SUMMER SCHOOL:

LA INNOVACIÓN TECNOLÓGICA COMO INSTRUMENTO FACILITADOR DE LOS CUIDADOS SOCIOSANITARIOS

PILDORA 4: *Biblioteca de métricas de evaluación, ¿cómo aplicarlas?*

EVALUATION METRICS LIBRARY

MEASURING THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY-BASED-ASSISTIVE TECHNOLOGIES (ICT-BASED-AT)

ICT-BASED-AT IN AN AGEING SOCIETY

- EMERGENCE AND INCREASNIG NUMBER OF ICT-BASED ASSISTIVE PRODUCTS AND RELATED SERVICES

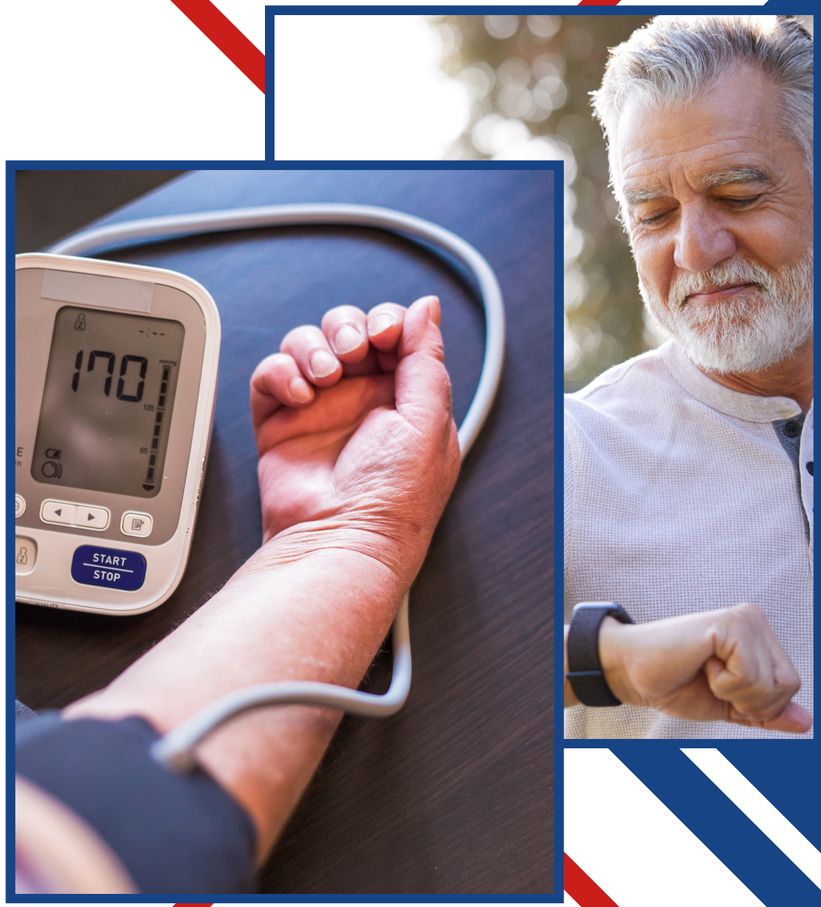
- DIGITAL ABILITIES
- SUPPORT FROM FAMILY AND FRIENDS
- CHARACTERISTICS OF THE PRODUCT
- (...)

COMPREHENSIVE NEEDS ASSESSMENT AND MATCH BETWEN USERS AND ICT-BASED AT

WHAT'S THE EVIDENCE?

- LOW QUALITY OF STUDIES EXAMINING THE EFFECTIVENESS OF ICT-BASED-AT
  - FEW RCT
  - SMALL SAMPLE SIZE
  - ABSENCE OF SOCIODEMOGRAPHIC DATA

- NEED TO SYSTEMATIZE THE EXISTING EVIDENCE ON METHODS USED TO EVALUATE ICT-BASED-AT SUPPORTING AGING IN PLACE



WHAT TO CONSIDER?

Targets

TECHNICAL FEATURES, USABILITY AND USER EXERPERIENCE

&

SURRONDING FACTORS...

- PHYSICAL AND MENTAL HEALTH
- QUALITY OF LIFE
- ETHICS
- FAMILY WORKLOAD
- SOCIAL IMPACT
- (...)

Potential barriers

- DIGITAL LITERARY AND SELF-EFFICACCY
- PHYSICAL AND SENSORY LIMITATIONS
- ATTITUDES AND BELIEFS
- COST AND AFFORDABILITY
- DESIGN AND USABILITY
- PRIVACY AND SECURITY
- SELF-IMAGEM AND SELF-PERCEPTION OF HEALTH

Challenges

1 **TAILORED TO SPECIFIC POPULATIONS AND SETTINGS**

which can limit the generalizability of findings

2 **SENSITIVITY OF THE INSTRUMENTS**

used to collect data

3 **ETHICAL CHALLENGES**

in randomizing and ethical approval of studies

Challenges

4 **ICT-BASED-AT ARE OFTEN DESIGNED FOR LONG-TERM USE**
and their impact may unfold over time

5 **BLINDING OF PARTICIPANTS**
is usually not possible

6 **DEFINING APPROPRIATE OUTCOME MEASURES**
that capture the impact of ICT-based-AT

7 **REAL-WORLD IMPLEMENTATION**
ICT-based-AT are often embedded in participants' homes

EML GOALS

SYSTEMATIZE A RELIABLE AND DIVERSE SET OF METRICS TO COMPREHENSIVELY CAPTURE THE VARIOUS DIMENSIONS OF IMPACT

- Facilitating consistency
- Enabling comprehensive assessments
- Supporting research and collaboration
- Driving improvement and innovation in ICT-based-AT for older adults and people with disabilities

1

DATABASE RESEARCH

SCOPING REVIEW

303 records met the inclusion criteria

&

26 articles included

2

REVIEW OF DOCUMENTATION FROM INTERNATIONAL ORGANIZATIONS

WORLD HEALTH ORGANIZATION & UNITED NATION

Conceptual definitions of terms
&
Dimensions such as quality of life, physical health and autonomy
&
Information about process indicators

3

CONSULTATION WITH EXPERTS

FOUR EXPERTS IN THE FIELD FROM PORTUGAL AND SPAIN

"end-users' perceptions about the impact, gains and changes promoted by the ICT-based-AT is key for the evaluation"

&

Other considerations such as mixed-methods approach

RESULTS

END-USERS	INFORMAL CAREGIVERS	SOCIAL AND HEALTH PROFESSIONALS
Quality of life *Life satisfaction* *Funtional status* *Physical health* *Mental health* *General health* *Cognitive status* *Social connectedness/ participation* *Adverse health events* *Autonomy*	*Quality of life* *Burden/stress level* *Caregiving demands and time for selfcare* *Perception of the ICT-based-AT impact in the end-user*	*Perception of the ICT-based-AT impact in the end-user*
10	**4**	**1**

RESULTS

END-USERS	INSTRUMENTS
Quality of life	*WHOQOL-Brief*
Life satisfaction	*Satisfaction with Life Scale (SWLS)*
Funtional status	*Barthel Index*
Physical health	*Grip Strength*
Mental health	*Geriatric Depression Scale 15-item (GDS)*
General health	*EuroQoL*
Cognitive status	*Mini-Cog Instrument*
Social connectedness/ participation	*UCLA Loneliness Scale 3-item*
Adverse health events	*Adverse events and medication*
Autonomy	*Autonomy-Connectedness Scale (ACS-30)*

RESULTS

INFORMAL CAREGIVERS	INSTRUMENTS
Quality of life	*WHOQOL-Brief*
Burden/stress level	*Zarit Burden Interview Assessment Tool (ZBI)*
Caregiving demands and time for selfcare	*Caregiving workload and Subjective perception of time available for self-care*
Perception of the ICT-based-AT impact in the end-user	*Caregiver Assistive Technology Outcome Measure (CATOM)*

RESULTS

SOCIAL AND HEALTH PROFESSIONALS

Perception of the ICT-based-AT impact in the end-user

INSTRUMENTS

Needs satisfaction, Subjective impact and Benefits and disadvantages

GRIP STRENGHT TEST

American Society of Hand Therapists testing protocol

Table III. Strength of the dominant hand by gender and age, measured with a Jamar dynamometer

Age group (years)	Grip strength (kg)								
	Mean ± SD	Maximum ± SD	P5	P10	P25	P50	P75	P90	P95
Men									
Total n = 364	45.7 ± 9.9	47.8 ± 10.3	30	34	40	48	54	62	64.8
Under 45 years n = 125	47.2 ± 10	49.5 ± 10.4	32.6	37.6	42	48	57.5	64	64.7
From 45 to 60 years n = 164	47.2 ± 9.2	49.5 ± 9.5	34.5	37.5	44	50	55.8	62	66
Over 60 years n = 71	39.5 ± 9.3	40.9 ± 9.6	26.6	29.2	34	40	47	54	58.2
Women									
Total n = 453	24.2 ± 6.2	26 ± 6.3	16	18	22	26	30	34	36
Under 45 years n = 175	24.7 ± 5.4	26.4 ± 5.4	18	20	23	26	30	33.4	36.4
From 45 to 60 years n = 216	24.7 ± 6.6	26.4 ± 6.7	15	18	22	26	30	34	38
Over 60 years n = 58	21.3 ± 6.4	22.5 ± 6.7	12.8	14	18	22	28	31.1	34

SD: standard deviation.

Table 2 Values of handgrip strength of Portuguese older women and men, stratified by age and height

Age range (years)	Height range (cm)	n (%)	Handgrip strength (Kgf)									
			mean (SD)	85% of mean	min-max	P10	P15	P25	P50	P75	P85	P90
Women, *n* = 868												
[65–75[	<148	97 (11.2)	18.7 (4.6)	15.9	7.9–30.1	12.6	14.1	16.3	18.1	21.9	22.9	25.1
	[148–153[	154 (17.7)	19.8 (5.5)	16.8	3.8–32.9	12.5	14.3	16.9	20.5	23.1	24.6	25.9
	≥153	172 (19.8)	21.1 (5.5)	17.9	9.6–35.5	14.3	15.2	17.0	21.0	25.4	27.0	28.3
[75–85[	<148	122 (14.1)	15.3 (4.1)	13.0	4.8–25.8	10.2	10.9	12.7	15.1	17.9	19.8	20.7
	[148–153[	109 (12.5)	16.8 (4.7)	14.3	4.3–28.2	9.9	12.1	14.3	16.5	19.9	22.1	22.9
	≥153	97 (11.2)	17.9 (4.7)	15.2	6.3–30.7	11.8	12.8	15.5	17.6	21.6	23.0	23.7
≥85	<148	70 (8.1)	13.4 (3.8)	11.4	6.0–24.3	8.6	9.4	10.5	13.3	15.9	17.5	18.3
	[148–153[	28 (3.2)	14.8 (3.7)	12.6	6.7–21.1	9.6	10.2	11.1	15.1	17.7	19.1	19.5
	≥153	19 (2.2)	16.9 (3.9)	14.4	9.1–22.8	11.3	12.2	14.4	18.0	19.4	22.1	22.7
Men, *n* = 628												
[65–75[	<161	92 (14.6)	28.6 (7.9)	24.3	9.6–48.0	16.9	18.8	23.7	29.3	34.5	35.1	38.2
	[161–167[	118 (18.8)	32.6 (8.4)	27.7	11.2–51.4	20.5	23.8	26.3	32.8	38.9	41.8	43.8
	≥167	144 (22.9)	36.9 (9.2)	31.4	9.4–58.9	23.9	27.3	31.1	38.5	43.9	45.8	47.3
[75–85[	<161	86 (13.7)	25.5 (7.7)	21.7	2.3–41.5	16.3	17.4	20.8	25.9	30.1	33.6	34.9
	[161–167[	77 (12.3)	27.5 (6.8)	23.4	5.2–46.4	19.4	20.4	23.6	27.4	32.1	34.0	35.2
	≥167	55 (8.8)	30.4 (6.4)	25.8	13.7–43.0	23.0	24.7	25.6	30.9	34.2	38.8	40.2
≥85	<161	29 (4.6)	19.1 (4.6)	16.2	6.2–30.6	13.5	14.5	17.4	19.1	21.5	22.6	25.2
	[161–167[	16 (2.5)	23.9 (6.2)	20.3	12.9–36.5	14.7	16.3	19.8	24.5	27.4	30.3	34.5
	≥167	11 (1.8)	29.2 (9.0)	24.8	21.2–46.0	21.2	21.3	21.3	26.1	32.8	45.8	45.9

Abbreviations: n number of subjects, *P* percentile, *SD* standard deviation

RECOMMENDATIONS

DIVERSE METRICS AND INDICATORS

To consider the type of ICT-based assistive product and service and select the metrics that seem more appropriate and relevant for the evaluation

SENSITIVE TO SMALL CHANGES

Detect small changes over the time - evaluate small improvements or changes in physical, cognitive or functional abilities

RECOMMENDATIONS

USABILITY AND ACCEPTABILITY

A period of familiarisation with the technology should be considered, and the actual duration may vary depending on several factors

SAFETY, PRIVACY, ETHICS

The assessment should incorporate security and privacy protection measures, as it necessarily implies guaranteeing the well-being and dignity of the elderly and persons with disabilities throughout the process

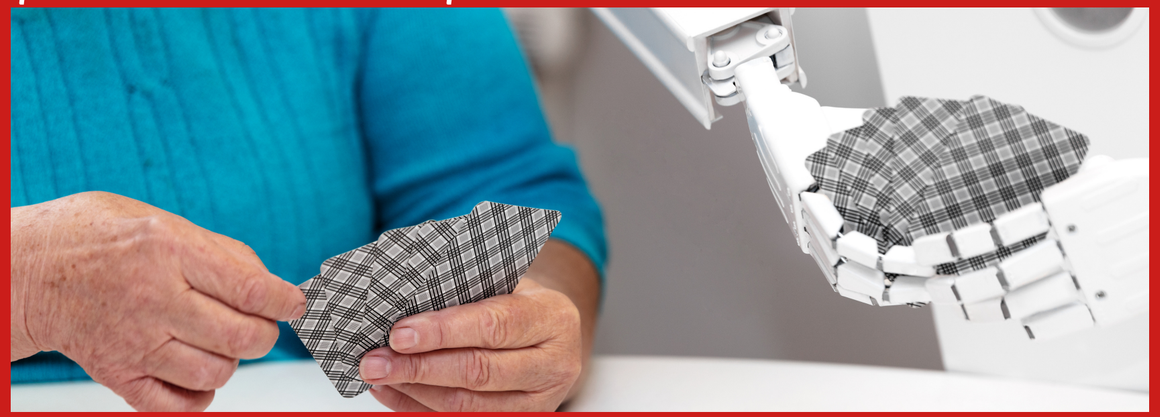
RECOMMENDATIONS

ASSESSMENT METHODS

Passive assessment methods - e.g. frequency, usage patterns, time and number or errors)

Active methods - e.g. filling in a questionnaire

Mixed evaluation methods - Combination of quantitative and qualitative methods



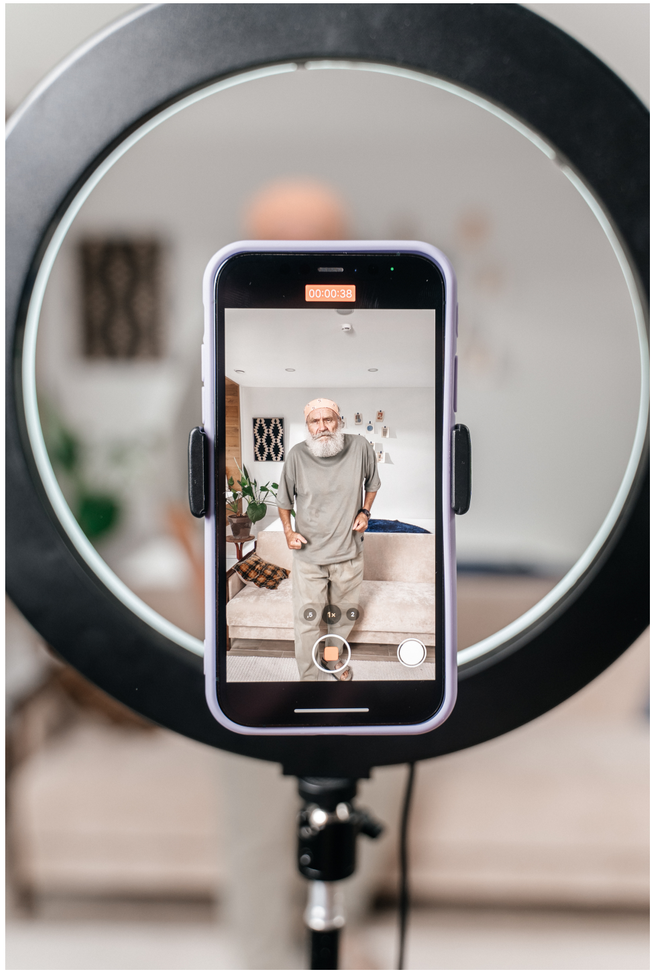
LONG-TERM ASSESSMENT

Analyzing the user's experience throughout their interaction with the technology, taking into account the characteristics of the individuals being assessed

RECOMMENDATIONS

STRUCTURING ASSESSMENT PROTOCOLS

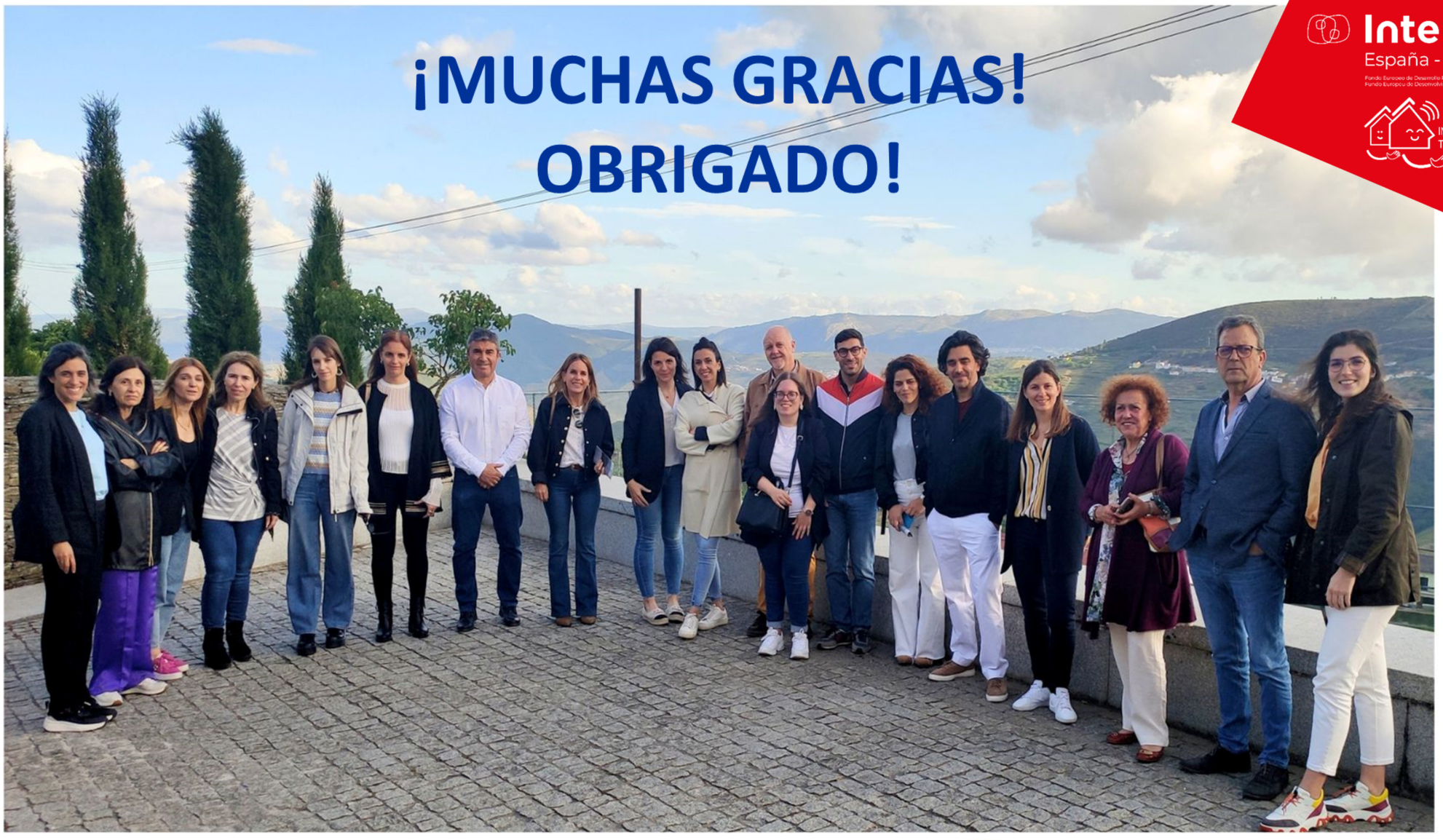
- *Evaluation setting*
- *The inclusion of control groups*
- *Blinding of evaluators*
- *Timing of evaluations*



FINAL REMARKS

- TRIANGULATION OF METHODS
- DYNAMIC DOCUMENT
- COMPREHENSIVE AND INCLUSIVE APPROACH
- PRACTICAL GUIDANCE

¡MUCHAS GRACIAS!
OBRIGADO!



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