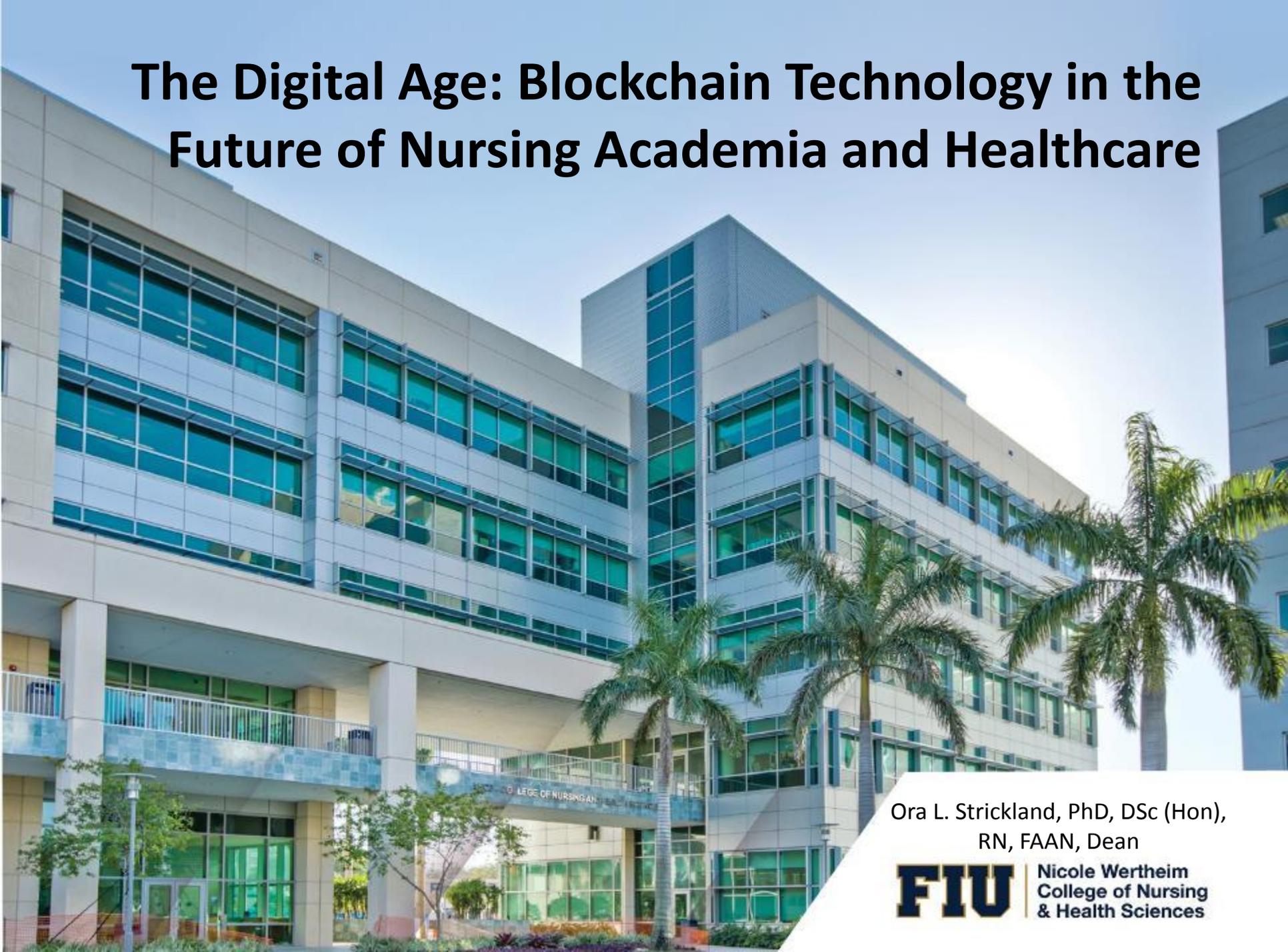


# The Digital Age: Blockchain Technology in the Future of Nursing Academia and Healthcare



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# The Future is Now!

Welcome to the future.

The future is now!

the Digital Age has brought us

**BLOCKCHAIN TECHNOLOGY!**

# Focus of Today's Presentation

We will:

Explore together the new reality of the next phase of the currently evolving Digital Age – Blockchain Technology.

Discuss the basics of blockchain technology, how it works, some of its current uses, its advantages, and disadvantages.

Explore how blockchain technology can enhance academia and healthcare; and, what might be required for us to fully participate in and take advantage of this technology.

# What is Blockchain Technology?

A shared, immutable ledger – a digital technology that will forever change the world!

# What is Blockchain Technology?

A means for recording and storing a shared or distributed ledger and its transactions, and tracking the movement of any asset on the ledger in a matter of seconds or minutes over a digital network.

Networks can be “unpermissioned” (open to anyone) or “permissioned” (restricted).

Assets can be tangible, intangible, or digital; e.g., a house, car, land, cash, patents, copyrights or intellectual property.

A blockchain is a digital operating system that provides for many applications that can run on that operating system. (Similar to internet operating systems, e.g. Microsoft Windows or MacOS.)

# How Blockchain Works

- A blockchain stores data in blocks linked together to form a chain.
- As the number of digital transactions grows, the blockchain also grows.
- The time and sequence of transactions are recorded and confirmed in blocks, which are logged into the blockchain within a discrete network.
- This network is governed by rules agreed on by the network participants (Gupta, 2018).

# Why is a Blockchain Immutable?

- Each block contains a digital fingerprint or unique identifier or *hash*.
- The previous block hash links blocks together and prevents any block from being altered or the insertion of another block between two existing blocks. This renders the blockchain tamper evident.
- The blockchain contains verified proof of transactions, and it removes the possibility of tampering by a malicious actor (Gupta, 2018).

# Advantages of Blockchain Applications

**Efficient:** Transaction information is recorded once and is immediately available to all parties through a distributed network with each participant acting as a publisher and subscriber. (Peer-to-peer replication)

**Cost-effective:** Eliminates the need for intermediaries. (Cuts out third parties)

**Reliable:** Information is immutable after transacted and recorded on the digital ledger of the blockchain network. (Data unchangeable, fixed, permanent)

**Secure and safe:** Since the underlying transferred ledger can't be changed; a change can only be made via another transaction, and both transactions would be visible.

**Finality:** Ownership and completion of a transaction is documented on a single, shared ledger.

# Types of Blockchain Technology

## **Cryptocurrency**

- Digital Currency
- Virtual Currency
- Characterized by peer-to-peer exchange

## **Blockchain Businesses and Markets**

- Provide services based on blockchain or distributed ledger technologies for tracking information for commerce or governmental activities.
- A private, permissioned network where identities are often known and without the need for cryptocurrencies.

# Cryptocurrency

- Digital currency that have no central monetary authority.
- They are **shared ledgers** that can be used to record any transaction and track the movement of any asset internationally. The effectiveness and efficiency of this ledger is the basis of a cryptocurrency's value.
- They are “mined” on running computers by people and businesses around the world who use special software in a peer-to-peer computer network.
- Current Major Cryptocurrencies (Over 1000)
  - Bitcoin, Ethereum, Litecoin, XRP (Ripple)

# The Evolution of Currency

- Currency and Monetary Exchange Over the Ages
  - Barter
  - Gold
  - Metal Coin
  - Paper Money
  - Plastic Card
  - Electronic Transfers of Money
  - Cryptocurrency
- Types of currency
  - Fiat Currency – National metal and paper currency
  - Alt Currency – Various cryptocurrencies

# Cryptocurrency: Is It the Next Logical Step in the Evolution of Money?

## Limitations of cash and fiat currency transactions:

- Useful in local transactions in small amounts.
- Prolonged time between transactions and settlement.
- Need for third-party validation of available funds except for cash transactions. (Inefficient and costly).
- Vetting credit card transactions are costly, time-consuming and include intermediary fees.
- Half of the world's population have no access to bank accounts.
- A central finance system, e.g. banks, add cost and risk of fraud, cyberattacks, and mistakes.

# Cryptocurrency: Is It the Next Logical Step in the Evolution of Money?

## **Disadvantages of Cryptocurrency**

- Lack of public understanding of the broad spectrum of use cases for cryptocurrencies.
- Volatility in value.
- Limited ability of the public to understand, value, access and manage cryptocurrencies.
- Virtual and cryptocurrencies pose risks as potential vehicles for money laundering, tax evasion, and fraud.
- Development of effective regulatory responses to virtual and cryptocurrencies are at an early stage as they operate on a global scale.

# Types of Blockchain Technology

## Blockchain Businesses:

- Business networks that use blockchain technology.
- Peer-to-peer replication: Each participant (called a node) on the network share a ledger that is updated in seconds each time a transaction is made.
- The blockchain business is economical and efficient since it eliminates duplication of effort and reduces the need for “middle men” or intermediaries.
- Transactions are verifiable, secure, and authenticated.
- Smart contracts are used to set rules that govern a business transaction. It is stored on the blockchain and automatically executed with each transaction.

# Key Business Benefits

- Time savings and cost savings.
- Enhanced privacy of transactions.
- Tighter Security: A “permissioned” network protects network participants against tampering, fraud, and cybercrime. By using IDs and permissions, users can indicate which transaction details they want other network participants to view.
- Enhanced trust across the business network: Transactions are more auditable. Digitalization streamlines transfer ownership, enhances privacy, and provides cryptographic proof of a set of transactions since they are tamper proof.

# The Future of Blockchain Technology in Nursing Academia and Healthcare

Healthcare and academia need more efficient, secure and cost-effective systems for managing:

- Medical and student records
- Preauthorizing payments
- Transfer of payments
- Settling insurance claims
- Recording and transmitting:
  - Patient data
  - Student data
  - Research data

# Potential Use Cases for Blockchain in Academia and Healthcare

- Faster and more accurate huge data entry and verification.
- Publication and copyright verification, storage and tracking.
- Redefinition and transparency of data sharing between academic and healthcare institutions related to research, and student and patient records.

# Potential Use Cases for Blockchain in Academia and Healthcare

- Ensuring privacy of sensitive student and patient data and information.
- Verification of insurance and claimant information reducing fraud.
- Using blockchain technology for cross border research, patient care, and education.
- Recording origin, processing, shipping and tracking of patient supplies across borders.

# Determining How Blockchain Fits in Your Work

(Gupta, 2018, p. 41-40)

- Does my business network need to manage contractual relationships?
- Do we need to track transactions that involve more than two parties?
- Is the current system overly complex or costly, due to the need for intermediaries or a central point of control?
- Can the network benefit from increased trust, transparency, and accountability in recordkeeping?

# Determining How Blockchain Fits in Your Work

(Gupta, 2018, p. 41-40)

- Is the current system prone to errors due to manual processes or duplication of effort?
- Is the current transaction system vulnerable to fraud, cyberattack, and human error?

A “yes” answer to any of these questions means blockchain can likely benefit your work.

# Key Questions for Nursing and Academia to Consider

- Are we ready to become active participants in blockchain technology?
- Is the nursing profession adequately prepared to help transform our ecosystems utilizing blockchain technology?
- With what other disciplines should we collaborate to ensure our active participation in blockchain development?
- How should we adapt our curricula to ensure that nurses and educators actively and meaningfully engage with blockchain technology?

# Final Word

“The blockchain technology, still in its early years, has thrown down the gauntlet in front of the current systems, challenging them to overhaul.”

Prableen Bajnai, 2016

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