Shaping the Value Equation in Digital Healthcare: A Holistic Perspective on Patient, System, and Provider Interactions

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Background: Value-based Competition

Decision-making within a patient-centered healthcare system places emphasis on the value of interventions. The definition of success is tailored to encompass clinical and non-clinical measures and metrics.

Problem: Valuing Innovations

Given the novel nature of digital interventions, new evaluation approaches are necessary.

Motivation: Money for Value

Value-based healthcare offers multiple benefits, such as cost reduction, improved patient satisfaction, increased adherence, and better outcomes for patients and society. Financial payments are based on the achievement of predetermined targets, goals, or outputs.

Research Question: Restructuring the Value Equation

How can the restructuring of the value equation support the management of digital interventions by providing relevant information, assessing the impact of interventions, and identifying value criteria?

Method: Triangulation

Literature: Acceptance Criteria

Boolean search strategy, conducted in January 2020 and February 2022.
Systematic reviews or research articles including acceptance theory in context of digital technologies and health.
Analyzing criteria impacting patient attitude and behavior.

Literature: Value Measures

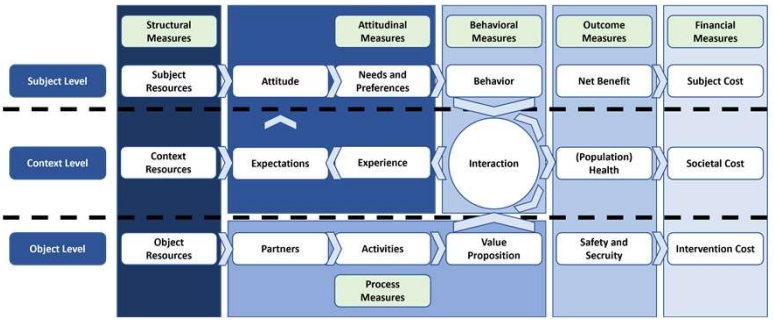
Boolean search strategy, conducted in August/September 2022.
Systematic reviews or guidelines including evaluation criteria of digital health interventions.
Extract evaluation criteria to evaluate digital health interventions.

Qualitative Interviews

Semi-structured interviews conducted March to September 2020.
Stroke patients (n=14) and neurorehabilitation experts (n=5).
Analyzing therapy-interaction processes and impacting factors in digital neurorehabilitation.

Discussion: Humanoid Robot in Neurorehabilitation

- The semi-structured interviews aimed to analyze perspectives on a humanoid robot.
- Participants attribute values such as flexibility, individuality and extended access to healthcare to digital technologies.
- Findings highlight the multidimensional nature of therapy value, indicating that it goes beyond clinical outcomes.
- This suggests the need for a more comprehensive evaluation of net benefits, considering their societal and economic impacts.



Results: *Value Level-Where does value come from?*

1. Subject Level: Analyzing patients needs, feels and does.

- **Subject Resources** are available to patients impacting their needs (psychological, physiological, individual).
- **Needs and preferences** indicate relevant barriers and opportunities for patient-centered care.
- **Attitudes** are personal opinions shaped by needs, preferences, experiences, and expectation.
- **Behavior** to achieve results and expectations (purchase, use, promotion, adoption, negative: protest).
- **Net benefit** is the overall gain resulting from a decision. *Net Benefit = Cumulative Benefits - Affiliated Risks*
- **Subject Costs** refer to indirect costs from missed opportunities and direct costs that patients themselves cover.

2. Context Level: Analyzing patient and provider interactions.

- **Context Resources** encompassing information, communication, task structures, and the wider environment.
- (Patient-derived) **Expectations** enable effective management of satisfaction and the fulfillment of their needs.
- **Experience** encompasses patients' interactions within a health interventions.
- **Population Health** is the health outcomes of geographic populations or certain groups including the distribution.
- **Societal Costs** result from direct costs and indirect costs (lost work capacity) collectively shouldered by society.

3. Object Level: Analyzing intervention process and operational management.

- **Object Resource** are combined, used, transformed in the production process to achieve goals and innovate.
- **Partners** come from different disciplines and provide services essential for creating value propositions.
- **Activities** are the sum of actions from partners that lead to a value proposition, encompassing interventions.
- **Value Proposition** is the added value achieved by delivering benefits, solving problems, and meeting needs.
- **Safety and Security** are defined standards that protect users' assets and protect them from risks.
- **Intervention costs** in a value-based system depend on quality; effective interventions leading to cost reductions.

Value Measures-How to model value?

1. **Structural measures** assess the infrastructure of a health system.
2. **Attitudinal measures** assess beliefs, perceptions, and attitudes related to health, disease, or intervention.
3. **Behavioral measures** provide insights into the performance, as they assess actual behavior.
4. **Outcome measures** can be characterized by net benefit, population health, safety and security.
5. **Financial measures** can provide valuable insights into the performance, as they help to assess the cost-effectiveness.
6. **Process measures** are metrics that assess the efficiency, effectiveness, and quality of intervention.

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