



QIMETA | WHITE PAPER

Transforming Education:

Addressing Literacy Challenges and
Teacher Shortages through AI-Driven
Solutions

2024

Table of Contents

S
T
R
U
C
T
U
R
E

01.

Executive Summary

02.

Introduction

03.

The Problem

04.

Our Solutions

05.

Market Segments and
Competitive Landscape

06.

Conclusion

EXECUTIVE SUMMARY

QiMeta is a pioneering company utilizing artificial intelligence to tackle the pressing issue of low literacy rates, chronic teacher shortages, and the resulting unfilled job positions. QiMeta's innovative platform aims to empower students, adults, and workers by enhancing their learning experiences, making education more accessible and effective.

01

Low Literacy Rates

A staggering 54% of adults in the U.S. have literacy levels below a 6th-grade standard, contributing to economic disparities [1].

02

Teacher Shortages

The education sector is facing a significant challenge with a projected shortage of 250,000 teachers by 2025 [2].

03

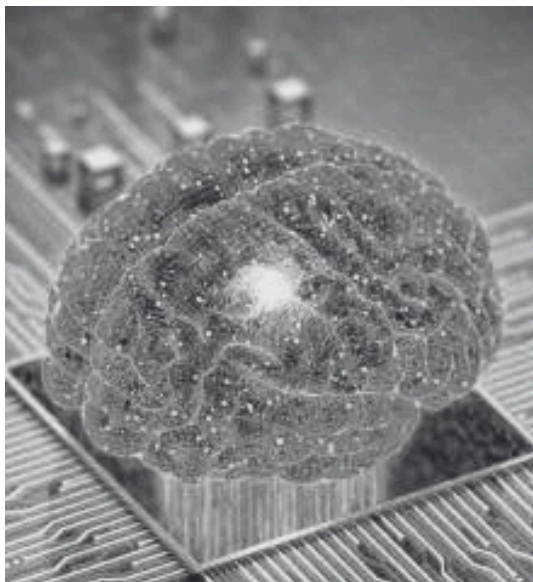
Unfilled Job Positions

The lack of adequate education is a key factor in the high number of unfilled job positions, exemplified by 5,000 job openings in Trenton, NJ, due to the absence of high school diplomas among applicants.

QiMeta's mission is to bridge educational gaps and empower underrepresented communities through its revolutionary knowledge enhancement AI platform. By addressing low literacy rates, combating chronic labor shortages, and increasing diversity in STEM, QiMeta strives to create a transformative impact on society.

Key Benefits and Outcomes

- **Enhanced Learning:** QiMeta's platform significantly improves the learning experience by automatically highlighting key concepts, providing summaries, and offering quick definitions, illustrations, and videos. This leads to students' outcome performance including a 10% increase in test scores, a 10% reduction in reading time, and a 30% increase in reading satisfaction.
- **Market Validation:** Over 80 customer and investor demos have validated the need for QiMeta's product. QiMeta has secured contracts with institutions such as Mercer County Community College and Capital Health, demonstrating market acceptance and potential for expansion.
- **Economic Impact:** By addressing low literacy rates, QiMeta can help solve the \$2.2 trillion economic burden caused by the literacy gap. The platform's effectiveness in education and corporate training environments showcases its broad applicability and potential for significant social impact.
- **Technological Advancement:** QiMeta is easy to deploy. QiMeta's platform works with existing documents, enhancing accessibility and engagement for students. It includes features like private cloud deployment, contextual chat, and self-service capabilities, ensuring a robust and user-friendly experience.



“Historically, technological innovations have left the underserved communities behind. QiMeta utilizes AI technology to help those who need it the most.”

-Founder and CEO,
Ruhul Quddus

NON-EDUCATIONAL PROBLEMS

The landscape of literacy in the United States is alarming. According to the National Center for Education Statistics, 54% of adults in the U.S. read below a 6th-grade level.

This statistic is not just a number but a stark reminder of the silent crisis affecting millions of Americans. These individuals struggle with everyday tasks such as reading instructions, understanding healthcare information, and even voting, which hinders their ability to fully participate in society.

Moreover, the education sector is beset with chronic teacher shortages. The Learning Policy Institute projects a shortfall of approximately 250,000 teachers by 2025. This shortage is particularly pronounced in subjects such as mathematics, science, and special education, where the demand for qualified teachers far outstrips the supply. The consequences of these shortages are severe, leading to larger class sizes, reduced individual attention for students, and an overall decline in the quality of education.

Economic Impact of Low Literacy Rates and Teacher Shortages

The economic repercussions of these literacy and education challenges are profound. The United Nations Conference on Trade and Development (UNCTAD) estimates that low literacy rates cost the U.S. economy up to \$2.2 trillion annually [3]. This staggering figure reflects lost earnings, lower productivity, and increased healthcare and social welfare costs. Individuals with low literacy skills are more likely to be unemployed or underemployed, perpetuating a cycle of poverty and economic disparity.

Teacher shortages exacerbate these economic impacts. Schools are forced to hire underqualified teachers or increase class sizes, leading to lower educational outcomes. A poorly educated workforce is less competitive in the global market, reducing the nation's economic potential. Furthermore, the shortage of teachers in critical subjects means that students are not receiving the education necessary to pursue careers in high-demand fields such as technology and engineering, stifling innovation and economic growth.

NON O T C U D O R T I N

Importance of Addressing These Issues

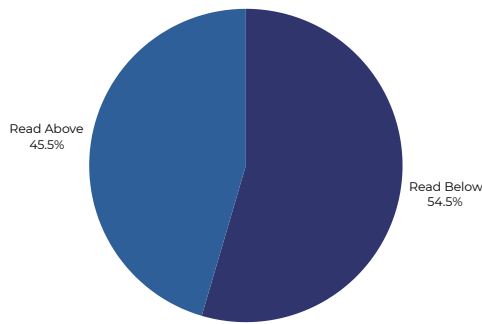
Addressing these literacy and education challenges is not merely an educational mandate; it is a national imperative. The future of American economic and social development hinges on a well-educated, literate population. Improving literacy rates and addressing teacher shortages will have far-reaching benefits, including higher employment rates, increased earnings, and a more robust and dynamic economy.

Investing in education is investing in the future. By equipping individuals with the skills they need to succeed, we empower them to contribute meaningfully to society and the economy. This, in turn, fosters social cohesion, reduces inequality, and drives sustainable development. As we stand at the crossroads of technological advancement and global competition, the need to prioritize education and literacy has never been more urgent.

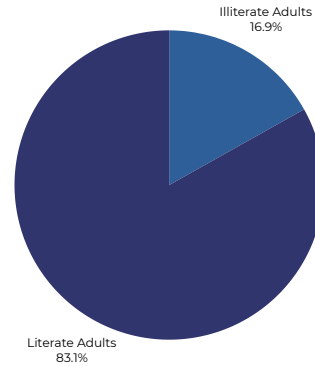
In this white paper, we explore how QiMeta leverages artificial intelligence to tackle these pressing challenges. Our mission is to bridge educational gaps and empower underrepresented communities, ensuring that everyone has the opportunity to thrive in the 21st century. Join us as we delve into the transformative potential of AI in education and its role in shaping a brighter future for all.

THE PROBLEM

Low literacy levels have pervasive and far-reaching consequences for individuals and society as a whole. According to the National Center for Education Statistics, approximately 43 million adults in the United States possess low literacy skills, meaning they read below a sixth-grade level [4]. This deficiency significantly hampers their ability to perform daily tasks, secure employment, and participate fully in civic life. Moreover, individuals with low literacy are more likely to experience poor health outcomes, higher rates of unemployment, and lower lifetime earnings. In fact, the Program for the International Assessment of Adult Competencies found that adults with low literacy skills earn 30-42% less than their literate counterparts [5].



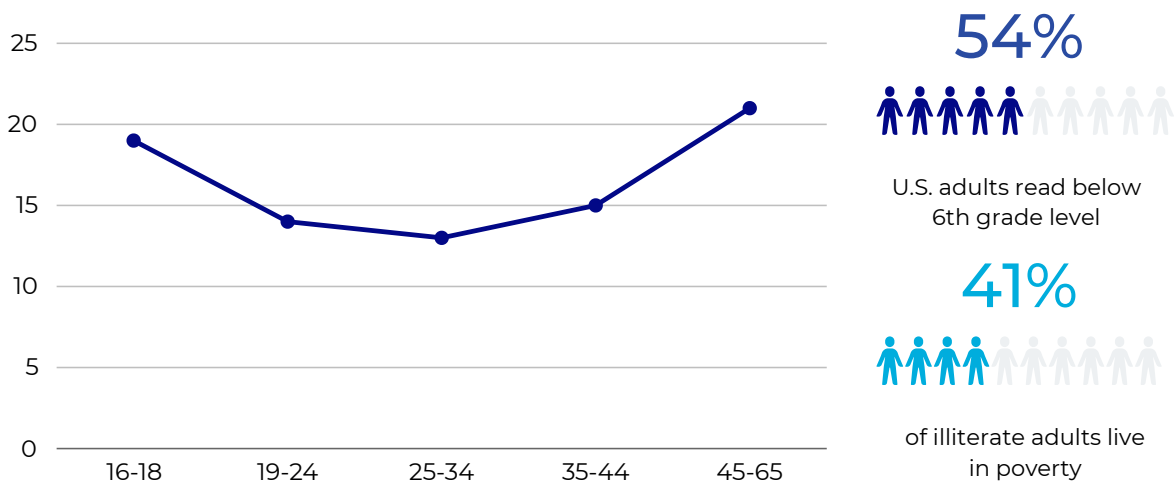
Source: National Center for Education Statistics. *The Condition of Education 2019*. NCES 2019-179. U.S. Department of Education, 2019. Accessed June 13, 2024.



Source: Crowe, Madison. "Illiteracy Among Adults in the US." *Ballard Brief*. Last modified March 28, 2022. Accessed June 13, 2024.

The societal impact of low literacy is equally concerning. It contributes to a cycle of poverty and social exclusion, impeding economic growth and increasing public expenditure on social services. The National Commission on Adult Literacy reported that improving adult literacy could increase national productivity and reduce poverty, potentially saving billions in healthcare costs, social services, and the criminal justice system [6]. Therefore, addressing low literacy is crucial for fostering a more inclusive and prosperous society.

Illiteracy in America Across Age Groups



Source: National Center for Education Statistics. *The Condition of Education 2019*. NCES 2019-179. U.S. Department of Education, 2019. Accessed June 13, 2024.

Teacher Shortages and Their Projected Growth

The education sector is grappling with a significant shortage of teachers, a problem that is expected to worsen in the coming years. According to the National Center for Education Statistics (NCES), 45% of public schools report feeling understaffed during the 2023-2024 school year [7]. The same NCES report reveals two-thirds of public schools reported that their biggest challenge in hiring teachers was a lack of qualified candidates.

The U.S. Department of Education highlights that this shortage is particularly acute in subjects like mathematics, science, and special education, as well as in high-need areas such as rural and urban districts.

Issue	Description	Consequences
Low Literacy Levels	43 million adults in the US read below a sixth-grade level, affecting daily tasks and employment.	<ul style="list-style-type: none"> • Poor health outcomes, higher unemployment, and lower earnings. • Adults with low literacy earn 30-42% less.
Teacher Shortages	45% of public schools are understaffed, with severe shortages in math, science, and special ed.	<ul style="list-style-type: none"> • Larger class sizes, less student attention, and reliance on underqualified teachers. • Decline in student performance.
Impact on the Job Market	Employers need advanced skills, but many job seekers lack them.	<ul style="list-style-type: none"> • Increased unemployment, job relocation or outsourcing, and a weaker domestic job market.

The projected growth of this shortage poses serious risks to the quality of education. Teacher shortages often lead to larger class sizes, reduced individual attention for students, and increased reliance on underqualified or substitute teachers. This undermines the effectiveness of education and exacerbates inequities in educational outcomes. According to the Economic Policy Institute, teacher shortages contribute to a decline in student performance, particularly among low-income and minority students [8].

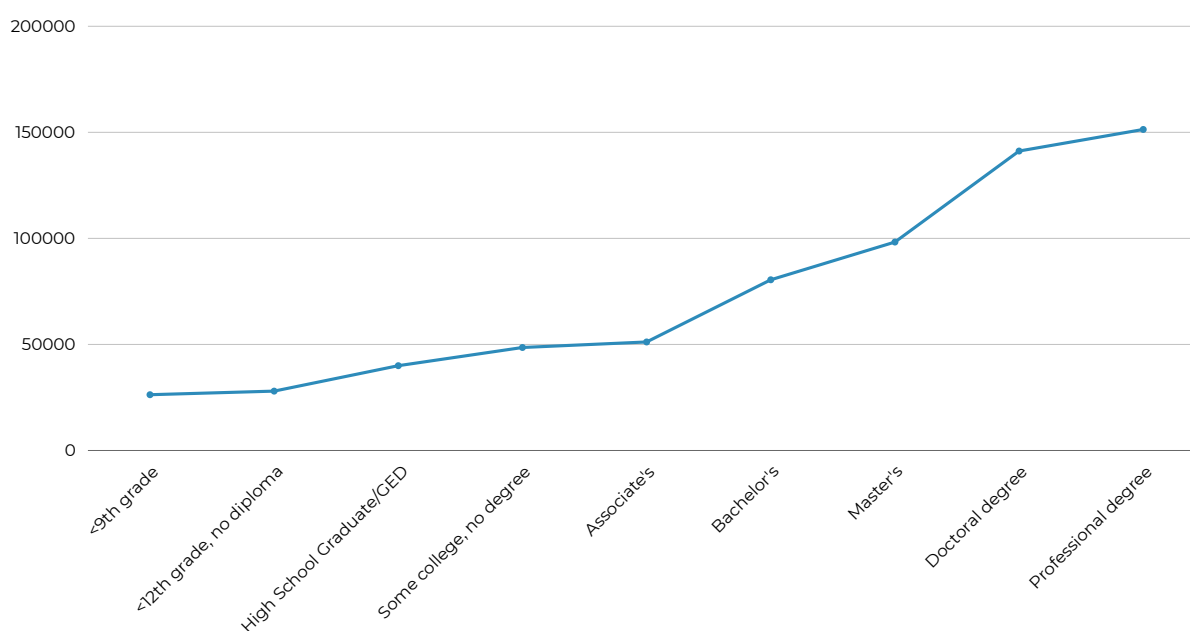
Addressing this shortage is essential to ensure that all students have access to high-quality education and are prepared for future success.

Teacher shortages are also driven by high levels of stress, burnout, and inadequate resources. A survey by the American Federation of Teachers (AFT) revealed that 61% of educators reported feeling stressed “often” or “always” at work, and 58% described their mental health as “not good” for at least seven days in the previous month [9]. The Learning Policy Institute also found that inadequate resources and support contribute significantly to teacher attrition [10].

Impact on the Job Market

The convergence of low literacy levels and teacher shortages has a profound impact on the job market. Employers increasingly demand a workforce equipped with advanced literacy and technical skills, yet many job seekers lack these competencies. The World Economic Forum predicts that by 2025, half of all employees will need reskilling due to technological advancements and changing job requirements [11]. However, the current educational infrastructure is ill-prepared to meet this demand, partly due to the aforementioned teacher shortages and literacy challenges.

Median Income (in U.S. Dollars) by Maximum Attained Education Level



Source: Desjardins, Jeff. "Here's the Average American's Income by Education Level." The Ascent. Last modified May 15, 2023. Accessed June 13, 2024.

Reports estimate that closing the skills gap could boost global GDP by \$6.5 trillion by 2030 [12]. Conversely, failing to address this issue could lead to increased unemployment and underemployment, especially among young adults and marginalized communities. Moreover, the inability to fill high-skill job vacancies can drive companies to relocate or outsource jobs to other countries, further weakening the domestic job market.

To mitigate these impacts, a coordinated effort is required to improve literacy rates, address teacher shortages, and align educational outcomes with market needs.

OUR SOLUTIONS

To address the critical issues of low literacy rates and teacher shortages, QiMeta offers a cutting-edge platform powered by artificial intelligence. This platform is designed to enhance learning experiences and make education more accessible and effective for all learners, especially those in underserved communities.

Overview of the QiMeta Platform and Its Functionalities

The QiMeta platform is a comprehensive AI-driven solution that transforms how students and workers engage with educational content. It is easy to deploy and integrate into the classroom experience. It leverages advanced natural language processing and machine learning algorithms to provide a highly interactive and personalized learning experience. The platform's functionalities are tailored to address the specific needs of users, making it a versatile tool for improving literacy and educational outcomes.

Highlighting Key Concepts and Terms

One of the core features of the QiMeta platform is its ability to automatically highlight key concepts and terms within the context of a document. This feature is particularly beneficial for learners with low literacy skills, as it helps them engage, identify, and focus on the most important parts of the text. By emphasizing critical information, QiMeta aids in comprehension and retention, making it easier for users to grasp complex subjects.

Providing Summaries and Quick Definitions

QiMeta goes beyond simple text highlighting by offering comprehensive summaries and quick definitions of highlighted terms in the context of the document. This functionality ensures that users can quickly understand the essential points of a document without getting bogged down by difficult language or lengthy explanations.

Interactive Chat with QiMeta for Discussions

A standout feature of the QiMeta platform is its interactive chat functionality. Users can engage in real-time discussions with the Ask QiMeta, asking questions and receiving immediate, contextually relevant responses. This interactive element simulates a tutoring experience, providing personalized assistance and clarifications on demand. The chat feature not only enhances comprehension but also encourages active learning and engagement, making the learning process more dynamic and interactive.

Students often shy away from asking questions out of self-consciousness or fear of being stigmatized by others. Our chatbot feature provides the privacy to ask questions without fear. This built-in feature also streamlines the exploration process: rather than venturing to external resources to ask questions (ie. search engines, dictionaries, books), students can prompt the chatbot right there on the same page as the article.

Similarly, completing assigned readings in the home setting can be challenging. Students are likely to lose focus when they do not understand a concept. This is more problematic in families where students do not have parents or adults at home capable of helping them answer questions.

QiMeta overcomes these critical barriers, allowing the students to engage with questions and remain an active reader.

Deployment and Integration with Existing Documents and Systems

QiMeta is very easy to deploy. QiMeta is a cloud solution that requires NO new hardware and can be used on any existing devices. QiMeta is designed to seamlessly integrate with existing documents and educational systems. The platform can process various file formats, including PDFs, HTMLs, and Word documents, allowing users to upload and work with their own materials. This flexibility ensures that QiMeta can be easily incorporated into existing workflows and educational settings, minimizing disruption and maximizing usability. Whether used in a classroom, corporate training, or individual study, QiMeta adapts to the user's environment, enhancing the learning experience without requiring significant changes to current practices.

Unified Functionality to Minimize Distractions

By offering highlights, summaries, definitions, illustrations, videos, and an interactive chat in one place, QiMeta eliminates the need for students to seek external resources such as Google or ChatGPT. This integrated approach minimizes distractions, allowing students to concentrate fully on the content they are reading. The constant switching between different applications can lead to reduced focus and productivity, but with QiMeta, all necessary resources are available at their fingertips, fostering a more concentrated and efficient learning environment.

From a teacher's perspective, QiMeta solution provides a condensed technology platform, minimizing dependencies on multiple tools for teaching, and reducing tools' fatigue.

PROVEN BENEFITS AND OUTCOMES

QiMeta has been successfully deployed in major institutions in the Trenton, NJ area.

At Mercer County Community College, QiMeta was utilized to assist students in GED preparation classes for the high school diploma equivalency test. A survey involving 13 students and 1 teacher revealed overwhelming support for QiMeta, with all participants rating their willingness to recommend the solution at 10 out of 10.

Students praised QiMeta, describing it as “brilliant,” “very helpful,” and “convenient,” appreciating its ability to provide straightforward definitions and support for those not fluent in English. One student noted, “It gives me straight definitions of words I do not understand and helps with my math.”

“It helped me learn a good amount of facts and what we can do about carbon acidification.”

- Student User

In a summer program, QiMeta was used to educate 45 students from Trenton High School on the impacts of climate change on ocean acidification. Following two instructional sessions, the students expressed their appreciation with a standing ovation, acknowledging the role of artificial intelligence in enhancing their understanding of how ocean acidification affects marine life.

“I like how I’m able to click on sentences that are a little bit difficult to understand, I’m able to click it and a simpler definition comes up.”

- Student User

Initial performance results indicated a 10% improvement in students' understanding and a 30% increase in their satisfaction. However, additional data is required to achieve statistical significance and confirm these findings conclusively.

COMPETITIVE LANDSCAPE

Comparison with Competitors

Most of the competitors currently use AI to focus on self-learners and students with high literacy levels. QiMeta, on the other hand, focuses on using AI to help students learn faster, transforming literacy for adults, for students, for all.

QiMeta's Unique Value Proposition

Personalization and Adaptability

- Offers highly personalized learning experiences, adapting content in real-time to meet user needs, enhancing engagement and learning outcomes.

Comprehensive Toolset

- Integrates document highlighting, summaries, interactive chat, and seamless integration with existing documents. Provides all necessary tools within a single platform, minimizing distractions and enhancing productivity.

Broad Market Application

- Versatile for education, corporate training, and small businesses, offering a cohesive solution across various industries, expanding market reach.

AI-Driven Efficiency

- Streamlines complex processes such as RFP analysis and response, reducing cost, time and effort, particularly beneficial for small businesses and corporate environments with limited resources.

QiMeta's unique value propositions and comprehensive functionalities position it as a leader in the education and training technology market. By addressing the specific needs of its target segments and offering innovative solutions that enhance learning and productivity, QiMeta sets itself apart from competitors and drives significant value for its users.

CONCLUSION

QiMeta is revolutionizing education and business through advanced AI, addressing critical issues like low literacy rates, teacher shortages, and lack of qualified workers.



For students

In education, QiMeta helps students and educators overcome literacy challenges, fostering a skilled population.

For adults

In corporate training, it streamlines employee development, boosting productivity.



For all

The platform's ability to provide summaries, definitions, and interactive discussions makes it suitable for users with different learning preferences and needs.

QiMeta's potential to drive positive change is immense. As we expand, our commitment to improving literacy, education, and business processes remains steadfast. We call upon stakeholders and investors to join us in this transformative journey. By supporting QiMeta, you invest in a future where education is accessible, business processes are streamlined, and opportunities abound.

SOURCES

1. BarbaraBushFdn. "Barbara Bush Foundation." Literacy Gap Map. Accessed June 13, 2024. <https://map.barbarabush.org/>.
2. "A Coming Crisis in Teaching? Teacher Supply, Demand, and Shortages in the U.S." Learning Policy Institute, September 25, 2023. <https://learningpolicyinstitute.org/product/coming-crisis-teaching-brief>.
3. Nietzel, Michael T. "Low Literacy Levels among U.S. Adults Could Be Costing the Economy \$2.2 Trillion a Year." Forbes, September 12, 2023. <https://www.forbes.com/sites/michaelnietzel/2020/09/09/low-literacy-levels-among-us-adults-could-be-costing-the-economy-22-trillion-a-year/>.
4. Adult literacy in the United States. Accessed June 13, 2024. <https://nces.ed.gov/pubs2019/2019179/index.asp>.
5. The-economic-social-cost-of-illiteracy-2023. ... Accessed June 13, 2024. <https://worldliteracyfoundation.org/wp-content/uploads/2023/09/The-Economic-Social-Cost-of-Illiteracy-2023.pdf>.
6. Reach higher, America - ed.gov. Accessed June 13, 2024. <https://files.eric.ed.gov/fulltext/ED506605.pdf>.
7. "School Pulse Panel: Responses to the Pandemic and Efforts toward Recovery." School Pulse Panel - Interactive Results. Accessed June 13, 2024. <https://nces.ed.gov/surveys/spp/results.asp>.
8. Report • By Emma García and Elaine Weiss • March 26. "The Teacher Shortage Is Real, Large and Growing, and Worse than We Thought: The First Report in 'The Perfect Storm in the Teacher Labor Market' Series." Economic Policy Institute. Accessed June 13, 2024. <https://www.epi.org/publication/the-teacher-shortage-is-real-large-and-growing-and-worse-than-we-thought-the-first-report-in-the-perfect-storm-in-the-teacher-labor-market-series/>.
9. Aftunion. "Survey Shows Educators Are Feeling Stressed Out." American Federation of Teachers, October 21, 2020. <https://www.aft.org/news/survey-shows-educators-are-feeling-stressed-out>.
10. Mahnken, Kevin. "61% of Teachers Stressed out, 58% Say Mental Health Is Not Good in New National Survey." The 74, October 31, 2017. <https://www.the74million.org/61-of-teachers-stressed-out-58-say-mental-health-is-not-good-in-new-national-survey/>.
11. "Reskilling Revolution." initiatives.weforum.org. Accessed June 13, 2024. <https://initiatives.weforum.org/reskilling-revolution/home>.
12. "Investment in Upskilling Could Boost Global GDP by \$6.5 Trillion by 2030." World Economic Forum. Accessed June 13, 2024. <https://www.weforum.org/press/2021/01/investment-in-upskilling-could-boost-global-gdp-by-6-5-trillion-by-2030/>.

Join us in shaping the future of education and business with QiMeta. For further information and collaboration opportunities, please feel free to contact us!

We thank you for your continued support in our efforts to make learning more accessible.

CONTACT US

Founder and CEO,
Ruhul Quddus

Princeton, NJ

www.qimeta.ai.com
rquddus@qianalysis.com
@QiMeta on LinkedIn

Head of Business
Development,
Jean-Harry Xavier, Ph.D.

Princeton, NJ

www.qimeta.ai.com
jxavier@qianalysis.com
@QiMeta on LinkedIn