Dark Metrics Illuminating the Negative Impact of Digital Health Design

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A *Pinterest* is worth a thousand words





Talking Points

PART I

Context

Data-Driven Explosion

Then—Product Success

— Now—Risk Assessment

PART II

Framework

- Dark Metrics Overview
- Framework

PART III

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- Disempowerment
- Exclusion
- Addiction
- Distraction

PART IV

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— Call to Action



The Data-Driven "Explosion"

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Then—Success Metrics

Traditional product metrics across digital technologies focus primarily on **near-term, product-oriented impact.** Figure 1. Google HEART Framework



Now-Risk Assessment

Emerging metrics across digital offerings are moving toward assessing the potential **biases, risks, and harm of our technologies.**

Figure 2. Ethical OS Risk Zones



Source: 2018 Institute for the Future and Omidyar Network

Dark Metrics, Raven Veal

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PART II

Dark Metrics—A New Paradigm

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Dark Metrics—Overview

Dark metrics is a framework for measuring the unintended negative consequences of digital health technologies *at the individual level.*



Dark Metrics—Overview





–Disempowerment

Does the technology replace or weaken users' authority in decision-making (or) is it being used to disempower others? -Exclusion

Does the technology introduce unjust or prejudicial treatment (or) is it being used to inflict such treatment against others?



-Addiction

Does the technology promote excessive use or unhealthy engagement?



-Distraction

Does the technology divert attention away from the participants' natural workflow?

PART III

Dark Metrics—Case Studies

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Disempowerment

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Disempowerment

Does the technology **replace or weaken an individual's autonomy** in decision-making (or) is it being used to disempower others?

Example: "Black-box" AI technologies for decision-support





Disempowerment

Case study, Improving decisionmaking among university students with depression

– Challenge. How might we equip undergraduate students with depressive symptoms with the appropriate skills and information to obtain help for their condition?

– Measurement. Self-efficacy scores to assess how confident students feel in obtaining support for their condition; AI ethics principles.





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Exclusion

Exclusion

Does the healthcare technology introduce **unjust or prejudicial treatment** (or) is it being used to inflict such treatment against others?

Example: AI encoding of racial discrimination



Exclusion

Case study, Improving racial equity among enterprise technologies

- Challenge. How might we support teams in designing product offerings that are more inclusive of racially/ethnically diverse end-users in order to improve trust and brand loyalty among global IBM clients and partners?

- Measurement. Heuristic evaluation using a design rubric that helps teams assess their products for racial bias across: *design strategy, design research ops, product design, data strategy, data visualization design, AI design.*

Figure #. Enterprise Design Racial Equity Rubric

	sign					
Applicable to all IBN	A offerings that se	rvice diverse global	audiences.			
Embedded Principles	Artifacts to Assess					
Racial Empathy Diverse Co-Creation Transparency	 Hills Performance Metrics/Design KPIs Documentation Research Plans Research Playbacks 					
		Section 2—De	sign for Da	ata and Al		
Design Strategy Hills	ſ	Applicable to IBM c	offerings that le	verage human	data (vs. macl	nine data).
Performance Metrics		Embedded Principles			Artifacts to Assess	
	-	Racial Empathy	Accountability	Fairness	— AI Demo — AI Documentatior	
		Diverse Co-Creation	Value Alignment	Explainability	 Performance Met 	
		Transparency	Accuracy	User Data Rights		
Design Research Research Plan	Ĩ					
		Data Strategy	Description	Below Standards	Meets Standards	Exceeds Standards
Participant Recruitment		Intent	Are recisive/treleasing devene value/treleasing log sponsor users or community advisory beards) involved in easily and enging conversations and our be purpose, development, and implementation of the AP-and/or data-analised product or loatant?	There is no diverse statematics involvement is discussions encould be listered and impact of the Al or data models). Furthermous, the Al or data enabled product or factors in ingrimentiat with no class factor to the individual included in the data.	The team ergages with diverse state-induces is every and organic conversations about the intern and inguar of the 4 ar ot alth models. Furthermore, the team cleanly identifies parential benefits of the 4 or other models product or feature to state-indexen, aligned with their values.	The total regarder with clients statishtides, including specific commutity abards, to ready communities about the upper participants and the statistical operator and the statistical about the statistical statistical about the statistical about the statistical commutities and the s
Data Collection		Performance Metrics	Does the team consider the measurement of fair, accurate, and equitable outcomes across diverse racial/ethnic user groups?	There is no consideration of measurements that assess bias, accuracy, or disparate outcomes across diverse user groups.	The team considers measurements that assess bias, accuracy, and disparate outcomes among primary users and teuchpoints.	The team considers measurements that assess bias, accuracy, and disparate outcomes among primary and secondary users and touchpoints.
						Total:
Data Analysis						
Data Analysis					Meets Standards	Exceeds Standards
		Data Management	Description	Below Standards		•
		Data Management Data Sourcing and Acquisition	Description Does the team have an exulty-oriented data sourching opportation or a plan for accessing quality, representative databases to answer high-interest questions?	Below Standards	Dera ta e ració estado formesente la place tota estado est	There is a nocial regulty framework in place, induring the teach data surviving efforts and supporting the offency's new in improvely solar equily. Furthermore, the distillancely lexitected represent data from diverse recisil/where groups.
	••	Data Management Data Sourcing and Acquisition Data Preparation and Cleaning	Does the team have an equity-oriented data sourcing agenda, or a plan for accessing quality, representative databases to answer	There is no racial requir formwork for data sourcing that transes the other view and cardiobadows in coasting and maintaining racial inequalities. The otherward justicel in here integring issues that robust	appoint in our off the subbond are over	There is a used encycle framework in place, support and encycle and a support of the sup



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Addiction

(Technology) Addiction

Does the technology promote excessive use or unhealthy engagement/dependency, causing deterioration of the mental, physical or social health of those who use it?

Example: Gamified Health Technologies





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Distraction

Does the technology provide an **overwhelming** amount of new or **complex** information or interactions that **divert peoples' attention away** from their natural workflow?

Example: Electronic medical records and patient communication



Distraction

Case study, Simplifying clinical trial recruitment in ER settings

– Challenge. How might we support medical staff in recruiting participants for clinical trials while maintaining an appropriate patient bedside manner?

– Measurement. Field study observations, shadowing both ER physicians and pharma staff, looking for clinician behaviors that demonstrate cognitive burden and distraction and patient frustrations



Dark Metrics—Overview

		Description
	Disempowerment	Does the healthcare technology replace or weaken users' authority in decision-making (or) is it being used to disempower others?
	Exclusion	Does the healthcare technology introduce unjust or prejudicial treatment (or) is it being used to inflict such treatment against others?
-	Addiction	Does the healthcare technology promote excessive use or unhealthy engagement, causing deterioration of the mental, physical or social health of the people who use it?
-	Distraction	Does the healthcare technology provide an overwhelming amount of new or complex information or interactions that divert attention away from the natural workflow?

	Signals	Metrics
	Survey Ratings	Self-efficacy scales
	Heuristic Evaluation	Racial equity scores
5	Diary Studies / Beta Testing	Time spent / wellbeing analytics
	Field Studies	Cognitive distraction metrics



Final Thoughts (Call to Action)

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The time is now to apply an ethical lens to the data that drive decisions.

- How might we raise *awareness* among CFTs and clients?
- How might we re-imagine the way data are collected?
- How might we better tell the complete story?





Final Thoughts (Call to Action)

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Raven Veal Design researcher

The Racial Equity in Design initiative is committed to ensuring racial equity is instilled in the design culture inside and outside of IBM by driving change through our interactions, investments, and actions that impact behaviors, policies, and deep-seated assumptions.

Featured

Our call to action is a

community-crafted statement which defines the IBM Design point of view on racial equity as the foundation for how we centered beliefs, it contains practical steps that designers will take towards creating a culture of equity at IBM and the design industry.





Final Thoughts (Call to Action)

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Advancing **Racial Equity** in Design A Field Guide for Managers and Leaders





"Black people in the United States [have been] systematically oppressed since 1619, [and] this history is unique to the Black experience in America. Most countries who endeavored to interact with Africa also colonized those people, [and] those constructs are alive today.

[We need to ask ourselves] where do early racism and internal biases still exist in our company that don't need to be there? This work of being anti-racist is more important now than ever."

- Nigel Prentice Design Director, Digital Growth & Commerce; F&O Support Experiences, IBM

ibm.biz/equity-field-guide





Discussion/Q&A