversely affect our results of operations.

Risks Related to Legal and Regulatory Compliance

Our business is subject to complex and evolving US and international laws and regulations. Many of these laws and regulations are subject to change and uncertain interpretation, and could result in claims, changes to our business practices, monetary penalties, increased cost of operations, or declines in user growth or engagement, or otherwise harm our business.

We are subject to a variety of laws and regulations in the United States and abroad that involve matters that are important to or may otherwise impact our business, including, among others, broadband internet access, online commerce, advertising, user privacy, data protection, intermediary liability, protection of

minors, consumer protection, accessibility, immigration and university admissions, taxation and securities law compliance. The introduction of new products, expansion of our activities in certain jurisdictions, or other actions that we may take may subject us to additional laws, regulations or other government scrutiny. In addition, foreign laws and regulations can impose different obligations or be more restrictive than those in the United States.

These US federal, state, and municipal and foreign laws and regulations, which in some cases can be enforced by private parties in addition to government entities, are constantly evolving and can be subject to significant change.

In addition, the introduction of new brands and products, or changes to our existing brand and products, may result in new or enhanced governmental or regulatory scrutiny. As a result, the application, interpretation, and enforcement of these laws and regulations are often uncertain, particularly in the new and rapidly-evolving industry in which we operate, and may be interpreted and applied inconsistently from state to state and country to country and inconsistently with our current policies and practices. These laws and regulations, as well as any associated inquiries or investigations or any other government actions, may be costly to comply with and may delay or impede the development of new products, require that we change or cease certain business practices, result in negative publicity, increase our operating costs, require significant management time and attention, and subject us to remedies that may harm our business, including fines, demands or orders that require us to modify or cease existing business practices. For example, a variety of laws and regulations govern the ability of users to cancel subscriptions and auto-payment renewals. We have in the past and may in the future be subject to claims under such laws and regulations that could materially adversely affect our business.

The promulgation of new laws or regulations, or the new interpretation of existing laws and regulations, in each case, that restrict or otherwise unfavorably impact our business, or our ability to provide or the manner in which we provide our services, could require us to change certain aspects of our business and operations to ensure compliance, which could decrease demand for services, reduce revenues, increase costs and subject us to additional liabilities.

The adoption of any laws or regulations that adversely affect the popularity or growth in use of the internet or our services, including laws or regulations that undermine open and neutrally administered internet access, could decrease user demand for our service offerings and increase our cost of doing business, any of which could have a material adverse effect on our business, financial condition and results of operations.

Our failure to comply with US and foreign export controls, sanctions and other trade laws and regulations could have a material adverse effect on our business.

We are subject to rules and regulations of the United States and other relevant authorities relating to export controls and economic and trade sanctions, including sanctions administered by the Office of Foreign Assets Control (“OFAC”) within the US Department of the Treasury, as well as the Export Administration Regulations (i.e. export controls) administered by the Department of Commerce. These laws and regulations limit our ability to market, sell, distribute or otherwise transfer our products, software, or technology to, or otherwise transact or deal with, certain countries, territories, governments, and persons, absent US government permissions or exemptions.

Further, we have historically provided services to users in countries that are the target of US sanctions, such as Syria. We believe our provision of such services is in compliance with applicable law, and have implemented various control mechanisms to maintain such compliance. We have also secured a license from OFAC to provide certain of our services to end-users in Syria, which we renewed in 2022 for an additional two years. There is no assurance that OFAC will agree to extend or renew our license.

While we have taken steps to comply with these rules and regulations, a determination that we have failed to comply, whether knowingly or inadvertently, may result in substantial penalties, including fines, enforcement actions, civil and/or criminal sanctions, the disgorgement of profits, and may materially adversely affect our business, results of operations and financial condition

Our success depends, in part, on our ability to access, protect, collect, and use personal data about our users and payers, and to comply with applicable data privacy laws.

Increased regulation of data utilization practices, including self-regulation, new laws, or findings or guidance under existing laws that limit our ability to collect, disclose, process, transfer, retain and use information and other data, could have a material adverse effect on our business. In addition, if we were to disclose information and other data about our users in a manner that was objectionable to them, our business reputation could be materially adversely affected, and we could face potential legal claims that could impact our operating results. Internationally, we may become subject to additional and/or more stringent legal obligations concerning our treatment of customer and other personal information, such as laws regarding data localization and/or restrictions on data export. For example, in July 2020 the Court of Justice of the European Union (“CJEU”) invalidated the EU-US Privacy Shield Framework (“Privacy Shield”) under which personal data could be transferred from the European Economic Area (“EEA”) and the United Kingdom to entities in the United States who had self-certified under the Privacy Shield scheme. This has led to uncertainty about the adequate transfer mechanisms for other personal data transfers from the EEA and the United Kingdom to the United States or interruption of such transfers. In the event that any court of law orders the suspension of personal data transfers to or from a particular jurisdiction this could give rise to operational interruption in the performance of services for customers, greater costs to implement alternative data transfer mechanisms that are still permitted, regulatory liabilities or reputational harm. Failure to comply with evolving privacy laws could subject us to liability and expose us to fines, penalties and compliance orders, and to the extent that we need to alter our business model or practices to adapt to these obligations, we could incur additional expenses, which may in turn materially adversely affect our business, financial condition, and results of operations. See “—The varying and rapidly-evolving regulatory framework on privacy and data protection across jurisdictions could result in claims, changes to our business practices, monetary penalties, increased cost of operations, or declines in user growth or engagement, or otherwise harm our business.”

Additionally, privacy activist groups have previously and may continue to provide resources to support individuals who wish to pursue privacy claims or put pressure on companies to change data processing practices. High-profile brands such as ours risk being targeted by such groups and there is a risk that if a user became disgruntled with our data processing practices they could leverage support from such privacy activist groups to take legal action, initiate regulatory investigation or gain publicity for their cause. There is a risk that these groups will seek to challenge our practices, particularly in relation to targeted advertising or international data transfers. Any such campaign could require significant resources to mount a response and could lead to negative publicity and potential investigation from regulators, any of which may materially adversely affect our business, financial condition, and results of operations.

The varying and rapidly-evolving regulatory framework on privacy and data protection across jurisdictions could result in claims, changes to our business practices, monetary penalties, increased cost of operations, brand damage, or declines in user growth or engagement, or otherwise harm our business.

As discussed above, we process personal information, personal data and other regulated information both from our employees and our users. There are numerous laws in the countries in which we operate regarding privacy and the storage, sharing, use, transfer, disclosure, protection and otherwise processing of this kind of information, the scope of which are constantly changing, and in some cases, inconsistent and conflicting and subject to differing interpretations, as new laws of this nature are proposed and

adopted and we currently, and from time to time, may not be in technical compliance with all such laws. Such laws also are becoming increasingly rigorous and could be interpreted and applied in ways that may have a material adverse effect on our business, financial condition, results of operations and prospects. Therefore, enforcement practices are likely to remain uncertain for the foreseeable future. In recent years, there has been an increase in attention to and regulations of data protection and data privacy across the globe, including in the United States, the EEA and the United Kingdom. We are subject to various data protection laws, including: the General Data Protection Regulation 2016/679 (GDPR) in the EEA, the United Kingdom data protection regime consisting primarily of (i) the UK General Data Protection Regulation and (ii) the UK Data Protection Act 2018 (collectively (i) and (ii), the UK GDPR), the Personal Information Protection Law (“PIPL”) in China, the California Consumer Privacy Act (“CCPA”), , the California Privacy Rights Act of 2020 (“CPRA”) and the Virginia Consumer Data Protection Act (“CDPA” in the United States, and the Brazilian General Data Protection Law, which imposes requirements similar to the GDPR on products and services offered to users in Brazil. We may be subject to additional privacy regulations in the future. Other comprehensive data privacy or data protection laws or regulations have been passed or are under consideration in other jurisdictions, including China, India and Japan. Laws such as these give rise to an increasingly complex set of compliance obligations on us, as well as on many of our service providers. These laws impose restrictions on our ability to gather personal data, provide individuals with the ability to opt out of personal data collection and control how their personal data is processed, impose obligations on our ability to share personal data with others, limit the geographic locations in which we can store personal data, and potentially subject us to fines, lawsuits, and regulatory scrutiny.

For example, the GDPR and the UK GDPR impose strict data protection compliance requirements including: providing detailed disclosures about how personal data is collected and processed (in a concise, intelligible and easily-accessible form); demonstrating that an appropriate legal basis is in place or otherwise exists to justify data processing activities; complying with rights for data subjects in regard to their personal data (including the right to be “forgotten” and the right to data portability); notifying data protection regulators or supervisory authorities (and in certain cases, affected individuals) of significant data breaches; ensuring appropriate safeguards are in place where personal data is transferred out of the EEA and the United Kingdom; limiting retention of personal data; maintaining a record of processing activities; and complying with the principle of accountability and the obligation to demonstrate compliance through policies, procedures, training and audit. The GDPR and the UK GDPR create compliance obligations that are also applicable to entities established outside the EEA/United Kingdom, which offer goods or services to individuals located in the EEA/United Kingdom or which observe the behavior of individuals located in the EEA/United Kingdom. This has created a greater compliance burden for us and other companies with users or employees in the EEA and the United Kingdom, as the legal regimes may subject non-compliant entities to substantial monetary penalties. In particular, fines for the most serious violations under the GDPR and the UK GDPR may amount to the greater of €20 million/£17.5 million or, in the case of an undertaking, up to 4% of the total worldwide annual group turnover of the preceding financial year. Since we are subject to the supervision of relevant data protection authorities under both the GDPR and the UK GDPR, we could be fined under each of those regimes independently in respect of the same violation. In addition to potential substantial fines, non-compliance could result in regulatory investigations, reputational damage, orders to cease/ change the processing of personal data, enforcement notices, and/ or assessment notices (for a compulsory audit). We may also face civil claims including representative actions and other class action type litigation (where individuals have suffered harm), potentially amounting to significant compensation or damages liabilities, as well as associated costs and diversion of internal resources.

As noted above, the CJEU invalidated the Privacy Shield on July 16, 2020 and, while it upheld the adequacy of the EU standard contractual clauses (a standard form of contract approved by the European

Commission (“SCCs”) as an adequate transfer mechanism for personal data, and potential alternative to the Privacy Shield), it made clear that reliance on them alone may not necessarily be sufficient in all circumstances. Use of the SCCs must be assessed on a case-by-case basis taking into account the legal regime applicable in the destination country, in particular surveillance laws and the rights of individuals and additional measures and/or contractual provisions may need to be adopted, however, the nature of these additional measures is currently uncertain. The CJEU went on to state that, if the competent supervisory authority believes that the SCCs cannot be complied with in the destination country and the required level of protection cannot be secured by other means, such supervisory authority is under an obligation to suspend or prohibit that transfer unless the data exporter has already done so itself. We rely on a mixture of mechanisms to transfer personal data from the EEA and the United Kingdom to the United States and other jurisdictions deemed non-adequate, and are evaluating what additional mechanisms may be required to establish adequate safeguards for personal data. As supervisory authorities continue to issue further guidance on personal data export mechanisms, including circumstances where the SCCs cannot be used and/or start taking enforcement action, and court cases progress, there will be uncertainty as to how we comply with EEA and United Kingdom privacy laws and we could suffer additional costs, complaints, and/or regulatory investigations or fines. While a new EU-U.S. data transfer framework has been proposed, it remains subject to further scrutiny before it may be fully implemented. Accordingly, compliance requirements remain uncertain as do the costs or business changes that may be ultimately required by law. If we are otherwise unable to transfer personal data between and among countries and regions in which we operate, it could affect the manner in which we provide our services, and we may find it necessary to establish systems in the EEA and the United Kingdom to maintain personal data originating from the EEA and the United Kingdom, which may involve substantial expense and distraction from other aspects of our business. Other countries have also passed or are considering passing laws requiring local data residency and/or restricting the international transfer of data, which would create similar risks for us in those countries.

We are also subject to evolving privacy laws in the EEA and the United Kingdom on cookies, tracking technologies and e-marketing. In the EEA and the United Kingdom, informed consent is required for the placement of non-strictly necessary cookies or similar technologies on users’ devices and for direct electronic marketing. The GDPR and the UK GDPR also impose conditions on obtaining valid consent, such as a prohibition on pre-checked consents and a requirement to ensure separate consents are sought for each type of non-strictly necessary cookie or similar technology. Regulators are increasingly focusing on compliance with such requirements in the online behavioral advertising ecosystem, and current national laws that implement the ePrivacy Directive may be replaced by an EU regulation known as the ePrivacy Regulation which would significantly increase fines for non-compliance. While the text of the ePrivacy Regulation is still under development, European court decisions and regulators’ guidance are driving increased attention to cookies and tracking technologies. If regulators continue to enforce the strict approach in recent guidance, this could lead to substantial costs, require significant systems changes, limit the effectiveness of our marketing activities, divert the attention of our technology personnel, adversely affect our margins, increase costs and subject us to additional liabilities. Regulation of cookies and similar technologies, and any decline of cookies or similar online tracking technologies as a means to identify and potentially target users as well as personalize the consumer experience, may lead to broader restrictions and impairments on our marketing and personalization activities and may negatively impact our efforts to understand and tailor our offerings to users.

Brexit (as defined below) and ongoing developments in the United Kingdom have created additional uncertainty as the United Kingdom may become a “third country” for the purposes of personal data transfers from the EEA to the United Kingdom should the United Kingdom lose its current “adequacy” status as a result of future privacy law reforms. These changes may require us to find alternative solutions

for the compliant transfer of personal data from the EEA into and out of the United Kingdom, which may be costly or disruptive to our service or business.

We depend on a number of third parties in relation to the operation of our business, a number of which process personal data on our behalf. With each such provider we attempt to mitigate the associated risks of using third parties by performing security assessments and detailed due diligence, entering into contractual arrangements to ensure that providers only process personal data according to our instructions, and that they have sufficient technical and organizational security measures in place. Where we transfer personal data outside the EEA or the United Kingdom to such third parties, we do so while considering the relevant data export requirements, as described above. There is no assurance that these contractual measures and our own privacy and security-related safeguards will protect us from the risks associated with the third-party processing, storage and transmission of such information. Any violation of data or security laws by our third party processors could have a material adverse effect on our business and result in the fines and penalties outlined above.

The GDPR and the UK GDPR will continue to be interpreted by data protection regulators and courts in the EEA and the United Kingdom. If their interpretation of the requirements under these laws is inconsistent with our business practices, this may require us to make changes to our business practices, which could be time-consuming and expensive, and could generate additional risks and liabilities.

Multiple legislative proposals concerning privacy and the protection of user information are being considered by the US Congress. Various US state legislatures have announced intentions to consider additional privacy legislation, and US state legislatures such as California and Virginia have already passed and enacted comprehensive privacy legislation. For example, among other cases, the CCPA requires covered companies to provide disclosures to California consumers and provide such consumers certain data protection and privacy rights, including the ability to opt-out of certain sales of personal information. The CCPA provides for civil penalties for violations, as well as a private right of action for certain data breaches. This private right of action may increase the likelihood of, and risks associated with, data breach litigation. A ballot initiative from privacy rights advocates intended to augment and expand the CCPA called the California Privacy Rights Act ("CPRA") was passed in November 2020 and took effect in January 2023 (with a look back to January 2022). The CPRA significantly modifies the CCPA, including by expanding consumers' rights with respect to certain sensitive personal information. The CPRA also creates a new state agency that will be vested with authority to implement and enforce the CCPA and the CPRA. The CDPA, which took effect in January 2023, gives new data protection rights to Virginia residents and imposes additional obligations on controllers and processors of personal data. For example, like the CCPA, the CDPA grants Virginia residents certain rights to access personal data that is being processed by the controller, the right to correct inaccuracies in that personal data and the right to require that their personal data be deleted by the data controller. In addition, Virginia residents now have the right to request a copy of their personal data in a format that permits them to transmit it to another data controller. Further, under the CDPA, Virginia residents have the right to opt out of the sale of their personal data, as well as the right to opt out of the processing of their personal data for targeted advertising. New legislation proposed or enacted in a number of states impose, or have the potential to impose additional obligations on companies that collect, store, use, retain, disclose, transfer and otherwise process confidential, sensitive and personal information, and will continue to shape the data privacy environment nationally. State laws are changing rapidly and there is discussion in Congress of a new federal data protection and privacy law to which we would become subject if it is enacted. Additionally, governmental agencies like the Consumer Financial Protection Bureau and the Federal Trade Commission have adopted, or are considering adopting, laws and regulations concerning personal information and data security. For example, the Federal Trade Commission has increased its focus on privacy and data security practices at digital companies, as evidenced by obtaining increasing fines against companies found to be in violation of the Children's Online Privacy Protection Act ("COPPA"), and

obtaining twenty-year consent decrees mandating enhanced and specific requirements for information security management programs. While the FTC does not have legal authority to seek monetary penalties or relief in the area of data security as a general matter, a violation of a privacy or data security consent decree can subject the responding company to very high monetary penalties, as evidenced by the FTC obtaining \$5 billion in negotiated monetary relief against Facebook for violation of a consent decree.

The myriad international and US privacy and data breach laws are not consistent, and compliance in the event of a widespread data breach is difficult and may be costly. In addition to government regulation, privacy advocates and industry groups have and may in the future propose self-regulatory standards from time to time. These and other industry standards may legally or contractually apply to us, or we may elect to comply with such standards. We expect that there will continue to be new proposed laws and regulations concerning data privacy and security, and we cannot yet determine the impact such future laws, regulations and standards may have on our business. Because the interpretation and application of data protection laws, regulations, standards and other obligations are still uncertain, and may be contradictory and in flux, it is possible that the scope and requirements of these laws may be interpreted and applied in a manner that is inconsistent with our practices and our efforts to comply with the evolving data protection rules may be unsuccessful.

We make public statements about our use and disclosure of personal information through our privacy policy, information provided on our website and press statements. Although we endeavor to ensure that our public statements are complete, accurate and fully implemented, we may at times fail to do so or be alleged to have failed to do so. We may be subject to potential regulatory or other legal action if such policies or statements are found to be deceptive, unfair or misrepresentative of our actual practices. In addition, from time to time, concerns may be expressed about whether our products and services compromise the privacy of our users and others. Any concerns about our data privacy and security practices (even if unfounded), or any failure, real or perceived, by us to comply with our posted privacy policies or with any legal or regulatory requirements, standards, certifications or orders or other privacy or consumer protection-related laws and regulations applicable to us, could cause our users to reduce their use of our products and services.

While we aim to comply with industry standards and applicable laws and industry codes of conduct relating to privacy and data protection in all material respects, there is no assurance that we will not be subject to claims that we have violated applicable laws or codes of conduct, that we will be able to successfully defend against such claims or that we will not be subject to significant fines and penalties in the event of non-compliance. Additionally, to the extent multiple state-level laws are introduced with inconsistent or conflicting standards and there is no federal law to preempt such laws, compliance with such laws could be difficult and costly to achieve and we could be subject to fines and penalties in the event of non-compliance.

Furthermore, enforcement actions and investigations by regulatory authorities related to data security incidents and privacy violations continue to increase. We have in the past received, and may continue to receive inquiries from regulators regarding our data privacy practices. Any failure or perceived failure by us (or the third parties with whom we have contracted to process such information) to comply with applicable privacy and security laws, policies or related contractual obligations, or any compromise of security that results in unauthorized access, use or transmission of, personal user information, could result in a variety of claims against us, including governmental enforcement actions and investigations, class action privacy litigation in certain jurisdictions and proceedings by data protection authorities. We could further be subject to significant fines, other litigation, claims of breach of contract and indemnity by third parties, and adverse publicity. When such events occur, our reputation may be harmed, we may lose current and potential users and the competitive positions of our various brands might be diminished, any or all of which could materially adversely affect our business, financial condition, results of operations and

prospects. In addition, if our practices are not consistent or viewed as not consistent with legal and regulatory requirements, including changes in laws, regulations and standards or new interpretations or applications of existing laws, regulations and standards, we may become subject to audits, inquiries, whistleblower complaints, adverse media coverage, investigations, loss of export privileges or severe criminal or civil sanctions, all of which may have a material adverse effect on our business, financial condition, results of operations and prospects.

In some locations we are subject to privacy regulations that may be seen as excessive, invasive or harmful, such as those that require organizations to provide access to personal information or confidential data to governmental bodies. We risk reputational damage if we are deemed to be negatively impacting the privacy of our users through our attempts to comply with such regulations. Should we actively choose to not comply with regulations we deem harmful to our users we risk damages from non-compliance as described previously.

Online applications are subject to various laws and regulations relating to children's privacy and protection, which if violated, could subject us to litigation and regulatory actions.

A variety of laws and regulations have been adopted in recent years aimed at protecting children using the internet such as the COPPA, Article 8 of the GDPR and the UK GDPR, and the United Kingdom's Age Appropriate Design Code (also referred to as the Children's Code). As some of these laws and regulations apply to us or our applications, we implement certain precautions to ensure that we comply with such laws and regulations. Despite our efforts, no assurances can be given that such measures will be sufficient to completely avoid allegations (whether founded or not) or decisions that we have, or are, not in compliance with COPPA or another relevant law or regulation, any of which could expose us to significant liability, penalties, reputational harm and loss of revenue, among other things. We also expect further jurisdictions to adopt these types of laws and regulations, which would further increase these risks, and may require us to spend additional resources in order to comply.

Additionally, new regulations are being considered in various jurisdictions to require the monitoring of user content or the verification of users' identities and age. Such new regulations, or changes to existing regulations, could increase the complexity of our compliance obligations and the cost of our operations.

Regulatory and legislative developments on the use of artificial intelligence and machine learning could adversely affect our use of such technologies in our products and services.

We use machine learning and artificial intelligence throughout the business. For example we use artificial intelligence and machine learning to help us produce content for both the learning application and the Duolingo English Test. Furthermore, in the first quarter of 2023 we began to offer in certain markets a higher subscription tier that uses artificial intelligence to enable two new features - one that provides more detailed explanations of correct and incorrect answers and one that allows a user to roleplay by text certain scenarios to practice their language skills.

As the regulatory framework for machine learning technology and artificial intelligence evolves, our business, financial condition, and results of operations may be adversely affected. The regulatory framework for machine learning technology, artificial intelligence and automated decision making is evolving. It is possible that new laws and regulations will be adopted in the United States and in non-U.S. jurisdictions, or that existing laws and regulations may be interpreted in ways that would affect the operation of our learning platforms, online testing business and data analytics and the way in which we use artificial intelligence and machine learning technology. Further, the cost to comply with such laws or regulations could be significant and would increase our operating expenses, which could adversely affect our business, financial condition and results of operations.

For example, in Europe, on April 21, 2021, the European Commission proposed a regulation seeking to establish a comprehensive, risk-based governance framework for artificial intelligence in the EU market. The proposal is intended to apply to companies that develop, use and/ or provide artificial intelligence in the EU and includes requirements around transparency, conformity assessments and monitoring, risk assessments, human oversight, security and accuracy, and proposes fines for breach of up to 6% of worldwide annual turnover. In addition, on September 28, 2022, the European Commission proposed two Directives seeking to establish a harmonized civil liability regime for artificial intelligence in the EU, in order to facilitate civil claims in respect of harm caused by artificial intelligence and to include artificial intelligence-enabled products within the scope of the EU's existing strict liability regime. If enacted, this regulatory framework is expected to have a material impact on the way artificial intelligence is regulated in the EU, and together with developing guidance and/ or decisions in this area, may affect our use of artificial intelligence and our ability to provide and to improve our services, require additional compliance measures and changes to our operations and processes, result in increased compliance costs and potential increases in civil claims against us, and could adversely affect our business, operations and financial condition.

We are subject to litigation and adverse outcomes in such litigation could have a material adverse effect on our business, financial condition and results of operations.

We are, and from time to time may become, subject to litigation and various legal proceedings, including litigation and proceedings related to intellectual property matters, privacy and consumer protection laws, as well as stockholder derivative suits, class action lawsuits, actions from former employees and other matters, that involve claims for substantial amounts of money or for other relief or that might necessitate changes to our business or operations. The defense of these actions could be time consuming and expensive and could distract our personnel from their normal responsibilities. We evaluate these litigation claims and legal proceedings to assess the likelihood of unfavorable outcomes and to estimate, if possible, the amount of potential losses. Based on these assessments and estimates, we may establish reserves or disclose the relevant litigation claims or legal proceedings, as and when required or appropriate. These assessments and estimates are based on information available to management at the time of such assessment or estimation and involve a significant amount of judgment. As a result, actual outcomes or losses could differ materially from those envisioned by our current assessments and estimates. Our failure to successfully defend or settle any of these litigations or legal proceedings could result in liability that, to the extent not covered by our insurance, could have a material adverse effect on our business, financial condition and results of operations. See Part II, Item 1. Legal Proceedings.

We are subject to taxation related risks in multiple jurisdictions.

We are a US-based multinational company subject to tax in multiple US and foreign tax jurisdictions. Significant judgment is required in determining our global provision for income taxes, deferred tax assets or liabilities and in evaluating our tax positions on a worldwide basis. While we believe our tax positions are consistent with the tax laws in the jurisdictions in which we conduct our business, it is possible that these positions may be challenged by jurisdictional tax authorities, which may have a significant impact on our global provision for income taxes.

Tax laws are being re-examined and evaluated globally. New laws and interpretations of the law are taken into account for financial statement purposes in the quarter or year that they become applicable. Tax authorities are increasingly scrutinizing the tax positions of companies. Many countries in the European Union, as well as a number of other countries and organizations such as the Organization for Economic Cooperation and Development and the European Commission, are actively considering changes to existing tax laws that, if enacted, could increase our tax obligations in countries where we do business. These proposals include changes to the existing framework to calculate income tax, as well as proposals

to change or impose new types of non-income taxes, including taxes based on a percentage of revenue. For example, several countries in the European Union have proposed or enacted taxes applicable to digital services, which includes business activities on social media platforms and online marketplaces, and would likely apply to our business. Many questions remain about the enactment, form and application of these digital services taxes. The interpretation and implementation of the various digital services taxes (especially if there is inconsistency in the application of these taxes across tax jurisdictions) could have a materially adverse impact on our business, results of operations and cash flows. Moreover, if the US or other foreign tax authorities change applicable tax laws, our overall taxes could increase, and our business, financial condition or results of operations may be adversely impacted.

The continuing impact of “Brexit” may have a negative effect on our business.

Following a national referendum and enactment of legislation by the government of the United Kingdom, the United Kingdom formally withdrew from the European Union (“Brexit”) and ratified a trade and cooperation agreement governing its future relationship with the European Union. The agreement, which became effective in 2021, addresses trade, economic arrangements, law enforcement, judicial cooperation and a governance framework including procedures for dispute resolution, among other things. Because the agreement merely sets forth a framework in many respects and will require complex additional bilateral negotiations between the United Kingdom and the European Union as both parties continue to work on the rules for implementation, significant political and economic uncertainty remains about how the precise terms of the relationship between the parties will differ from the terms before withdrawal.

We have users in the United Kingdom and the European Union and, as a result, we face risks associated with the potential uncertainty and disruptions that may follow Brexit and the implementation and application of the trade and cooperation agreement, including with respect to volatility in exchange rates and interest rates, disruptions to the free movement of data, goods, services, people and capital between the United Kingdom and the European Union and potential material changes to the regulatory regime applicable to our operations in the United Kingdom. In addition, Brexit could lead to legal uncertainty and potentially divergent national laws and regulations as the United Kingdom determines which laws of the European Union to replace or replicate. These developments have had and may continue to have a material adverse effect on global economic conditions and the stability of global financial markets and could significantly reduce global market liquidity and limit the ability of key market participants to operate in certain financial markets.

The ongoing instability and uncertainty surrounding Brexit and the implementation and application of the Trade and Cooperation Agreement, could require us to restructure our business operations in the United Kingdom and the European Union, may increase our regulatory costs, and could have an adverse impact on our business and staff in the United Kingdom and European Union.

Risks Related to Our Intellectual Property

From time to time, we may be party to intellectual property-related litigation and proceedings that are expensive and time consuming to defend, and, if resolved adversely, could materially adversely impact our business, financial condition and results of operations.

Our commercial success depends in part on avoiding infringement, misappropriation or other violations of the intellectual property rights of third parties. However, we may become party to disputes from time to time over rights and obligations concerning intellectual property held by third parties, and we may not prevail in these disputes. Companies in the internet, technology and social media industries are subject to frequent litigation based on allegations of infringement, misappropriation or other violations of intellectual property rights. Furthermore, various “non-practicing entities” that own patents and other intellectual

property rights often attempt to assert claims in order to extract value from technology companies and, given that these patent holding companies or other adverse intellectual property rights holders typically have no relevant product revenue, our own issued or pending patents and other intellectual property rights may provide little or no deterrence to these rights holders in bringing intellectual property rights claims against us. From time to time we may receive claims from third parties which allege that we have infringed upon their intellectual property rights. Further, from time to time we may introduce new products, product features and services, including in areas where we currently do not have an offering, which could increase our exposure to patent and other intellectual property claims from competitors and non-practicing entities. In addition, some of our agreements with third-party partners require us to indemnify them for certain intellectual property claims against them, which could require us to incur considerable costs in defending such claims, and may require us to pay significant damages in the event of an adverse ruling. Such third-party partners may also discontinue their relationships with us as a result of injunctions or otherwise, which could result in loss of revenue and adversely impact our business operations.

Although we try to ensure that our employees and consultants do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that we or our employees or consultants have inadvertently or otherwise used or disclosed intellectual property, including trade secrets, software code or other proprietary information, of a former employer or other third parties. Litigation may be necessary to defend against these claims and if we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. Further, while it is our policy to require our employees and contractors who may be involved in the conception or development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who, in fact, conceives or develops intellectual property that we regard as our own. Additionally, any such assignment of intellectual property rights may not be self-executing, or the assignment agreements may be breached, and we may be forced to bring claims against third parties, or defend claims that they may bring against us, to determine the ownership of what we regard as our intellectual property.

As we face increasing competition and develop new products, we expect the number of patent and other intellectual property claims against us may grow. There may be intellectual property or other rights held by others, including issued or pending patents, that cover significant aspects of our products and services, and we cannot be sure that we are not infringing or violating, and have not infringed or violated, any third-party intellectual property rights or that we will not be held to have done so or be accused of doing so in the future.

Any claim or litigation alleging that we have infringed or otherwise violated intellectual property or other rights of third parties, with or without merit, and whether or not settled out of court or determined in our favor, could be time-consuming and costly to address and resolve, and could divert the time and attention of our management and technical personnel. The outcome of any litigation is inherently uncertain, and there can be no assurances that favorable final outcomes will be obtained in all cases. In addition, third parties may seek, and we may become subject to, preliminary or provisional rulings in the course of any such litigation, including potential preliminary injunctions requiring us to cease some or all of our operations. We may decide to settle such lawsuits and disputes on terms that are unfavorable to us. Similarly, if any litigation to which we are a party is resolved adversely, we may be subject to an unfavorable judgment that may not be reversed upon appeal, including being subject to a permanent injunction and being required to pay substantial monetary damages, including treble damages, punitive damages, and attorneys' fees, if we are found to have willfully infringed a party's intellectual property rights. The terms of such a settlement or judgment may require us to cease some or all of our operations, pay substantial amounts to the other party, or admit liability. Moreover, as part of any settlement or other compromise to avoid complex, protracted litigation, we may agree not to pursue future claims against a third party, including for claims related to alleged infringement of our intellectual property rights. Part of

any settlement or other compromise with another party may resolve a potentially costly dispute but may also have future repercussions on our ability to defend and protect our intellectual property rights, which in turn could adversely affect our business, financial conditions, and results of operations and prospects. In addition, we may have to seek a license to continue practices found to be in violation of a third-party's rights. If we are required, or choose to enter into royalty or licensing arrangements, such arrangements may not be available on reasonable terms, or at all, and may significantly increase our operating costs and expenses. Such arrangements may also only be available on a non-exclusive basis such that third parties, including our competitors, could have access to the same licensed technology to compete with us. As a result, we may also be required to develop or procure alternative non-infringing technology, which could require significant effort, time and expense or discontinue use of the technology. There also can be no assurance that we would be able to develop or license suitable alternative technology to permit us to continue offering the affected products or services as currently offered. If we cannot develop or license alternative technology for any allegedly infringing aspect of our business, we would be forced to limit our products and services and may be unable to compete effectively. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. Any of the foregoing, and any unfavorable resolution of such disputes and litigation, would materially and adversely impact our business, financial condition, results of operations and prospects.

We may fail to adequately obtain, protect and maintain our intellectual property rights or prevent third parties from making unauthorized use of such rights.

Our intellectual property is a material asset of our business and our success depends in part on our ability to protect our proprietary information and techniques and multiple forms of intellectual property. For example, we rely heavily upon our trademarks, designs, copyrights, related domain names, social media handles and logos to market our brands and to build and maintain brand loyalty and recognition. We also rely upon proprietary technologies and trade secrets, as well as a combination of laws, and contractual restrictions, including confidentiality agreements with employees, customers, suppliers, affiliates and others, to establish, protect and enforce our various intellectual property rights. We have generally registered and continue to apply to register and renew, or secure by contract where appropriate, trademarks, service marks and copyrights as they are developed and used, and reserve, register and renew domain names and social media handles as we deem appropriate.

If our trademarks and trade names are not adequately protected, then we may not be able to build and maintain name recognition in our markets of interest and our business may be adversely affected. Effective trademark protection may not be available or may not be sought in every country in which our products are made available, in every class of goods and services in which we operate, and contractual disputes may affect the use of marks governed by private contract. Our registered or unregistered trademarks, tradenames or other intellectual property rights may be challenged, infringed, circumvented or declared invalid or unenforceable or determined to be infringing on other marks. Further, at times, competitors may adopt trade names or trademarks similar to ours, thereby impeding our ability to build or extend brand identity and possibly leading to market confusion.

Similarly, not every variation of a domain name or social media handle may be available or be registered by us, even if available. The occurrence of any of these events could result in the erosion of our brands and limit our ability to market our brands using our various domain names and social media handles, as well as impede our ability to effectively compete against competitors with similar technologies or products, any of which could materially adversely affect our business, financial condition and results of operations. We are also party to certain agreements that may limit our trademark rights in certain jurisdictions; while

we believe these agreements are unlikely to have a significant impact on our business as currently conducted, our ability to use our existing trademarks in new business lines in the future may be limited.

We also rely on seeking patent protection for key technologies or approaches we develop that enable us to deliver or enhance the products and services we offer. We seek patent protection for these types of innovations primarily in order to best protect our ability to utilize the innovations either by ourselves or as part of a joint development project.

We cannot guarantee that our efforts to obtain and maintain intellectual property rights are adequate, that we have secured, or will be able to secure, appropriate permissions or protections for all of the intellectual property rights we use or rely on. Furthermore, even if we are able to obtain intellectual property rights, any challenge to our intellectual property rights could result in them being narrowed in scope or declared invalid or unenforceable. In addition, other parties may independently develop technologies that are substantially similar or superior to ours and we may not be able to stop such parties from using such independently developed technologies to compete effectively with us.

We also rely upon unpatented proprietary information and other trade secrets to protect intellectual property that may not be registrable, or that we believe is best protected by means that do not require public disclosure. While it is our policy to enter into confidentiality agreements with employees and third parties to protect our proprietary expertise and other trade secrets, we cannot guarantee that we have entered into such agreements with each party that has or may have had access to our proprietary information or trade secrets and, even if entered into, these agreements may otherwise fail to effectively prevent disclosure of proprietary information, may be limited as to their term, or may not provide an adequate remedy in the event of unauthorized disclosure or use of proprietary information. Monitoring unauthorized uses and disclosures is difficult, and we do not know whether the steps we have taken to protect our proprietary technologies will be effective.

Enforcing a claim that a party illegally disclosed or misappropriated a trade secret can be difficult, expensive and time-consuming, and the outcome is unpredictable. Further, some courts inside and outside the United States may be less willing or unwilling to protect trade secrets. In addition, trade secrets may be independently developed by others in a manner that could prevent legal recourse by us. If any of our confidential or proprietary information, such as our trade secrets, were to be disclosed or misappropriated, or if any such information was independently developed by a competitor, our competitive position would be materially adversely harmed.

Our intellectual property rights and the enforcement or defense of such rights may be affected by developments or uncertainty in laws and regulations relating to intellectual property rights. Moreover, many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, may not favor the enforcement of trademarks, copyrights, trade secrets and other intellectual property protection, which could make it difficult for us to stop the infringement, misappropriation or other violation of our intellectual property or the marketing of competing products in violation of our intellectual property rights generally.

We also may be forced to bring claims against third parties to determine the ownership of what we regard as our intellectual property or to enforce our intellectual property rights against infringement, counterfeiting, misappropriation or other violations by third parties. However, the measures we take to protect our intellectual property from unauthorized use by others may not be effective and there can be no assurance that our intellectual property rights will be sufficient to protect against others offering products or services that are substantially similar or superior to ours or that compete with our business. We may not prevail in intellectual property-related proceedings that we initiate against third parties. Further, in such proceedings or in proceedings before patent, trademark and copyright agencies, our asserted intellectual property could be found to be invalid, unenforceable or limited in scope, in which case we

could lose valuable intellectual property rights. In addition, even if we are successful in enforcing our intellectual property against third parties, the damages or other remedies awarded, if any, may not be commercially meaningful. Regardless of whether any such proceedings are resolved in our favor, such proceedings could cause us to incur significant expenses and could distract our personnel from their normal responsibilities. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

Despite the measures we take to protect our intellectual property rights, our intellectual property rights may still not be adequate and protected in a meaningful manner, challenges to contractual rights could arise, third parties could copy or otherwise obtain and use our intellectual property without authorization, or laws and interpretations of laws regarding the enforceability of existing intellectual property rights may change over time in a manner that provides less protection or introduces uncertainty. The occurrence of any of these events could impede our ability to effectively compete against competitors with similar technologies, any of which could materially adversely affect our business, financial condition and results of operations.

Our use of “open source” software and materials could subject our proprietary software to general release, adversely affect our ability to sell our products and services and subject us to possible litigation.

We use open source software, content and materials (“Open Source Materials”) in connection with a portion of our proprietary software and our service offerings and we expect to continue to use Open Source Materials in the future. Under certain circumstances, some open source licenses require users of the Open Source Materials to provide the user’s own proprietary source code to third parties upon request, to license the user’s own proprietary source code or other materials for the purpose of making derivative works, prohibit users from charging a fee to third parties in connection with the use of the user’s proprietary code, or require the relicensing of the Open Source Materials and derivatives thereof under the terms of the applicable license. While we employ practices designed to monitor our compliance with the licenses of third-party Open Source Materials and protect our proprietary source code and content, we cannot guarantee that we will be successful, that all Open Source Materials are reviewed prior to use in our products, that our developers have not incorporated Open Source Materials into our products, or that they will not do so in the future. Accordingly, we may face claims from others challenging our use of Open Source Materials or seeking to enforce the license terms applicable to such Open Source Materials, including by demanding public release of the Open Source Materials or derivative works or our proprietary source code and content that was developed or distributed in connection with such Open Source Materials. Such claims could also require us to purchase a commercial license or require us to devote additional research and development resources to change our software and content, any of which would have a negative effect on our business and results of operations. In addition, if the license terms for the open source code change, we may be forced to re-engineer our software, revise our content or otherwise incur additional costs. Additionally, the terms of many open source licenses to which we are subject have not been interpreted by US or foreign courts. There is a risk that open source licenses could be construed in a manner that imposes unanticipated conditions or restrictions on our ability to market or provide our products.

In addition, the use of open source software may entail greater risks than the use of third-party commercial software, as open source licensors generally do not provide warranties or other contractual protections regarding infringement claims or the quality of the code. To the extent that our platform depends upon the successful operation of the open source software we use, any undetected errors or defects in this open source software could prevent the deployment or impair the functionality of our platform, delay the introduction of new solutions, result in a failure of our platform, and injure our

reputation. For example, undetected errors or defects in open source software could render it vulnerable to breaches or security attacks and make our systems more vulnerable to data breaches.

Our exposure to these risks may be increased as a result of evolving our core source code base, introducing new content and offerings, integrating acquired-company technologies, or making other business changes, including in areas where we do not currently compete. Any of the foregoing could adversely impact the value or enforceability of our intellectual property, and materially adversely affect our business, results of operations, and financial condition.

Risks Related to Ownership of our Class A Common Stock

We do not know whether an active, liquid and orderly trading market will continue to develop or be maintained for our Class A common stock.

We cannot predict the extent to which investor interest in us will sustain an active public trading market for shares of our Class A common stock. If an active public market does not continue to develop or is not sustained, it may be difficult for you to sell your shares of Class A common stock at a price that is attractive to you, or at all. The lack of an active market may also reduce the fair market value of your shares. An inactive market may also impair our ability to raise capital to continue to fund operations by selling shares and may impair our ability to make acquisitions by using our shares as consideration.

The market price of shares of our Class A common stock may be volatile or may decline regardless of our operating performance, which could cause the value of your investment to decline.

The trading price of our Class A common stock may be highly volatile and could be subject to wide fluctuations. Securities markets worldwide experience significant price and volume fluctuations. This market volatility, as well as general economic, market or political conditions, could reduce the market price of shares of our Class A common stock regardless of our operating performance. In addition, our operating results could be below the expectations of public market analysts and investors due to a number of potential factors, including variations in our quarterly operating results or dividends, if any, to stockholders, additions or departures of key management personnel, failure to meet analysts' earnings estimates, publication of research reports about our industry, litigation and government investigations, changes or proposed changes in laws or regulations or differing interpretations or enforcement thereof affecting our business, adverse market reaction to any indebtedness we may incur or securities we may issue in the future, changes in market valuations of similar companies or speculation in the press or investment community, announcements by our competitors of significant contracts, acquisitions, dispositions, strategic partnerships, joint ventures or capital commitments, adverse publicity about the industries we participate in or individual scandals, and in response the market price of shares of our Class A common stock could decrease significantly.

Stock markets and the price of our Class A shares may experience extreme price and volume fluctuations. In the past, following periods of volatility in the overall market and the market price of a company's securities, securities class action litigation has often been instituted against these companies. This litigation, if instituted against us, could result in substantial costs and a diversion of our management's attention and resources.

If securities or industry analysts do not publish research or reports about our business, or if they downgrade their recommendations regarding our Class A common stock, our stock price and trading volume could decline.

The trading market for our Class A common stock relies in part on the research and reports that industry or securities analysts publish about us or our business. If any of the analysts who cover us downgrade

our Class A common stock or publish inaccurate or unfavorable research about our business, our Class A common stock price may decline. If analysts cease coverage of us or fail to regularly publish reports on us, we could lose visibility in the financial markets, which in turn could cause our Class A common stock price or trading volume to decline and our Class A common stock to be less liquid.

The dual class structure of our common stock has the effect of concentrating voting control with those stockholders who held our capital stock prior to the listing of our Class A common stock on the Nasdaq Global Select Market, including our directors, executive officers, and 5% stockholders and their respective affiliates, who held in the aggregate 82.5% of the voting power of our capital stock as of March 31, 2023. This ownership will limit or preclude your ability to influence corporate matters, including the election of directors, amendments of our organizational documents, and any merger, consolidation, sale of all or substantially all of our assets, or other major corporate transaction requiring stockholder approval.

Our Class B common stock has 20 votes per share, and our Class A common stock has one vote per share. As of March 31, 2023, our directors, executive officers, and 5% stockholders and their affiliates held in the aggregate 82.5% of the voting power of our capital stock. Because of the 20-to-one voting ratio between our Class B and Class A common stock, the holders of our Class B common stock collectively could continue to control a significant percentage of the combined voting power of our common stock and therefore be able to control all matters submitted to our stockholders for approval until all outstanding shares of Class A and Class B common stock have converted automatically into shares of a single class of common stock. This concentrated control may limit or preclude your ability to influence corporate matters for the foreseeable future, including the election of directors, amendments of our organizational documents, and any merger, consolidation, sale of all or substantially all of our assets, or other major corporate transaction requiring stockholder approval. In addition, this may prevent or discourage unsolicited acquisition proposals or offers for our capital stock that you may believe are in your best interest as one of our stockholders.

In addition, future transfers by holders of Class B common stock will generally result in those shares converting to Class A common stock, subject to limited exceptions, such as certain transfers effected for estate planning purposes. The conversion of Class B common stock to Class A common stock will have the effect, over time, of increasing the relative voting power of those holders of Class B common stock who retain their shares in the long term. As a result, it is possible that one or more of the persons or entities holding our Class B common stock could gain significant voting control as other holders of Class B common stock sell or otherwise convert their shares into Class A common stock.

In addition, while we do not expect to issue any additional shares of Class B common stock, any future issuances of Class B common stock would be dilutive to holders of Class A common stock.

We cannot predict the impact our dual class structure may have on the market price of our Class A common stock.

We cannot predict whether our dual class structure will result in a lower or more volatile market price of our Class A common stock, in adverse publicity or other adverse consequences. Certain index providers have announced restrictions on including companies with multiple class share structures in certain of their indices. For example, S&P Dow Jones has stated that companies with multiple share classes will not be eligible for inclusion in the S&P Composite 1500 (composed of the S&P 500, S&P MidCap 400 and S&P SmallCap 600), although existing index constituents in July 2017 were grandfathered. Under the announced policies, our dual class capital structure would make us ineligible for inclusion in any of these indices. Given the sustained flow of investment funds into passive strategies that seek to track certain indices, exclusion from stock indices would likely preclude investment by many of these funds and could

make our Class A common stock less attractive to other investors. As a result, the market price of our Class A common stock could be materially adversely affected.

We may issue preferred stock whose terms could materially adversely affect the voting power or value of our Class A common stock.

Our amended and restated certificate of incorporation authorizes us to issue, without the approval of our stockholders, one or more classes or series of preferred stock having such designations, preferences, limitations and relative rights, including preferences over our Class A common stock respecting dividends and distributions, as our board of directors may determine. The terms of one or more classes or series of preferred stock could adversely impact the voting power or value of our Class A common stock. For example, we might grant holders of preferred stock the right to elect some number of our directors in all events or on the happening of specified events or the right to veto specified transactions. Similarly, the repurchase or redemption rights or liquidation preferences we might assign to holders of preferred stock could affect the residual value of the Class A common stock.

Future issuance and sales of our common stock in the public market could cause the market price of our common stock to drop significantly, even if our business is doing well.

Sales of a substantial number of shares of our common stock in the public market or the perception that these sales might occur in large quantities, could cause the market price of our Class A common stock to decline and could impair our ability to raise capital through the sale of additional equity securities.

All shares of Class A common stock sold in our IPO are freely tradable without restrictions or further registration under the Securities Act except for any shares held by our affiliates as defined in Rule 144 under the Securities Act ("Rule 144").

Moreover, as of March 31, 2023, the holders of up to 890,383 shares of our Class B common stock have rights, subject to some conditions, to require us to file registration statements for the public resale of the Class A common stock issuable upon conversion of such shares or to include such shares in registration statements that we may file for us or other stockholders. Any registration statement we file to register additional shares, whether as a result of registration rights or otherwise, could cause the market price of our Class A common stock to decline or be volatile.

Further, as of March 31, 2023, we had options outstanding that, if fully exercised, would result in the issuance of 2,830,500 shares of Class A common stock and 1,034,500 shares of Class B common stock, as well as 2,048,000 shares of Class A common stock issuable upon vesting and settlement of outstanding RSUs. We have registered on Form S-8 under the Securities Act the shares of our common stock subject to outstanding stock options and RSUs as of the date of the Final Prospectus (defined below) and shares that will be issuable pursuant to future awards granted under our equity incentive plan. These shares can be freely sold in the public market upon issuance, subject to applicable vesting requirements, compliance by affiliates with Rule 144, and other restrictions provided under the terms of the applicable plan and/or the award agreements entered into with participants.

We may issue our shares of common stock or securities convertible into our common stock from time to time in connection with financings, acquisitions, investments, or otherwise. New investors in subsequent transactions could gain rights, preferences, and privileges senior to those of holders of our Class A common stock. Any such issuance could result in substantial dilution to our existing stockholders and cause the trading price of our Class A common stock to decline.

We do not intend to pay dividends for the foreseeable future. Consequently, any gains from an investment in our Class A common stock will likely depend on whether the price of our Class A common stock increases.

We do not intend to pay any dividends on our Class A common stock in the foreseeable future. We anticipate that we will retain all of our future earnings for use in the operation and growth of our business and for general corporate purposes. Any determination to pay dividends in the future will be at the discretion of our board of directors. Accordingly, investors must rely on sales of their Class A common stock after price appreciation, which may never occur, as the only way to realize any future gains on their investments.

Anti-takeover provisions contained in our amended and restated certificate of incorporation and amended and restated bylaws, as well as provisions of Delaware law, could impair a takeover attempt.

Our amended and restated certificate of incorporation and amended and restated bylaws contain and Delaware law contains provisions which could have the effect of rendering more difficult, delaying or preventing an acquisition deemed undesirable by our board of directors. Our corporate governance documents provide for:

- a dual-class structure;
- a classified board of directors with three-year staggered terms, who can only be removed for cause, which may delay the ability of stockholders to change the membership of a majority of our board of directors;
- no cumulative voting in the election of directors, which limits the ability of minority stockholders to elect director candidates;
- the exclusive right of our board of directors to set the size of the board of directors and to elect a director to fill a vacancy, however occurring, including by an expansion of the board of directors, which prevents stockholders from being able to fill vacancies on our board of directors;
- the ability of our board of directors to authorize the issuance of shares of preferred stock and to determine the price and other terms of those shares, including voting or other rights or preferences, without stockholder approval, which could be used to significantly dilute the ownership of a hostile acquiror;
- the ability of our board of directors to alter our amended and restated bylaws without obtaining stockholder approval;
- in addition to our board of director's ability to adopt, amend, or repeal our amended and restated bylaws, our stockholders may adopt, amend, or repeal our amended and restated bylaws only with the affirmative vote of the holders of at least 66 2/3% of the voting power of all our then-outstanding shares of capital stock;
- the required approval of (i) at least 66 2/3% of the voting power of the outstanding shares of capital stock entitled to vote generally in the election of directors, voting together as a single class, to adopt, amend, or repeal certain provisions of our restated certificate of incorporation and (ii) for so long as any shares of Class B common stock are outstanding, the holders of at least 80% of the shares of Class B common stock outstanding at the time of such vote, voting as a separate series, to adopt, amend, or repeal certain provisions of our restated certificate of incorporation;
- the ability of stockholders to act by written consent only as long as holders of our Class B common stock hold at least 50% of the voting power of our capital stock;

- the requirement that a special meeting of stockholders may be called only by an officer of our company pursuant to a resolution adopted by a majority of our board of directors then in office or the chairperson of our board; and
- advance notice procedures that stockholders must comply with in order to nominate candidates to our board of directors or to propose matters to be acted upon at a stockholders' meeting, which may discourage or deter a potential acquiror from conducting a solicitation of proxies to elect the acquiror's own slate of directors or otherwise attempting to obtain control of us.

These provisions, alone or together, could delay or prevent hostile takeovers and changes in control or changes in our management.

As a Delaware corporation, we are also subject to provisions of Delaware law, including Section 203 of the General Corporation Law of the State of Delaware (the Delaware General Corporation Law), which prevents some stockholders holding more than 15% of our outstanding common stock from engaging in certain business combinations without approval of the holders of substantially all of our outstanding common stock.

Any provision of our certificate of incorporation, bylaws or Delaware law that has the effect of delaying or deterring a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our common stock, and could also affect the price that some investors are willing to pay for our common stock.

Claims for indemnification by our directors and officers may reduce our available funds to satisfy successful third-party claims against us and may reduce the amount of money available to us.

Our amended and restated certificate of incorporation and amended and restated bylaws provide that we will indemnify our directors and officers, in each case to the fullest extent permitted by Delaware law.

In addition, as permitted by Section 145 of the Delaware General Corporation Law, our amended and restated bylaws and our indemnification agreements that we have entered or intend to enter into with our directors and officers provide that:

- we will indemnify our directors and officers for serving us in those capacities or for serving other business enterprises at our request, to the fullest extent permitted by Delaware law. Delaware law provides that a corporation may indemnify such person if such person acted in good faith and in a manner such person reasonably believed to be in or not opposed to the best interests of the registrant and, with respect to any criminal proceeding, had no reasonable cause to believe such person's conduct was unlawful;
- we may, in our discretion, indemnify employees and agents in those circumstances where indemnification is permitted by applicable law;
- we are required to advance expenses, as incurred, to our directors and officers in connection with defending a proceeding, except that such directors or officers shall undertake to repay such advances if it is ultimately determined that such person is not entitled to indemnification;
- the rights conferred in our amended and restated bylaws are not exclusive, and we are authorized to enter into indemnification agreements with our directors, officers, employees and agents and to obtain insurance to indemnify such persons; and
- we may not retroactively amend our amended and restated bylaw provisions to reduce our indemnification obligations to directors, officers, employees, and agents.

Our directors' and officers' liability insurance policies may not be available to us in the future at a reasonable rate, may not cover all potential claims for indemnification, and may not be adequate to indemnify us for all liability that may be imposed.

Our amended and restated certificate of incorporation and amended and restated bylaws provide for an exclusive forum in the Court of Chancery of the State of Delaware for certain disputes between us and our stockholders, and that the federal district courts of the United States of America will be the exclusive forum for the resolution of any complaint asserting a cause of action under the Securities Act, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers, or employees.

Our amended and restated certificate of incorporation and amended and restated bylaws provide that the Court of Chancery of the State of Delaware is the exclusive forum for any derivative action or proceeding brought on our behalf, any action asserting a breach of fiduciary duty, any action asserting a claim against us arising pursuant to the Delaware General Corporation Law, our amended and restated certificate of incorporation or our amended and restated bylaws, or any action asserting a claim against us that is governed by the internal affairs doctrine; provided that, the exclusive forum provision will not apply to suits brought to enforce any liability or duty created by the Exchange Act or any other claim for which the federal courts have exclusive jurisdiction; and provided further that, if and only if the Court of Chancery of the State of Delaware dismisses any such action for lack of subject matter jurisdiction, such action may be brought in another state or federal court sitting in the State of Delaware. Our amended and restated certificate of incorporation and amended and restated bylaws also provide that the federal district courts of the United States of America will be the exclusive forum for the resolution of any complaint asserting a cause of action against us or any of our directors, officers, or employees arising under the Securities Act. Nothing in our amended and restated certificate of incorporation or amended and restated bylaws precludes stockholders that assert claims under the Exchange Act from bringing such claims in state or federal court, subject to applicable law.

We believe these provisions may benefit us by providing increased consistency in the application of Delaware law and federal securities laws by chancellors and judges, as applicable, particularly experienced in resolving corporate disputes, efficient administration of cases on a more expedited schedule relative to other forums and protection against the burdens of multi-forum litigation. This choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or any of our directors, officers, other employees or stockholders, which may discourage lawsuits with respect to such claims. If a court were to find the choice of forum provision that will be contained in our amended and restated certificate of incorporation or amended and restated bylaws to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could materially adversely affect our business, results of operations, and financial condition.

General Risk Factors

We will incur significant expenses as a result of being a public company, which could materially adversely affect our business, results of operations, and financial condition.

As a public company, we incur significant legal, accounting, and other expenses that we did not incur as a private company. We are subject to the reporting requirements of the Exchange Act, the applicable requirements of the Sarbanes-Oxley Act, the Dodd-Frank Act, the rules and regulations of the SEC, and the Listing Rules of the Nasdaq Global Select Market. Stockholder activism and the level of government intervention and regulatory reform may lead to substantial new regulations and disclosure obligations, which may lead to additional significant compliance costs and impact the manner in which we operate our business in ways we cannot currently anticipate. The increased costs will increase our net loss or

decrease our net income, and may require us to reduce costs in other areas of our business or increase our service fees which could result in a reduction in bookings. For example, we expect these rules and regulations to make it more difficult and more expensive for us to obtain director and officer liability insurance. The impact of these requirements could also make it more difficult for us to attract and retain qualified persons to serve on our board of directors, on our board committees, or as executive officers. Furthermore, if we are unable to satisfy our obligations as a public company, we could be subject to delisting of our Class A common stock, fines, sanctions, and other regulatory action and potentially civil litigation.

Further, the majority of our management team, including our Chief Executive Officer and Chief Financial Officer, have either no or limited experience in managing publicly-traded companies. Our management team may not successfully or efficiently manage our transition to being a public company and the continuous scrutiny of securities analysts and investors. These obligations and constituents have and will require significant attention from our senior management and could divert their attention away from the day-to-day management of our business, and could materially adversely affect our business, results of operations, and financial condition.

As a public reporting company, we are subject to rules and regulations established by the SEC and Nasdaq regarding our internal control over financial reporting. We may not complete needed improvements to our internal control over financial reporting in a timely manner, or these internal controls may not be determined to be effective, which may adversely affect investor confidence in our company and, as a result, the value of our Class A common stock and your investment.

As a result of becoming a public company, we are required, pursuant to Section 404 of The Sarbanes-Oxley Act of 2002 ("Section 404"), to furnish a report by management on the effectiveness of our internal control over financial reporting. This assessment includes disclosure of any material weaknesses identified by our management in our internal control over financial reporting. As a result of no longer qualifying as an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012 and becoming a large accelerated filer, we are also required to comply with, among other requirements, the auditor attestation requirements of Section 404.

We expect to incur costs related to implementing an internal audit and compliance function in the upcoming years. If we identify material weaknesses in our internal control over financial reporting or if we are unable to comply with the demands placed upon us as a public company, including the requirements of Section 404, in a timely manner, we may be unable to accurately report our financial results, or report them within the timeframes required by the SEC. A material weakness is a deficiency, or combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of our Unaudited Condensed Consolidated Financial Statements will not be prevented or detected on a timely basis. We cannot assure you that the measures we have taken to date, and actions we may take in the future, will be sufficient to prevent or avoid potential future material weaknesses. A material weakness in our internal control over financial reporting could result in an increased probability of fraud, the potential loss of customers, litigation from our stockholders, reduction in our ability to obtain financing, and require additional expenditures to remediate. Our failure to implement and maintain effective internal control over financial reporting could result in errors in our financial statements that could result in loss of investor confidence in the accuracy and completeness of our financial reports and a decline in our stock price, and we could be subject to sanctions or investigations by the SEC or other regulatory authorities.

Changes in accounting principles or their application to us could result in unfavorable accounting charges or effects, which could adversely affect our operating results and prospects.

We prepare Unaudited Condensed Consolidated Financial Statements in accordance with accounting principles generally accepted in the United States. The accounting for our business is subject to change based on the evolution of our business model, interpretations of relevant accounting principles, enforcement of existing or new regulations, and changes in policies, rules, regulations, and interpretations, of accounting and financial reporting requirements of the SEC or other regulatory agencies. A change in any of these principles or guidance, or in their interpretations or application to us, may have a significant effect on our reported results, as well as our processes and related controls, and may retroactively affect previously reported results, which may negatively impact our financial statements, which may in turn adversely affect our prospects. It is difficult to predict the impact of future changes to accounting principles and accounting policies over financial reporting, any of which could adversely affect our results of operations and financial condition and could require significant investment in systems and personnel.

If our estimates or judgments relating to our critical accounting policies are based on assumptions that change or prove to be incorrect, our operating results could fall below our publicly announced guidance or the expectations of securities analysts and investors, resulting in a decline in the market price of our common stock.

The preparation of financial statements in conformity with generally accepted accounting principles in the United States requires us to make estimates and assumptions that affect the reported amount of assets and liabilities and the disclosure of contingent liabilities as of the date of the financial statements and the reported amount of revenues and expenses during the reporting period. For example, we make certain assumptions about the interpretation of these principles and accounting treatment of our non-cash stock-based compensation expense and related obligations with respect to our financial statements. If these assumptions turn out to be unfounded, our stock-based compensation expense could be materially higher than expected for current and future periods, which could have a material adverse effect on our net loss. We base estimates and assumptions on historical experience and on various other factors that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets, liabilities, equity, revenue and expenses that are not readily apparent from other sources. We may make estimates regarding activities for which the accounting treatment is still uncertain. Actual results could differ from those estimates. If our assumptions change or if actual circumstances differ from our assumptions, our operating results may be adversely affected and could fall below our publicly announced guidance or the expectations of securities analysts and investors, resulting in a decline in the market price of our common stock.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

None.

Item 3. Defaults Upon Senior Securities

None.

Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

None.

Item 6. Exhibits

Exhibit Number	Exhibit Description	Incorporated by Reference			Exhibit	Filed Herewith
		Form	File No.	Date		
3.1	Amended and Restated Certificate of Incorporation, as currently in effect	8-K	001-40653	7/30/2021	3.1	
3.2	Bylaws, as currently in effect	8-K	001-40653	7/30/2021	3.2	
31.1	Certification of Principal Executive Officer pursuant to Exchange Act Rule 13a-14(a)					X
31.2	Certification of Principal Financial Officer pursuant to Exchange Act Rule 13a-14(a)					X
32.1*	Certification of Principal Executive Officer and Principal Financial Officer pursuant to 18 U.S.C. Section 1350					X
101.INS	Inline XBRL Instance Document - the Instance Document does not appear in the interactive data file because its XBRL tags are embedded within the Inline XBRL document					X
101.SCH	Inline XBRL Taxonomy Extension Schema Document					X
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document					X
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document					X
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document					X
101.LAB	Inline XBRL Taxonomy Extension Presentation Linkbase Document					X
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)					X

*The certification attached as Exhibit 32.1 that accompanies this Quarterly Report on Form 10-Q pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, is not deemed "filed" by the Registrant for purposes of Section 18 of the Securities Exchange Act of 1934, as amended.

Signatures

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

DUOLINGO, INC.

Date: May 9, 2023

By: /s/ Luis von Ahn
Luis von Ahn
Chief Executive Officer
(Principal Executive Officer)

Date: May 9, 2023

By: /s/ Matthew Skaruppa
Matthew Skaruppa
Chief Financial Officer
(Principal Financial Officer and Principal Accounting Officer)

**CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Luis von Ahn, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Duolingo, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 9, 2023

By: _____ /s/ Luis von Ahn

Luis von Ahn

**President and Chief Executive Officer
(Principal Executive Officer)**

**CERTIFICATION OF CHIEF EXECUTIVE OFFICER AND CHIEF FINANCIAL OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Quarterly Report of Duolingo, Inc. (the “Company”) on Form 10-Q for the quarter ended March 31, 2023 as filed with the Securities and Exchange Commission on the date hereof (the “Report”), Luis von Ahn, President and Chief Executive Officer of the Company, and Matthew Skaruppa, Chief Financial Officer of the Company, each hereby certifies, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

1. The Report fully complies with the requirements of Section 13(a) or Section 15(d) of the Exchange Act; and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: May 9, 2023

/s/ Luis von Ahn

Luis von Ahn

President and Chief Executive Officer

(Principal Executive Officer)

Date: May 9, 2023

/s/ Matthew Skaruppa

Matthew Skaruppa

Chief Financial Officer

(Principal Financial Officer and Principal Accounting Officer)