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General Consultation Report
Blockchain for Education:
Creating an Open Architecture for the Learning Economy

Under the UNESCO World Higher Education Conference (WHEC2022)
Section for Higher Education | Division for Education 2030

Basic information

Date of consultation	Dec 2020 - Dec 2022 (Ongoing)			
Location of consultation	Virtual (Zoom)			
Hosting organisation(s) (include webpage if available)	World Bank https://www.worldbank.org/en/topic/edutech/brief/blockchain-for-education-community Learning Economy Foundation https://www.learningeconomy.io/post/lef-and-the-world-bank-announce-the-blockchain-for-education-community-of-practice			
Name and email address of key contact person	Taylor Kendal, taylor@learningeconomy.io			
Complete name, title, and affiliation of moderator(s)	Chris Purifoy, CEO, Learning Economy Foundation Robert Hawkins, Global Lead for Technology and Innovation in Education, World Bank			
Language of consultation	Primary: English Secondary: Various			
Time spent in consultation (minutes)	1490			
Number of participants	~250			
Participant profiles (please, briefly describe the composition of the group)	The World Bank Blockchain for Education Workshops and Community of Practice (CoP) is composed of a diverse mix of educators, public/private sector professionals, ministries of education, technologists, social impact agencies, and LMIC project leads.			
Countries represented by participants	Australia, Bangladesh, Belgium, Canada, China, Colombia, Cyprus, Denmark, Estonia, Finland, France, Germany, Honduras, Hong Kong SAR, India, Indonesia, Kenya, Lithuania, Malaysia, Malta, Moldova, Nepal, New Zealand, Nigeria, Norway, Philippines, Qatar, Rwanda, Singapore, SouthKorea, Sri Lanka, Italy, Romania, Spain, Switzerland, Turkey, UK, United States			
Stakeholder groups (please mark with an "x" as appropriate)	x Professors/ Researchers	x Students/Youth	x Higher education managers/authorities	x Private sector
	x NGOs/civil society	x International organisations	x Policy makers/government	☐ Others (please, specify):

Which theme did you choose for this consultation?

☐ Theme 1: Impact of COVID-19 on higher education

x Theme 2: Higher education and the SDGs

x Theme 3: Inclusion in higher education

☐ Theme 4: Quality and relevance of programmes

☐ Theme 5: Academic mobility in higher education

☐ Theme 6: Higher education governance

☐ Theme 7: Financing higher education

x Theme 8: Data and knowledge production

x Theme 9: International cooperation to enhance synergies

x Theme 10: The futures of higher education

x Other (please, specify): **Blockchain and emerging technology**

Synthesis of contributions

Kindly provide a summary, synthesizing and reflecting the ideas provided by all participants. There is no need to identify participants. Consultation reports should not exceed 1,200 **words**, including the responses to the three questions outlined below (consider a balance of approximately 400 words per response). If necessary, add attachments. Remember that question 1 is general, but questions 2 and 3 should refer to the specific theme you have chosen (see list in **Annex 1**).

Question 1: *What should be the present and future role of higher education to favour the wellbeing of humans and sustainability of societies?*

'Blockchain for Education' is a workshop series and community of practice exploring the role of pioneering technologies as global public goods for the next generation of education. It provides a space to learn about and collaborate on open architectures for the global learning economy and focuses on six key topics: blockchain and fintech for education, decentralized education ecosystems and organizations, skills economies, digital credentials, next generation assessments, and incentivized learning and token economics.

The present and future role of higher education should be to offer flexible learning experiences that enable exploration, innovation, well-being, and relevant career and opportunity pathways for **ALL** humans. For such a system to exist globally and be universally accessible, the Blockchain for Education Workshops and Community of Practice (CoP) endeavors to align and build a social foundation focused on the responsible integration of learner-centered digital wallets, verifiable credentials, rich skills libraries, and incentivized learning models using trust-based technology architectures. Blockchain and other Web3 technologies provide a true paradigm shift for higher education that empowers individual learners to control their own learning and employment data, which may seem like a simple nuance, but in fact changes everything. Verifiable credentials that contain interoperable metadata and are linked to rich skill descriptors can provide lifelong proof of education, skills, jobs, career progress, impact, and achievements.

By decentralizing education into a network of individual learners whose learning achievements, credentials, and employment data is stored on their own devices, an Internet of Education emerges in which individuals earn real equity while they learn, converting their educational journey into true assets that can be saved, stored, and indefinitely shared with confidence as verifiable proof of their skills. This type of decentralized and trusted skills network will empower the next generation of learners to self-direct their learning and employment pathways with the precision of a GPS, removing social inequities and increasing opportunities for every human on earth.

When packaged and deployed, a new global model for higher education emerges; one which responsibly leverages trust-based technologies in order to more rapidly and effectively achieve SDG4 and SDG8.

Question 2: *What are the main* ***challenges/problems/gaps*** *in relation to the future of education?*

The world's education systems are struggling to deliver the learning environments, and therefore the skills, needed for a global population to collectively thrive in the emerging post 4th industrial revolution landscape, where AI, machine learning, and robotics are set to replace many historically human employment options. This is evidenced by the fact that an estimated 50% of the workforce needs to be re-skilled by the year 2025, and that 53% of the world's youth experiences 'learning poverty.' Ed Tech, which is often lauded as a silver bullet, is too fundamentally linked to the existing education infrastructure to ameliorate any systemic problems. Subsequently, Ed Tech will often simply digitize existing biases and issues rather than beneficially disrupt them for the greater good of the global community, especially those from low and middle income environments.

We need to transform the way we think about where learning occurs, how achievements and skills are captured and stored, and how learners are connecting with employment opportunities and vice versa. By purposefully establishing frameworks that meaningfully address education inequities and education system shortcomings, we can proactively shape a future where every individual—irrespective of wealth, background or birthplace—is given the opportunity to develop and thrive as a creative, lifelong learner in the society of tomorrow. As a result, economies can grow by actively matching emergent workplace needs to individuals with requisite and respected skills. This will help rebalance the economic scales between value creation at the individual level and value extraction at the investor level, securing a more equitable and socially sustainable model for the future.

Question 3*: What needs to* ***change*** *or be* ***created*** *to face these challenges* ***within*** *and/or* ***outside*** *of higher education institutions?*

In order to address the aforementioned challenges, both in education and across global sectors, focus must be reoriented on learner-centered approaches that empower each individual to direct their own paths through the value centers of education and toward their own individual learning and career goals. Additionally, while courses and degrees offer a great proxy for knowledge and perseverance, the skills earned on each path of a learner's journey also need to be identified and recorded as micro-credentials, providing the skills beacons needed to better match talent with opportunities and effectively close skills gaps to maximize impact.

New decentralized and open source technologies provide the infrastructure necessary to enable such a future. Digital wallets, verifiable credentials, and self-sovereign IDs provide the portable upgrade needed for institutions of higher education to effectively issue verified digital credentials that can persist with each learner throughout their life and career path. These credentials also act as the foundation for pathways, protocols, and applications that will allow each learner to navigate their education/employment with GPS-like accuracy, from training to assessments to credentials, and then to the job opportunities they qualify for at each step of their learning journey. Through the Blockchain Education Workshop and Community of Practice, we have been able to connect global networks and partners in an effort to showcase and highlight a variety of pilot projects and use cases around the world.

One major goal, of both the workshop series and the ongoing community of practice, is to collaborate across geographical boundaries on the development and implementation of pilot projects that generate and prove viability of shared, open source public goods. If we are to solve

many of the global challenges we face as a species, we **MUST** see these types of public good efforts prioritized by local and national governments alike, and signaled via new funding and policy models. There is a critical need for investment in open source infrastructures, and the development of private-public partnerships that help to move pilots to scale across every layer of the Internet of Education. To catalyze such a future, standards that can offer interoperability and scalability for new education and employment infrastructures must be developed and embraced. Several such standards-based open source technologies have been or are currently being developed by members of the Blockchain for Education Community of Practice.

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Members of the CoP developed and proved open source digital wallet and identity protocols.

The Tech: The W3C Universal Wallet (UW) is a packaging of draft standards and open source frameworks incubated by MIT and Learning Economy Foundation. The UW includes key management and rotation capabilities, Verifiable Credentials (VCs), Decentralized Identifiers (DIDs), and a trust triangle that operates modularly on IPFS with plug-ins for any layer 1 or layer 2 blockchain.

Proof Cases: In 2021, MIT developed a proof case for secondary education with the U.S. Department of Education, and Learning Economy Foundation deployed a proof case for young children in partnership with the Lego Foundation (to solve for the toughest privacy challenges first).

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Members of the CoP also developed and proved open source skills library protocols.

The Tech: The Open Skills Management Tool (OSMT) is a metadata library builder that uses Rich Skill Descriptors (RSDs) to create dynamic and linkable skill taxonomies developed by Western Governors University and the Open Skills Network (500+ allies). The Open Competency Framework, incubated by the U.S. Chamber of Commerce Foundation T3 Innovation Network, is a skill library search tool for querying and making open skills data easily searchable and actionable. Open Badges 3.0, incubated within IMS Global, is a recognition infrastructure for skills attained and achievements accomplished using verifiable credentials to authenticate the credential (badges, skills, certifications, licenses, diplomas, micro-credential, self-assertions, etc.), the issuer, and the learner/earner.

Proof Cases: In 2021/22, OSMT was piloted by more than 15 network cohorts as part of the Open Skills Network's Skills Collaboratives, and Open Badges 3.0 aligns with VCs to extend a proven and scaled recognition protocol.

Which Sustainable Development Goals (SDGs) were particularly emphasised during this consultation?

x Goal 1: No poverty

☐ Goal 2: Zero hunger

☐ Goal 3: Good health and well-being

x Goal 4: Quality education

☐ Goal 5: Gender equality

☐ Goal 6: Clean water and sanitation

☐ Goal 7: Affordable and clean energy

x Goal 8: Decent work and economic growth

x Goal 9: Industry, innovation, and infrastructure

x Goal 10: Reduced inequality

☐ Goal 11: Sustainable cities and communities

☐ Goal 12: Responsible consumption and production

☐ Goal 13: Climate action

☐ Goal 14: Life below water

☐ Goal 15: Life on land

☐ Goal 16: Peace and justice strong institutions

x Goal 17: Partnerships to achieve the goals

You may provide additional feedback…

Are there any other issues that should be considered in relation to higher education challenges and options in your community, your region, the world?

Is there any other comment you wish to share with UNESCO or the organisers of the WHEC2022?

Building on the existing relationship between the World Bank's Global Education practice and UNESCO (and UNICEF), we would be very interested in exploring ways to collaborate further on our shared mission to solve SDG4 & SDG8 by 2030. Our hope is to work together to advance our vision of a global open source backbone for digital credentialing, skills libraries, earn-to-learn models, and learning and career pathways, that will all provide simplicity for nations to quickly leapfrog their education and employment systems to more innovative and sustainable models. UNESCO's support for our mission would provide a valuable signal and contribution to a more equitable future for all learners.

List of participants

[Please, include the moderator (s)]

*This list represents the private distribution list, though everyone listed was not present for every session.

Organisation	Name
a16z	Margit Wennmachers
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a16z	Zoran Basich
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American Council of Education (ACE)	Sarah Cunningham
American Public University System	M. Layne
APCO Worldwide	Judit Arenas
APoll01	Dan Guendeso
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Arizona State University (ASU)	Donna Kidwell
Arizona State University (ASU)	Katherine Giovacchini
Arizona State University (ASU)	L. Denny
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Asian Development Bank (ADB)	Haemiwan Fathony
Asian Development Bank (ADB)	Rudi van Dael
Asian Development Bank (ADB)	Ryotaro Hayashi
Asian Development Bank (ADB)	Sun Hwa Lee
Asian Development Bank (ADB)	Sungsup Ra
Asian Development Bank (ADB)	Xian Long
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AWS	Kathleen Mcgeer
AWS	Maysam Ali
AWS	Patrick Svenburg
AWS	Paul Grist
BacBon (Bangladesh)	Maheen Matin
BitDegree (Lithuania)	Danielius Stasiulis
Brigham Young University	Matthew Hailstone
Brighthive	Matt Gee
Brighthive	Natalie
Buffalo, University at	Bina Ramamurthy
C-BEN	Amber Garrison Duncan
Cartwheel Foundation International	Helen Reyes
CBC-EMEA (Lagos)	Foluso Falaye
CET Global	Johnson Wong
CET Global	Thomas Yeo
Circle	Dante Disparte
Cisco	Garif Yalak
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Coinbase	Hermine Wong
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ConsenSys	Constantin Kostenko
ConsenSys	Coogan Brennan
ConsenSys	John Wolpert
ConsenSys	Juliana Guaqueta Ospina
ConsenSys	Thomas Hay
Credly	Jonathan Finkelstein
Credly	Peter Janzow
Curious Learning	Tinsley Galyean
DCC - MIT Media Lab	Brandon Muramatsu
DCC - MIT Media Lab	Kim Hamilton Duffy
DCC - MIT Media Lab	Philipp Schmidt
DeepSkills	Andrej Berlin
DeepSkills	Stepan Gershuni
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DEVxDAO	Wulf Kaal
Digitary, Parchment, IEEE	Simone Ravaioli
Dioworksgroup (Singapore)	Michael Choy
Diplomatic Courier	Ana Rold
DM Digital Solutions	Dilip Mirchandani
Duklas Cornerstone Consulting (Canada)	Joanne Duklas
DXtera Institute	Dale Allen
Educate Lanka Foundation	Manjula Dissanayake

Education Above All	Aishwarya Shetty
Education Above All	Janhvi Kanoria
Education Alliance Finland	Ollie Vallo
Education University of Hong Kong	Cherping Lim (Cherp)
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Ekiti State (Nigeria)	Michael Omolayo
Ethereum	Marc
ETS	Catherine M. Millett
ETS	Vladimir Zubenko
EU	Georgi Dimitrov
EU	Maria Gkountouma
EU	Yves Punie
Everis	Anthony Camilleri
EY	Paul Brody
Fab9	Hans Chang
Fluree	K. Doubleday
Fundación Telefónica	Daniela Hofle
Gates Foundation	Asyia Kazmi
Gates Foundation	Clio Dintilhac
Gates Foundation	Michael van der Ven
GG4I	Robert Iskander
Gnowbe	Jim Tam
Gnowbe	So-Young Kang
Google (X-Moonshot Factory)	Simon
GreenLight	S. Hriknat
Harrisburg University	Ian Kanski
Harvard, University of	Cory Snow
Harvard, University of	Primavera De Filippi
Headai (Finland)	Harri Ketamo
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Hello.PLATO	Rachel Fisher
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Hyland Credentials	Mary Strain
Hyland Credentials	Natalie Smolenski
IBM	Alex Kaplan
IBM	Mei Ling Liew

IBM	Rick Goldgar
IDB	Alejandro Pardo
IDB	Antonio Leal Batista
IDB	Lucia Latorre Salvador
IDB	Marcos Allende Lopez
IEEE	Gregory Nadeau
Imaginable Futures	Luis Duarte
IMS Global	Mark Leuba
IMS Global	Michael King
Inspired Classroom	Alli DePuy
International Council on Badges and Credentials	Rupert Ward
Jamestown Group	Taylor Hansen
JFF Labs	Kristina Gunnarsdottir
JFF Labs	Sharon Leu
JobKred (Singapore)	Gary Gan
JobKred (Singapore)	Ley Ley Lo
Juvo Ventures	Maia Sharpley
k20 Education / Ed 3.0 DAO	Scott David Meyer
k20 Education / Ed 3.0 DAO	Vriti Saraf
Leadership Academy of Nepal	Arun Joshi
Learning Economy Foundation	Chris Purifoy
Learning Economy Foundation	Colin Reynolds
Learning Economy Foundation	Danielle Saunders
Learning Economy Foundation	Duncan Cox
Learning Economy Foundation	Jacksón Smith
Learning Economy Foundation	Katie Kempton
Learning Economy Foundation	Taylor Kendal
Learning Economy Foundation	Terrance Liff
LEGO Foundation	Bo Stierne Thomsen
LEGO Foundation	Diana Ringe Krogh
LEGO Foundation	John Goodwin
LEGO Foundation	Michael Sjælland
LEGO Foundation	Naomi Stone
LEGO Foundation	Ollie Bray
LEGO Foundation	Soeren Holm
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Mapua Institute of Technology (Philippines)	Reynaldo Vea
Mastercard Foundation	Aissata Sow
Mastercard Foundation	Chidinma Lawanson
Mastercard Foundation	Chiemelie Umenyiora
Mastercard Foundation	Crystal Chan
Mastercard Foundation	Joseph Nsengimana
Mastercard Foundation	Suraj Shah
mEducation Alliance	Anthony Bloome
mEducation Alliance	Scott Isbrandt
Microsoft	Alexa Joyce
Microsoft	Christopher Ashford
Microsoft	Frank Mccosker
Microsoft	Jaye Richards-Hill
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Moodle	Martin Dougiamas
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Motlow State CC (TN Board of Regents)	Michael Torrence
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Open U	John Domingue
Oracle	Patricia Velazquez

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SAP	Alexander Schaefer
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