**Targeting Stakeholders and Tailoring Knowledge as Communication Strategies in Assistive Technology: Three Randomized Controlled Case Studies**

Presenter: Vathsala Stone

Center on Knowledge Translation for Technology Transfer (KT4TT)

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Presented for the panel – “KT Casebook”

NARRTC Annual Meeting, March 26, 2018

**Slide 1: Cover and title slide**

Targeting Stakeholders and Tailoring Knowledge as Communication Strategies in Assistive Technology: Three Randomized Controlled Case Studies. Presenter: Vathsala Stone, [vstone@buffalo.edu](mailto:vstone@buffalo.edu)

Center on Knowledge Translation for Technology Transfer (KT4TT), University at Buffalo, NY. <http://sphhp.buffalo.edu/cat/kt4tt.html>

Presented for the panel – “KT Casebook” NARRTC Annual Meeting, March 26, 2018.

**Cover slide template:** At the top of page,dark blue background with white text. Gray middle of page and at bottom right are the logo’s for University at Buffalo, (the letters U and B and the University at Buffalo are in blue, below those words is The State University of New York in gray letters), KT4TT, (The letters KT4TT are different colored and are contained in circles with the words Center on Knowledge Translation for Technology Transfer above and underneath the circled letters) and NIDILRR, (NIDILRR in blue letters and the words National Institute on Disabilities, Independent Living, and Rehabilitation Research above the acronym.

**Slide 2:**

**Why the project?**

An Accountability Concern (GPRA, 1993, 2010; Weiss, 1979; Wholey et al, 2004)

Prior Knowledge Base with an arrow pointing to New Knowledge (K) (Research-generated) with an arrow filled with question marks, pointed to Beneficial Impacts (Societal/End-users) and below with an arrow pointed up to New Knowledge is Public Funds (Investment in Innovations).

**Title slide template:** same as above

**Slide 3: Obtaining Impact is a Challenge**

A. Multiple stakeholders must

* Uptake & Use the New K;
* Pass new outputs forward

B. Diverse Stakeholders for Assistive/RehabTechnology innovations; and

C. Disperse (hard-to-reach) Stakeholders

Need

Effective Knowledge Translation (KT) strategies (including communication)

* To move new K through stakeholders to end-users

**Slide 4: Objective**

For a published Research output (findings/new K) identified as *innovative* in the Assistive/Rehab Technology field:

A. Identify the diverse groups of potential stakeholders and develop appropriate KT strategies & materials to communicate the new K to these stakeholders; and

B. Evaluate effectiveness of proposed strategies, compared to Passive Diffusion (traditional form), in a randomized controlled study.

**Slide 5: Three Randomized Controlled Studies**

A box with three columns. First column is Study/YR, second column is Study Area, third column is Publication (New Knowledge)

Case One: 2009-2011, Alternative and Augmentative Communication (AAC) Technology, Bryen (2008) Vocabulary Set (to support socially-valued adult roles).

Case Two: 2010-12, Recr-Environmental Access Technologies, Rimmer et al.,(2004) AIMFREE: Accessibility Instruments Measuring Fitness and Recreation Environments.

Case Three: 2011-13, Wheeled Mobility Technologies, Sonenblum, Sprigle & Maurer (2009) use of power tilt systems in everyday life. (Consumer use of power tilting technology)

**Slide 6: Figure 2: Knowledge-to-Action Model (Adapted from Graham et al, 2006)**

This figure shows a diagram of the Knowledge-to-Action Process. The diagram contains two parts: the knowledge creation cycle illustrating the process of knowledge creation, and the Action cycle illustrating the process of knowledge application. The Knowledge creation cycle is positioned within the Action cycle.

The Knowledge Creation cycle is represented by an inverted cone shape surrounded by a circle of arrows. The inverted cone shape contains three steps in knowledge creation, starting from top (the base of the cone) to bottom (the tip of the cone) as follows: Knowledge inquiry, Knowledge synthesis, and Knowledge tools/products. The inverted cone shape symbolizes the condensation/distillation of knowledge as it moves through the three steps in the order specified. The tailoring of knowledge to knowledge users is a required element through all three steps. The circle of arrows represents an ongoing process of knowledge creation through the three steps.

The Action cycle contains 7 steps, and forms an outer circle encompassing the knowledge creation cycle. Each Action cycle step is listed in a box connected by an arrow in clockwise direction to the next step. The steps are in the following order: Identify problem and identifying, review, and select the knowledge to solve the problem; Adapt knowledge to local context; Assess barriers to knowledge use; Select, tailor, implement intervention; Monitor and knowledge use; Evaluate outcomes; and Sustain knowledge use-- which is connected back to the first step of Identify problem and identify, review, and select the knowledge to solve the problem to form a complete circle.

**Slide 7: Two KT Interventions (Knowledge Communication Strategies)**

1. Tailor and Target Strategy (based on Graham, et al, 2006)

Pre-identify *(target)* relevant stakeholder groups

Tailor the new Knowledge (published Research Findings) to the context of each stakeholder type;

Deliver the tailored information to the Stakeholders using multi modal channels.

 2.  Target-Only Strategy (based on NCDDR,1996)

  a) Pre-identify (*target)* stakeholders and

  b) Deliver the original publication, with no tailoring.

**Slide 8: Five Types of Stakeholder Groups participated in Each Study**

A box with 4 columns. The first column titled “Stakeholder Type\*. The next three columns fall under the title “Sample Size in the 3 Studies”. Study One (AAC Tech), Study 2 (RecAccess Tech), Study 3 (Wh. Mobility Tech).

Brokers (liaison to consumers) 65, 40, 31

Clinicians/Practitioners, 45, 61, 59

Industry/Manufacturers, 26, 58, 45

Researchers, 21, 65, 21

Consumers w/Disabilities, 50, 64, 54

(Policy Implementers) \*\*, 0, 0, 0

N=207, N=288, N=210

\*Lane & Flagg (2010)

\*\*Excluded due to their limited availability for participation

**Slide 9: Intervention Materials – Tailor & Target Strategy**

<http://sphhp.buffalo.edu/cat/kt4tt/projects/past-projects/kt4tt-2008-2013/research-projects/case-studies-materials.html>

1.Contextualized Knowledge Packages (CKPs)

A. Five different stakeholder versions (*See* Example set in display)

B. Print & electronic formats (for stakeholder accessibility)

C.  Enclosures:

1.Cover letter

2.The original Research article

3.Tailored Information package: Highlight relevance/value of new K to Stakeholder’s living and working context

Content: Need/problem addressed; Research findings and potential benefits; Using the new K in specific stakeholder context - opportunities and resources.

4. A CD version of the CKP

**Slide 10: Intervention Materials – Tailor & Target Strategy (Contd)**

<http://sphhp.buffalo.edu/cat/kt4tt/projects/past-projects/kt4tt-2008-2013/research-projects/case-studies-materials.html>

**2. Tailored Webcast + optional technical assistance**

* Five different stakeholder versions;
* Similar to CKP in content – present new K, potential benefits, highlight how applied in specific stakeholder context;
* Video demonstration of example applications of the new K
* Offer of technical assistance for applying the new Knowledge;
* Contact Info

**Slide 11: Intervention Materials: Target-only Strategy.**

Direct delivery of published research article to pre-identified (targeted) stakeholders; with no tailoring.

Enclosures:

* Cover letter
* Copy of research article (obtained with prior author/publisher   permission)
* Delivered through US mail/ e-mail

**Slide 12**: **Developed the Level of Knowledge Use Survey (LOKUS) Instrument.**

(*Based on Hall et al,1975; Rogers, 1983)*

1.Web-based survey instrument (via the ***Vovici*** (2011)software).

<http://sphhp.buffalo.edu/cat/kt4tt/projects/past-projects/kt4tt-2008-2013/research-projects/lokus-instrument.html>

2. Measures at 4 Levels of Use:

**Non-awareness**, **Awareness**, **Interest**, **Use**.

   (covers 10 Dimensions; 37 Activities)

4. Strong validity (Item, content, construct), reliability and   responsiveness to change (Stone et al., 2014)

**Slide 13: Table 1. Randomized Controlled Pretest-Posttest Design to Evaluate Two Knowledge Communication Strategies**

A table with 7 columns: Five Stakeholder Types, Group, Pretest: Level of Use at Baseline, Intervention (4 Mo.) Posttest 1: Level of Use At 4 months, Intervention (4 Mo.), Posttest 2: Level of Use At 8 months)

(R) T1, LOKUS, CKP, LOKUS, Webcast + TA offer, LOKUS

(R) T2, LOKUS, R article delivery, LOKUS, ---, LOKUS

(R) C, LOKUS, ---, LOKUS, ---, LOKUS

Legend: R=Random assignment to groups; T1=group exposed to Tailor-and-Target intervention; T2=group exposed to Target-Only intervention; C=Control group (no intervention).

**Slide 14: Date Analysis**

Statistics:

Non-parametric, because of Nominal or Ordinal data.

Effectiveness Analysis:

1.**Changes** in K Use Level from Pretest to Post test, separately for groups T1, T2 & C

2.**Differences** in K Use Level between groups T1, T2 and C (at 4 months & at 8 months)

Guidelines

•Consider both Statistical and Practical significance.

•Changes in groups T1 and T2 should surpass “testing effect”.

•Consider first 4 months important for T2; no intervention reinforcement beyond that period.

**Slide 15: Summary of Findings**

In all three studies, both **Tailor-and-target and Target-only** strategies were:

1.**Effective**. For each strategy, **Pretest-to-posttest changes** were significant**.**

2.**Effective** compared to Passive Diffusion (Control)

a) But there was **no significant difference** between the two strategies in any study. Neither was better than the other.

[Question: Is tailoring worth the extra effort?]

**3. Differentially effective** with different stakeholder groups.

**4. Effective** in raising Awareness of the new K between pre- and posttests.

**5.** **Effective** in persuading Non-Users to Use the new K, differently across studies

6. In **practical terms**, able to **persuade too few people** to initiate use or sustain it.

[Question: initiating/sustaining Use vs. stakeholder perceived value of the new K?]

**Slide 16: Limitations and Lessons**

Successful implementation - Seamlessly smooth logistics supported rigor of the RCT Design

Limitation:

• LOKUS called for repeated and self-reported responses based on recall. Correction for testing effect, necessary not sufficient.

• Design did not provide for follow-up qualitative interviews; missed opportunity for in-depth learning about actual use/non-use of the new K.

Future studies need to focus on:

* shorter or longer study periods. How soon after dissemination to expect stakeholder awareness, interest or use?
* Qualitative follow-up of stakeholders for barriers and facilitators of K use
* Prior-to-grant KT that validates stakeholder need/value for the new K *before* generating it

**Slide 17: References:**

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**Slide 18: Acknowledgement**

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**Slide 19: Thank you!**

Questions?

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**Slide 20: Appendix Tables**

**Slide 21: 1. Both strategies effective, taken individually**

In all three studies, **Pretest-to-posttest changes were significant**

a) *Tailor-and-target* strategy:

•At 4 months (p<.001) and

•At 8 months (p<.001)

•CKP effective, in particular.

b) *Target-Only Strategy*:

•At 4 months - Period of active intervention

  (p=.001; p<.001; p<.001)

Additionally at 8 months in Studies 1 & 2 (p=.001; p<.001)

**Slide 22: Pretest-to-posttest changes within each Group**

Table with four columns 1) Group, subdivided into Case Studies 1, 2, and 3. 2) Months 1-4; Months 5-8; and 8 months.

Row 1: T1 Tailor and Target

Case Study 1: Months 1-4 (CKP) yes; p<.001; Months 5-8 (Webcast + TA offer) No; 8 months Yes p<.001

Case Study 2: Months 1-4 (CKP) yes; p<.001; Months 5-8 (Webcast + TA offer) No; 8 months Yes p<.001

Case Study 3: Months 1-4 (CKP) yes; p<.001; Months 5-8 (Webcast + TA offer) Yes; p<.031; 8 months Yes p<.001

Row 2: Target Only

Case Study 1: Months 1-4 (Publication delivery) yes; p=.001; Months 5-8 No; 8 months Yes p=.001

Case Study 2: Months 1-4 (Publication delivery) yes; p=.001; Months 5-8 No; 8 months Yes p<.001

Case Study 3: Months 1-4 (Publication delivery) yes; p<.001; Months 5-8 No; 8 months Yes p<.001 testing eff?

Row 3: No Intervention

Case Study 1: Months 1-4 No; p=.321; Months 5-8 No; 8 months Yes p=.036\*

Case Study 2: Months 1-4 No; p=.015\*; Months 5-8 No; 8 months Yes p=.011\*

Case Study 3: Months 1-4 No; p=.<.013\*; Months 5-8 No; 8 months Yes p<.001\*

\*Testing effect

**Slide 23:** **2. Both strategies effective, compared to Passive Diffusion**

a) In all three studies, **both Tailor-and-target and Target-only strategies were   effective** compared to Passive Diffusion (Control)

Study 1, at 8 mo. *(p=.029);*

Study 2 at 4mo. *(p=.001)* & at 8 mo. *(p=.001);*

Study 3 at 4 mo. *(p=.002*)

b) But there was **no difference** between the two strategies in any study

  (p=.086; p=.323; p<.615)

  Neither was better than the other

Question: Is tailoring worth the extra effort?

-Ask the stakeholder, maybe?

**Slide 24: Between-Group Differences**

Table with three columns each is a Case Study among T1-T2-C and Between T1-T2 within parameters of “after 4 months” and “after 8 months”

Case study One:

Among T1-T2-C, after 4 months=no diff. after 8 months=Yes (p=.029)

Between T1-T2, after 4 months=…, after 8 months No (p=.086)

Case Study Two:

Among T1-T2-C, after 4 months=Yes (p=.001), after 8 months=Yes (p=.001)

Between T1-T2, after 4 months=No (p=.086), after 8 months=No (p=.323

Case Study Three:

Among T1-T2-C, after 4 months=Yes (p=.002), after 8 months=No\* (p=.603)

Between T1-T2, after 4 months=No (p=.060, after 8 months=No (p<.615)

\*(See Stone et al, 2015 for details)

**Slide 25:** 3. The strategies were differentially effective with stakeholder groups

3. However, stakeholder type made a difference in the effectiveness of each strategy

**Tailor & Target** was effective with

* **Manufacturers, Clinicians and Consumers** for all 3 technologies (AAC, RecAccess & WhMobility)
* **Brokers**\* for Wheeled Mobility technology
* **Researchers** for Recreational Access technology

**Target-only**was effective with

* **Manufacturers, Clinicians, Consumers and Brokers** for Wh Mobility technology
* **Manufacturers and Researchers** for RecAccess technology
* **Consumers** for AAC technology

\* *They were caregivers/nurses*

**Slide 26: Differential Effectiveness – by Strategy**

Table with five columns Intervention (divided into Tailor & Target and Target Only), Stakeholder Type, Study 1: AAC, Study 2: Rec. Env Access, Study 3: Wheeled Mobility

Tailor & Target, Practitioner (Clinician/Therapist), p1=.023, p2=.016 CKP (p2=.005), p3=.023

Tailor & Target, Manufacturer, (Industry), p1=.016, p2=.016 CKP (p2=.010), p3=.040)

Tailor & Target, Consumer, p1=.024 CKP (p1=.017), p2=.006 CKP (p2=.026), p3=.014 CKP (p3=.024)

Tailor & Target, Brokers, p3=.007; p3=.039

Tailor & Target, Researcher, p2=.011, p2=.038

Target Only, Practitioner (Clinician/Therapist), p3=.011

Target Only, Manufacturer (Industry), p2=.010; p2=.007, p3=.011

Target Only, Consumer, p1=.013, p3=.038

Target Only, Brokers, p3=.034

Target Only, Researcher, p2=.038; p2=.014

**Slide 27: Differential Effectiveness by Stakeholder Type**

Table with five columns Stakeholder Type, Intervention, Study 1: AAC, Study 2: Rec. Env Access, Study 3: Wheeled Mobility

Clinician/Therapist (Practitioners) Tailor & Target, p1=.023, p2=.016 CKP (p2=.005), p3=.023. Target Only, p3=.011

Industry/Manufacturers, Tailor & Target, p1=.016, p2=.016 CKP (p2=.010), p3=.040. Target Only, p2=.010; p2=.007, p3=.011

Consumers, Tailor & Target, p1=.024 CKP (p1=.017), p2=.006 CKP (p2=.026), p3=.014 CKP (p3=.024). Target Only, p1=.013, p3=.038

Brokers, Tailor & Target, p3=.007; p3=.039. Target Only, p3=.034

Researchers, Tailor & Target, p2=.011; p2=.038. Target Only, p2=.038; p2=.014

**Slide 28: 4. Both strategies raised stakeholder awareness of new knowledge**

Both strategies raised Stakeholder Awareness of the new Knowledge.

* they did so in all 3 Case Studies.

Between pretest & posttest, they effectively moved people

* from “Non-awareness” level to “Awareness/Interest/Use” levels.

**Slide 29: Both Strategies raised Awareness of the New K in each Group**

Pretest-to-posttest changes within each Group in the 3 Studies

Table with four columns 1) Group, subdivided into Case Studies 1, 2, and 3. 2) Months 1-4; Months 5-8; and 8 months.

Row 1: T1 Tailor & Target

Intervention – Months 1-4 CKP, Months 5-8 Webcast +TA offer

Case Study 1: Months 1-4 (CKP) yes; p<.001; Months 5-8 (Webcast + TA offer) No; 8 months Yes p<.001

Case Study 2: Months 1-4 (CKP) yes; p<.001; Months 5-8 (Webcast + TA offer) No; 8 months Yes p<.001

Case Study 3: Months 1-4 (CKP) yes; (p<.001); Months 5-8 (Webcast + TA offer) No; 8 months Yes (p<.001)

Row 2: T2 Target-Only

Intervention – Months 1-4 Deliver R Publication, Months 5-8 Blank, 8 months Blank

Case Study 1: Months 1-4 (Deliver R Publication) yes; p=.001; Months 5-8 No; 8 months Yes p=.001

Case Study 2: Months 1-4 (Deliver R Publication) yes; p<.001; Months 5-8 No; 8 months Yes p<.001

Case Study 3: Months 1-4 (Deliver R Publication) yes; (p<.001); Months 5-8 No; 8 months Yes (p<.000)

Row 3: No Intervention

Case Study 1: Months 1-4 No; p=.321; Months 5-8 No; 8 months Yes p=.036a

Case Study 2: Months 1-4 Yes; p=.015a; Months 5-8 No; 8 months Yes p=.011a

Case Study 3: Months 1-4 Yes; (p=.001)a; Months 5-8 No; 8 months Yes (p<.001)a

Note: a Denotes Testing Effect; the control group had no intervention

**Slide 30: 5. Both Strategies persuaded Non-Users to use the new K, differently across the 3 studies**

Statistically speaking, both strategies persuaded Non-users to use the new K.

* There was significant move between pretest and posttest:

   From “(Non-awareness/Awareness/ Interest)” levels to “Use” level

* But the pattern was different across the 3 studies

Tailor & target - Studies 1 & 2: effective over months 1-4;

       Study 3: effective over months 5-8 as well as over months 1-8.

Target-only: Studies 1, 2 & 3: effective over months 1-4;

  Study 3: over months 1-8

**Slide 31: Both strategies persuaded Non-users to Use the new knowledge: differently across the three studies**

Pretest-to-posttest changes within each Group in the 3 Studies

Table with four columns 1) Group, subdivided into Case Studies 1, 2, and 3. 2) Months 1-4; Months 5-8; and 8 months.

Row 1: T1 Tailor & Target

Intervention – Months 1-4 CKP, Months 5-8 Webcast +TA offer; 8 months Blank

Case Study 1: Months 1-4 (CKP) yes; p=.039; Months 5-8 (Webcast + TA offer) No; 8 months No

Case Study 2: Months 1-4 (CKP) yes; p<.001; Months 5-8 (Webcast + TA offer) No; 8 months No

Case Study 3: Months 1-4 (CKP) yes; (p<.004) – but changes did not surpass testing effect; Months 5-8 (Webcast + TA offer) yes; p<.041; 8 months Yes (p<.000)

Row 2: T2 Target-Only

Intervention – Months 1-4 Deliver R Publication, Months 5-8 Blank, 8 months Blank

Case Study 1: Months 1-4 (Deliver R Publication) yes; p=.022; Months 5-8 No; 8 months No

Case Study 2: Months 1-4 (Deliver R Publication) yes; p<.001; Months 5-8 No; 8 months No

Case Study 3: Months 1-4 (Deliver R Publication) yes; (p<.001); Months 5-8 No; 8 months Yes; (p<.021)

Row 3: C No Intervention

Case Study 1: Months 1-4 No; Months 5-8 No; 8 months No

Case Study 2: Months 1-4 No; Months 5-8 No; 8 months No

Case Study 3: Months 1-4 Yes; (p=.027)a; Months 5-8 No; 8 months Yes (p<.001)a

Note: a Testing Effect, since the Control group had no intervention

**Slide 32: 6. Too few Non-users made the move to Use the new K**

Practically speaking:

In the case of both strategies, too few persons

•made the move to Use, or

•stayed there after moving.

* Persuading people to actually apply new K remains a challenge to KT.
* Decision to use /not use depends, among other things, on stakeholder perception of value in the new K;
* Ensuring stakeholder relevance before generating new K needs consideration.