Mobile Messaging: It's More Than Texting
A Mobile Message Taxonomy that Utilizes the Capacity of Mobile Technology

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Introduction

When developing message content to be utilized in health behavior change interventions, evidence indicates the importance of tailoring and framing messages as strategies for driving health outcomes. Messages tailored on psychosocial dimensions relevant to the desired outcome can influence how individuals process information and can increase message effectiveness. Message framing techniques can be used to create more persuasive messages.

However, mHealth technology creates new opportunities for message concept development and delivery, based on its dynamic and adaptive delivery capabilities and possibilities for contextual tailoring of content. Maximizing the capabilities of mobile technology compels to consider the aspects of effective messaging that include not only the content, but the message delivery and timing needed to achieve the desired health outcomes and patient engagement. These could include:

- **Type of content:** Clinical, behavioral, psychosocial, and personal
- **How to deliver:** unidirectional, bidirectional, and multi-directional messaging both inside and outside the product.
- **When to deliver:** asynchronous, synchronous, real-time, just-in-time, longitudinal, frequency of delivery

Taxonomy is the practice and science of classification and provided one way to begin to categorize messages types by their attributes.

Methods

Phase I: CDE, health informatics and behavior science subject matter experts reviewed messages delivered in a RCT of a mobile phone intervention for blood glucose control and identified preliminary message categories.

Phase II: These categories were applied to the design of three mHealth products supporting three different chronic conditions to refine message categories and attributes.

Results

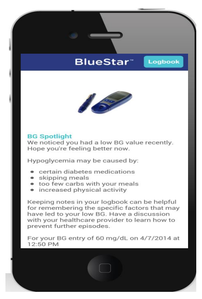
In Phase I of our review, we identified a preliminary set of message types and categories primarily related to the delivery of clinical and health behavior concepts: prompts, real-time feedback, interpersonal and longitudinal messages. The application of the taxonomy in Phase II revealed an additional category related to the delivery of health concepts (summary messages). It also revealed a category related to the importance of utilizing messaging to guide the user experience and support user engagement.

Message Type / Message Attributes	Prompts	Touchpoint	Real-time Feedback	Longitudinal/Trending	Interpersonal	Summary
Message Intent	Call to action for system use or self-care action	Regular touchpoint with user	Provide immediate response to data entered	Provide contextual feedback on data trends	Determined by stakeholder	Provide overview of how a patient is doing over a specified period of time
Trigger	•System use notifications •User set reminder	Time	Data point value	Longitudinal data analysis	Stakeholder	Time period
Product feature delivering message (Illustrative)	•External email •Calendar	Landing page	Journal/Logbook	•Landing page •Logbook	Message Center	Landing page
System source (backend)	Rules	Rules	RTFB Mobile Algorithm	Automated Expert Analytics System ™	Stakeholder (e.g. provider)	Automated Expert Analytics System ™
Content type	•Reminders •Notifications for system use	•Motivational •Psychosocial	•Educational •Self-management behavioral support (skills, barriers) •Safety	•"Just in time" feedback •Ecological momentary assessment	Based on provider professional licensing/protocol	•Summary of data •Recommended actions
Message Objective(s)	Prompt action	•Engage patient •Motivate •Empathize	In context of **data value**: •Increase knowledge •Improve skills •Address barriers •Reinforce action	In context of **data pattern or trend**: •Improve skills •Address barriers •Reinforce action	Based on provider professional licensing/protocol	Summarize data
Type of individualization (Segmentation and Tailoring)	Personalized	•Universal •Psychosocial •Behavioral •Personalized	•Contextual •Clinical •Behavioral •Personalized	•Contextual •Clinical •Personalized	Interpersonal	Clinically tailored
Delivery Mechanism	Pushed	Passive	Responsive	Pushed	Pushed	Pushed
User action required	•Yes (Reminders) •No (Alerts)	No	Yes	Yes	Based on protocol/stakeholder	Yes
Timing of delivery	•Time-based •Event-based	Time-based	Immediate	Trend-based	Based on protocol/stakeholder	Pre-determined time
Frequency	•Per event •Per data pattern	Daily	Per data entry	Based on presence or absence of trend	Based on protocol/stakeholder	Weekly
Message cycle rotation	None	Yes	Yes	None	Based on protocol/stakeholder	None

Touchpoint

Real-time Feedback

Longitudinal



Conclusion

Our Mobile Health Messaging Taxonomy identifies categories of mobile health messages and their common attributes. This allows us to systematically design, develop, and evaluate content for mobile health applications. This taxonomy (or catalog) facilitates the mapping of concepts, features, and mobile capabilities to the message content delivered through mobile interventions.

References

Gallagher, K.M., Updegraff, J.A. (2012). Health message framing effects on attitudes, intentions, and behaviors: A Meta-analytic review. *Annals of Behavioral Medicine*, 43(1), 101-116.

Kreuter, M. W., Farrell, D. W., Olevitch, L. R., & Brennan, L. K. (1999). *Tailoring Health Messages: Customizing Communication With Computer Technology*. Routledge.

Riley, W. T., Rivera, D. E., Atienza, A. A., Nilsen, W., Allison, S. M., & Mermelstein, R. (2011). Health behavior models in the age of mobile interventions: are our theories up to the task? *Translational behavioral medicine*, *1*(1), 53–71.

Kakabadse, N.K., Kakabadse, A., Kouzmin, A. (2003). Reviewing the knowledge management literature: towards a taxonomy. *Journal of Knowledge Management*, 7(4), 75 – 91.