Mobile Applications: From Design to Implementation

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12/28/2022

Outline

- Definitions
- mHealth Dimensions
- Types of mHealth App
- Features for Effective Designs
- Usability Considerations
- Factors Influencing Effective Use
- Challenges and Solutions
- WHO Principles for AI

Relevant Terms

eHealth

"**The use of information and communication technologies for health and health-related issues**"/ **EHRs initiatives (1)**

Global Health Assembly (2005):

A need for a long-term strategy to develop the infrastructure for information and communication technologies for health...to promote equitable, affordable and universal access to eHealth benefits (2)

Digital Health (DH)

Rooted in eHealth "**The use of digital technologies for health**" **Advanced Computing in Big Data, Genomics, and AI (2) .**

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mHealth

-A subset of eHealth, defined as "the use of mobile wireless technologies for health" (3)

- Initially by Professor **Robbert S.H. Istepanian** in **2003**, "as the emerging mobile communications and network technologies for healthcare" (4)

"mHealth is the use of mobile technology to provide health care support to patients or technical support to health service providers in a direct, low-cost and engaging manner" (5)

"the delivery of healthcare services and practice of medicine using mobile devices such as phones, computers, tablets, wearables and PDAs" (6)

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4 Dimensions of mHealth (7)

People: **Demographics**

A nuanced understanding of demographics such as age, gender, and income can point to technology preferences and help drive customization and targeting of users' mHealth experiences.

Places: **Local infrastructure**

The convergence of infrastructure needs (reliable local networks – cellular, broadband and wireless, download speeds, and bandwidth capacity) and rapid technological development may be a tipping point for mHealth adoption.

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4 Dimensions of mHealth

Payment: **Reimbursement and regulatory**

Value-based reforms to

1)   find more efficient ways to improve care while increasing quality;
2)   expand care delivery outside the hospital and physician office;
3)   facilitate patient-provider connectivity "anytime and anywhere";
4)   increase patient engagement.

Purpose: **Disease dynamics**

Fitness, wellness, care provision, disease management, and complex case management can be supported by mHealth functionality, but the approach has to fit the condition.

Different types of mHealth apps (8)

- **Remote monitoring apps**
- **Clinical and diagnostic apps**
- **Healthy living apps**
- **Behavior Change**
- **Data Collection and Reporting**
- **Rehabilitation**
- **Clinical reference apps**
- **Productivity apps**

Key Points in Effective Design (9)

- **Design Based on Human-centered Research Methodologies and Principle**
- **Generate Concrete Design Guidelines to Develop Effective Solutions in a Given Context**
- **Develop a Theoretical Framework if Appropriate**
- **Engage Users and then Ensure Their Trust**
- **Incorporate Evidence-based Practices that Improves Health Outcomes**
- **Ensure your App is Operating Based on Ethical Principles**

Key Points in Developing mHealth Apps

Design and Evaluation of a Mobile Application for Relapse Prevention to Methamphetamine Use Disorder

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Conceptual Frameworks!! (10)

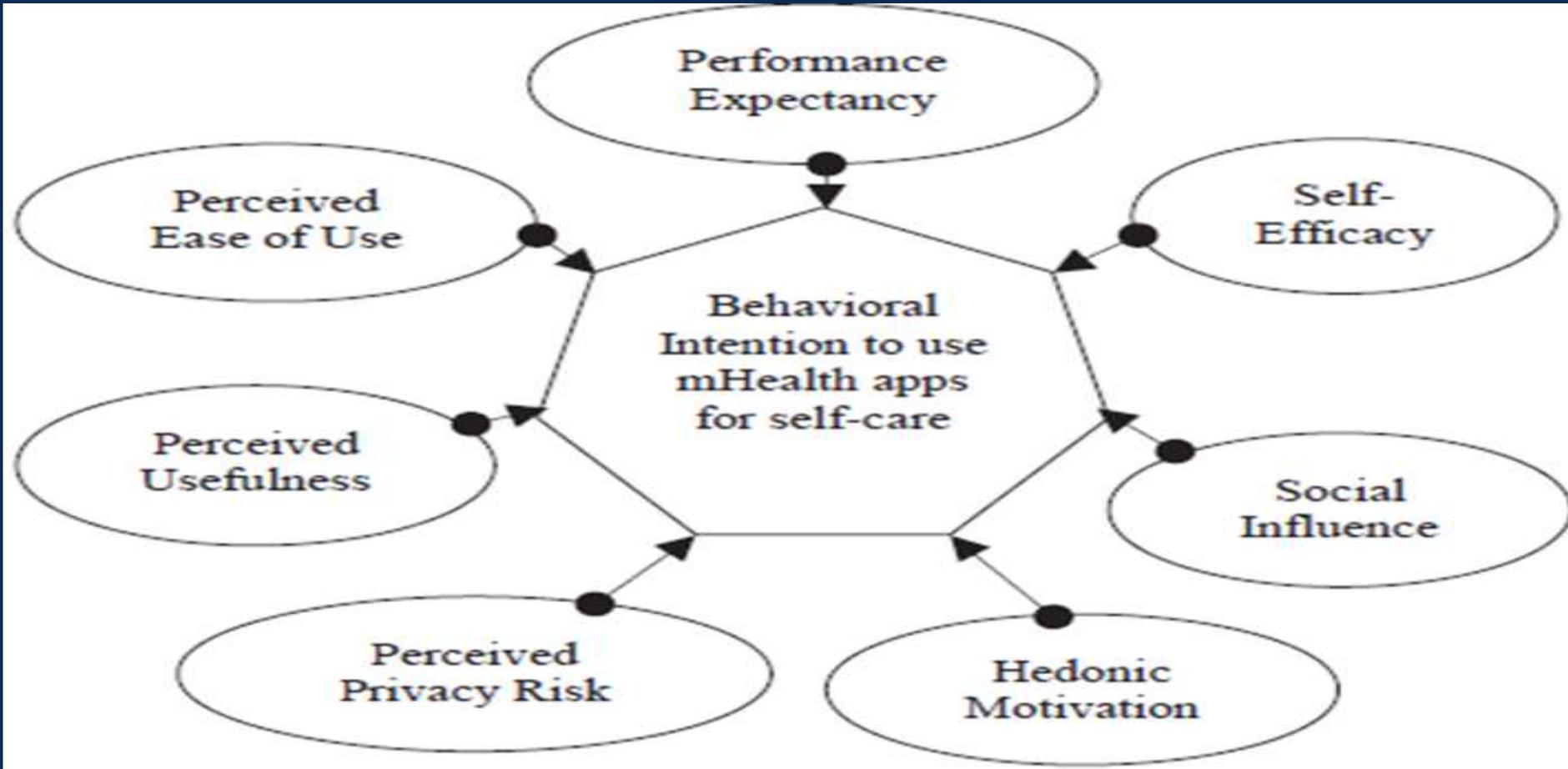**Dr. R. Rabiei**
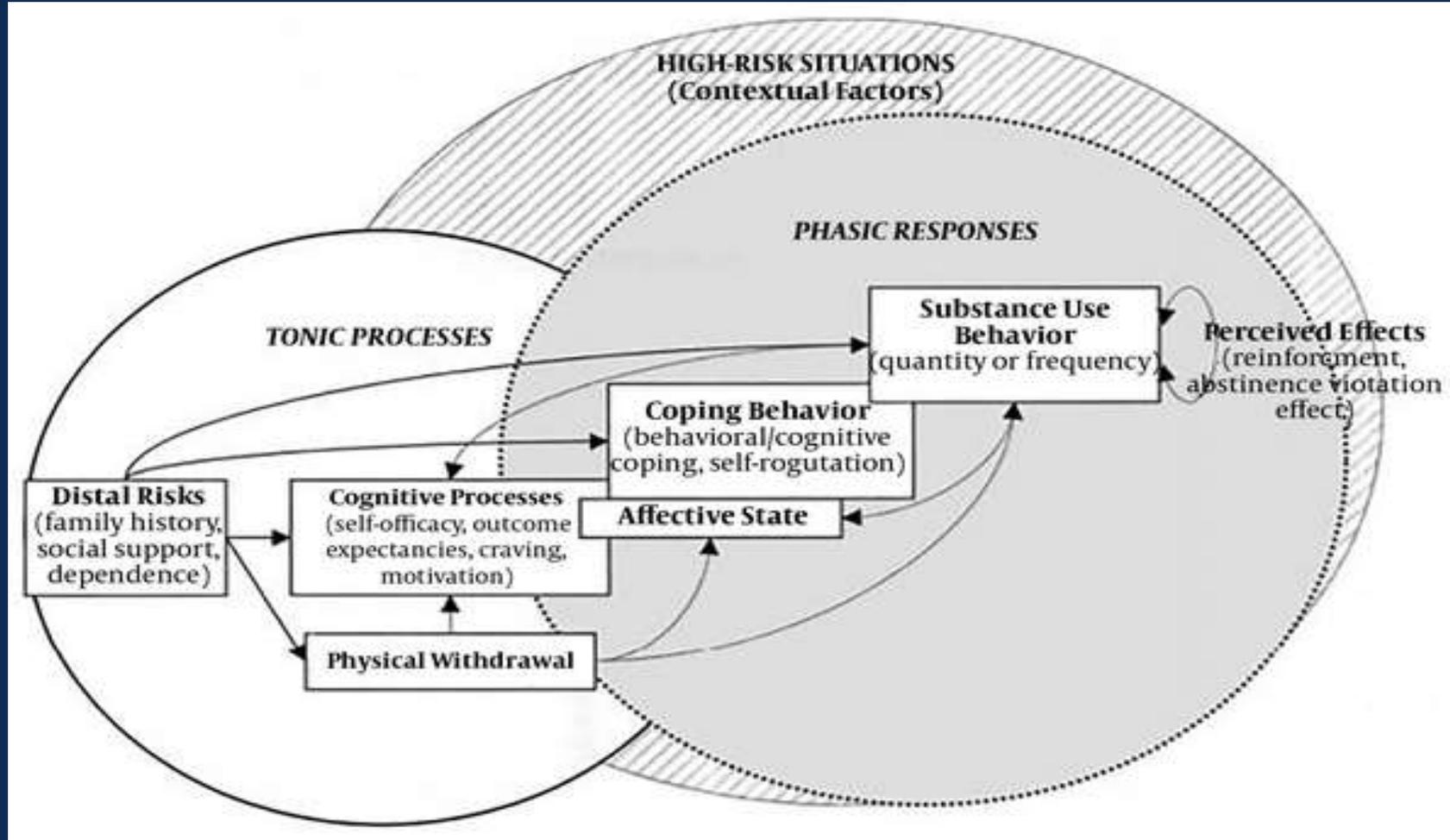
Check/Test Usability Appropriately

- **ISO 9241-11 (**Most Used Criteria**: Efficiency, Effectiveness, Satisfaction)**
- **ISO 9126-1 (**Most Used Criteria**: Attractiveness, Learnability, Operability, Understandability)**

Are These Suffice?

What About uMARS and MAUQ?
What Should I Do for My Own App?

Factors Influencing Effective Use mHealth App (4)

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mHealth Implementation Challenges (6)

- **Usability**
- **Integration of technology and interoperability**
- **Data security and privacy**
- **Reliability**
- **Network Access**
- **Technically challenged Staff**
- **Illiteracy**
- **Policy and regulation**
- **Financial accessibility**
- **Acceptability**

Solutions to Implementation Challenges (6)

- Absolute collaboration among all essential sectors and stakeholders
- Integration of all mHealth projects into nationwide healthcare system and strategy
- Align the strategy to comprehensive solutions with the most relevant priorities Network Access
- Develop policy regulations and frameworks to link healthcare to mobile health services
- Intense awareness creation, education and training
- Take records and analyze user adoption of apps and satisfaction level
- Institute surveillance and extensive research

WHO Ethical Principles for AI in Healthcare

- A guidance document created by 22 experts over 2 years

- The first consensus report on AI ethics in healthcare (11)

N.B

Governments and regulators **SHOULD** scrutinize

Where and How AI is used in healthcare!!

Six Key Principles

- Protect autonomy
- Promote human safety
- Ensure transparency

- Foster accountability
- Ensure equity
- Promote sustainable AI

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