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User-centered design considerations for mobile yoga applications addressing the challenges faced by the breast cancer survivors: A mixed-method study
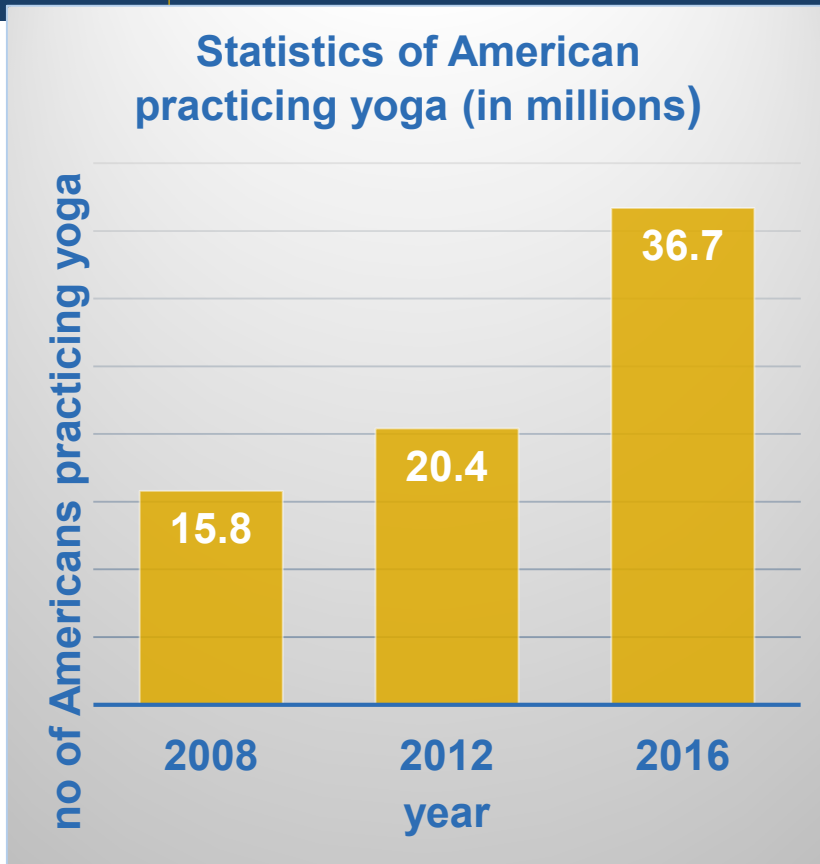
BETTY IRENE MOORE SCHOOL OF NURSING

Presented at 'Academic Symposium' on June 4, 2021 at 9.40 am

Sayantani Sarkar, PhD candidate

Background

Statistics of American practicing yoga (in millions)

Year	no. of Americans practicing yoga (millions)
2008	15.8
2012	20.4
2016	36.7

Source: Ipsos Public Affairs, 2016 (a study conducted by yoga journal and yoga alliance)

3.8 million female breast cancer survivors in US (Miller, 2019)

Yoga is a popular healing practice among breast cancer survivors (Hammersen, 2020)

Some of the barriers of in-person class (ex: time, transportation, cost, appropriate yoga class etc.) (Atkinson, 2009; Dayananda, 2014)

Breast cancer survivors reported to use exercise or diet mobile app (41.2%) and activity tracker (40.5%) (Phillips, 2017)

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Specific gaps in literature where my study fits!!

Benefits of mHealth apps to provide yoga support are unclear

Experience of using mobile yoga apps is understudied

Adoption and usefulness of mobile yoga apps are less studied

Potential of current commercial yoga apps to provide support to the breast cancer survivors is unclear

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Aims:

- **Aim 1: To conduct a systematic evaluation of commercially available mobile apps for yoga practice for the potential benefit of breast cancer survivors**

- **Aim 2: To explore the relationships between technology acceptance and use (as measured by the Health Technology Acceptance and Use Scale - HTAU) and actual use of a mobile yoga application through a post-field test survey**

- **Aim 3: To understand female breast cancer survivors' perspectives or opinion regarding the use of a commercially available mobile yoga application in a field test of the technology in their homes, followed by contextual interviews**

Paper 1: A structured review and evaluation of Android mobile yoga applications

Aims:

- **To review and evaluation of android mobile apps**

- **To select a yoga app that will be used in a future intervention with breast cancer survivors.**

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Method for selecting yoga apps

Python library 'google-play-scraper'

Search date: 4/18/2019

Key search term: "Yoga"

Initial search extract: 250 apps

Inclusion	Exclusion
Yoga poses (Asanas)	Not updated after 2017
Language: English	Includes premium features
Star rating ≥4	Targeted for specific groups
Free to use	

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Process of selecting yoga apps

1

Search term 'yoga' retrieved 250 from Google Play store

2

Exclusion of 62 apps

(Teen = 9; Non-English = 6; yoga quote=1;yoga magazine=2; Not updated after 2017 = 28; Music only = 9; Others = 7)

3

23 apps were selected from a pool of 142 apps with ≥4-star rating. Selected 23 apps have minimum 1824 raters

4

18 apps for final analysis

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Mobile Application Rating Scale (MARS)

5-point Likert scale (1- Inadequate, 2-Poor, 3- Acceptable, 4- Good, 5- Excellent)

1) Engagement:

Entertainment, Customization, Interactivity, Target group

2) Functionality:

Performance, Ease of use, Navigation, Gestural design

3) Aesthetics:

Layout, Graphics, Visual Appeal

4) Information:

Accuracy of App description, Goals, Quality of Information, Quantity of information, visual information, credibility and evidence base

5) Subjective quality:

Recommendation, frequency of use, payment, star rating

(Stoyanov, 2015)

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Results of MARS evaluation

	AVERAGE* ENGAGEMENT	AVERAGE* FUNCTIONALITY	AVERAGE* AESTHETICS	AVERAGE* INFORMATION
MEAN	3.83	4.65	4.22	3.75
SD	.62	.34	.41	.83

*Average engagement, functionality, aesthetics, information are based on the mean score of two raters.
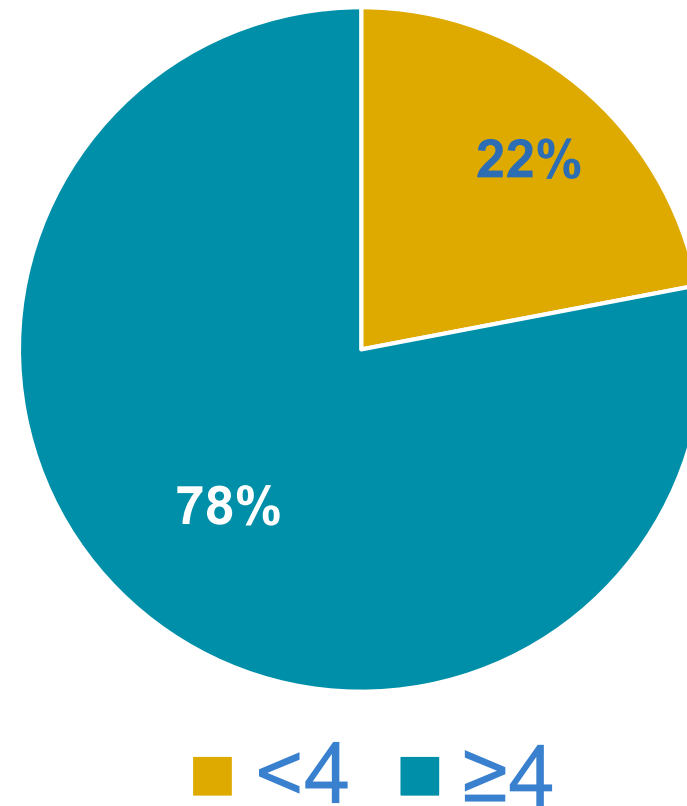
* Intra class correlation coefficient (ICC)=.88; 95% CI (.85-.91)

MARS score:

Highest MARS
score=4.82

Lowest MARS
score=3.19

Distribution of MARS score

22%

78%

■ <4 ■ ≥4

Aims:

- **To assess the usability and acceptance of a commercial yoga app to support the yoga practice of breast cancer survivors.**

Data Collection

(1)

Pre-screening survey

(2)

Consent form & enrollment

(3)

Demographic & Health-related survey

(4)

Download and use 'Track Yoga app' for 7 days

(5)

Post-7-day study survey (HTAU)

(6)

Post-30-day study survey (1 question)

Constructs of UTAUT 2 Model
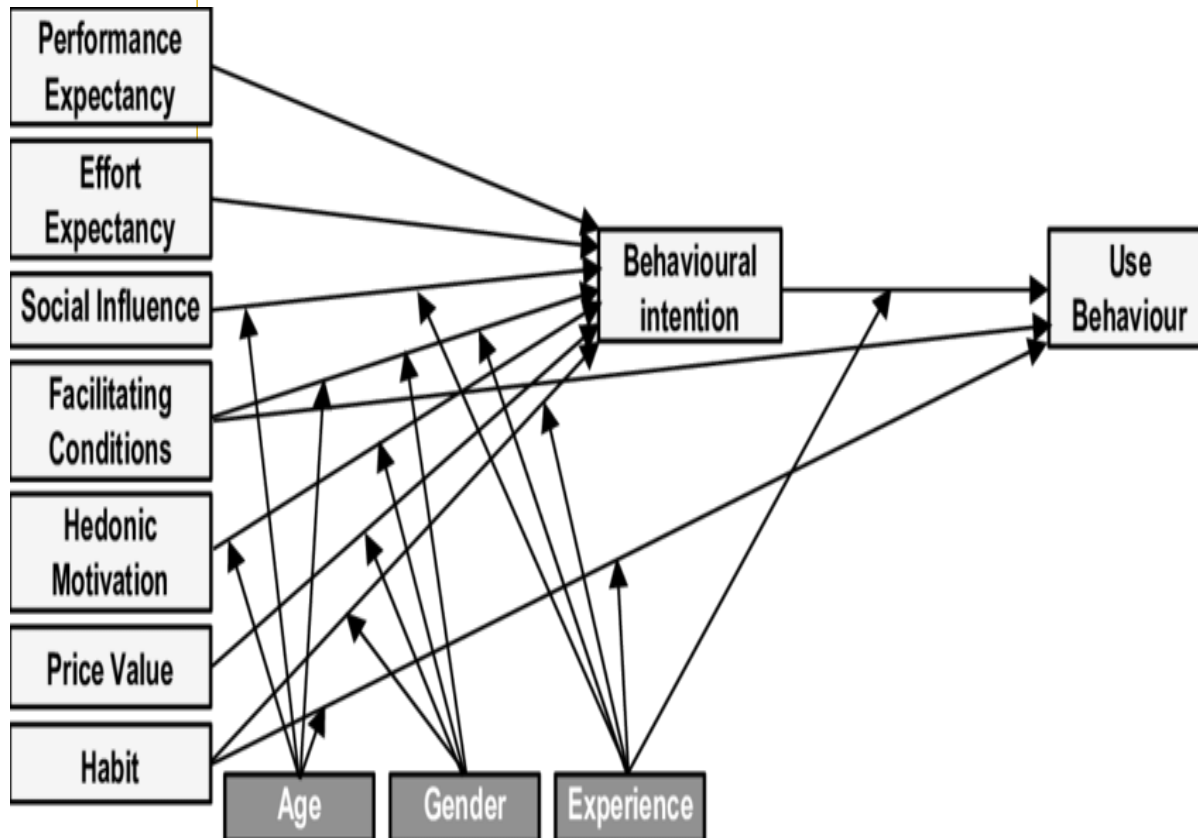### (Venkatesh et al. 2012; Slade et al., 2013)

Image source: Slade, E. L., Williams, M. D., & Dwivedi, Y. (2013, March). An extension of the UTAUT 2 in a healthcare context. In UKAIS(p. 55).

Constructs of UTAUT 2 Model	Definition
Performance Expectancy (PE)	The degree to which technology or system is improving the intended work quality and performance.
Effort Expectancy (EE)	The degree to which a technology is easy or difficult to implement or use
Social influence (SI)	It is broadly defined as the influence by society; users feel belonged to. Sometimes different cultural and social factors influence user's behavioral intention.
Facilitating Condition (FC)	This defines the availability of the technical infrastructure and resources to support or promote the use of technology or systems for the users to enhance their adoption.
Hedonic Motivation	It is related to self-perceived enjoyment while using technology by users.
Price Value	It is the cost of a technology which users believes reasonable to pay for the services they are receiving from the system.
Habit	Habit is user's daily practice or schedule to use a technology or system.

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Health Technology Acceptance and Use (HTAU) scale
[33 items and 8 constructs]

(Kim et. al, 2018)

Health Technology Acceptance and Use	0 (not at all) to 6 (a great deal)
Performance Expectancy	
PE1. I find Track Yoga useful in my daily life.	0 1 2 3 4 5 6
PE2. Using Track Yoga helps me to accomplish things more quickly.	0 1 2 3 4 5 6
PE3. I find Track Yoga useful in managing my health condition.	0 1 2 3 4 5 6
PE4. Using Track Yoga saves me time in managing my health condition.	0 1 2 3 4 5 6
PE5. Using Track Yoga increases my productivity.	0 1 2 3 4 5 6
PE6. Using Track Yoga improves my effectiveness in managing my health condition.	0 1 2 3 4 5 6
PE 7. Using Track Yoga helps me get the information I need.	0 1 2 3 4 5 6
PE 8. Track Yoga improves my ability to keep in touch with my health care provider	0 1 2 3 4 5 6
Effort Expectancy	
EE1. Learning how to use Track Yoga is easy for me.	0 1 2 3 4 5 6
EE2. My interaction with Track Yoga is clear and understandable.	0 1 2 3 4 5 6
EE3. I find Track Yoga easy to use.	0 1 2 3 4 5 6
EE4. It is easy for me to become skillful at using Track Yoga.	0 1 2 3 4 5 6

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Demographic characteristics of participants

Characteristics	N=48	%
Age		
Below 35	2	4.16
35 to 55	21	43.75
56 to 75	24	50
Above 75	1	2.08
Race		
White	41	85.42
Asian	2	4.17
Native Hawaiian or Pacific Islander	1	2.08
Hispanic or Latino/ Hispanic or Latino, White*	2	4.16
White, Other	2	4.17
Education		
Some college	6	12.50
College Graduate	21	43.75
Post-Graduate	21	43.75
Insurance		
Medicare/ Medicare, Another type of health insurance/ Medicare, Private Health insurance**	7	14.58
Medi-Cal	1	2.08
Private health insurance	38	79.17
Another type of health insurance	2	4.17
Marital Status		
Single	6	12.50
Married	35	72.92
Unmarried but living with partner	2	4.17
Divorced/Separated	3	6.25
Widow	2	4.17
Family income		
Less than $40,000	5	10.42
$40,000 to $80,000	13	27.08
$90,000 and above	23	47.92
Prefer not to State	7	14.58

Other Questions		
Mental Health		
Excellent	6	12.50
Very good	33	68.75
Fair	9	18.75
Physical Health		
Excellent	3	6.25
Very good	27	56.25
Fair	18	37.50
Current Yoga Practice		
Yes	17	35.42
No	31	64.58

Frequency, duration of app use and HTAU score

VARIABLE NAME	N	MEAN	SD	MINIMUM	MAXIMUM
Raw HTAU Score	48	103.97	40.46	15	183
Frequency (no of times in 7 days)	47	3.85	1.45	1	7
Duration (minutes)	46	58.44	39.80	10	180

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HTAU Construct Score

Construct	Mean	SD
Facilitating Condition (FC)	4.31	1.03
Effort Expectancy (EE)	4.27	1.44
Hedonic Motivation (HM)	3.72	1.66
Price Value (PV)	3.64	1.94
Behavioral Intention (BI)	3.09	1.89
Habit (HT)	2.03	1.41
Social influence (SI)	1.98	1.84

Important findings:

↑ Frequency of app use; ↑ Raw HTAU Score ($P<.05$)

↑ Raw HTAU Score; ↑ expressed interest to continue app use at post-30-day survey ($P<.05$)

↑ Self-reported BI score after 7-day; ↑ expressed interest to continue app use at post-30-day survey (near significant)

Conclusion:

- **58 % (23 out of 40 respondents) expressed intention to continue the app in future.**

- **HTAU as a total instrument is important. Total score should be used to interpret the results.**

- **Yoga app might seem acceptable and attractive to some users.**

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- **Dr. Jill Joseph**
- **Dr. Daniel J Tancredi**

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- **Dr. Katherine Kim**
- **Dr. Kathrin Milbury**
- **Dr. Jill Joseph**
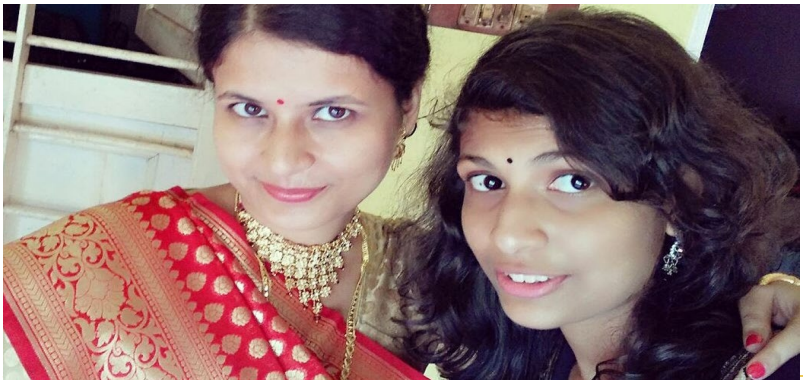- **Dr. Richard Kravitz**

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Thank you!

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Thank you!

Questions?