



**Technology acceptance of an online speech and
language assessment application for stroke patients-
the medical caregivers' viewpoints**

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Introduction

- Stroke is a major cause of death and different kinds of chronic disabilities in adults, and **Speech and language** loss is the most common disease for stroke survivors.
- The process of **relearning communication** skills is difficult and a time taking process. **Technology-enhanced systems** (TES) can be useful in speech and language relearning, however, the **acceptance** and **usability** of TES for stroke patients have been a matter of concern and more research is needed in this area.
- This study evaluates the **technology acceptance** and adoption of an online speech and language assessment application.





Aim

Despite the fact that several advanced and sophisticated technologies are available in the health sector, the use and acceptance of these technologies are doubtful and more research is needed to find the critical factors that might affect technology acceptance.

This study is aimed to assess and evaluate the technology acceptances of an eHealth application by using the Unified Theory of Acceptance and Use of Technology (UTAUT) as a theoretical model.

The addressed research question was :

1. What is the technology acceptance of a speech and language assessment application from medical caregivers' viewpoint?



Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT model was designed to assess the **user behavior** and **intention to use** technology.

The UTAUT model suggests the following four technology acceptance elements

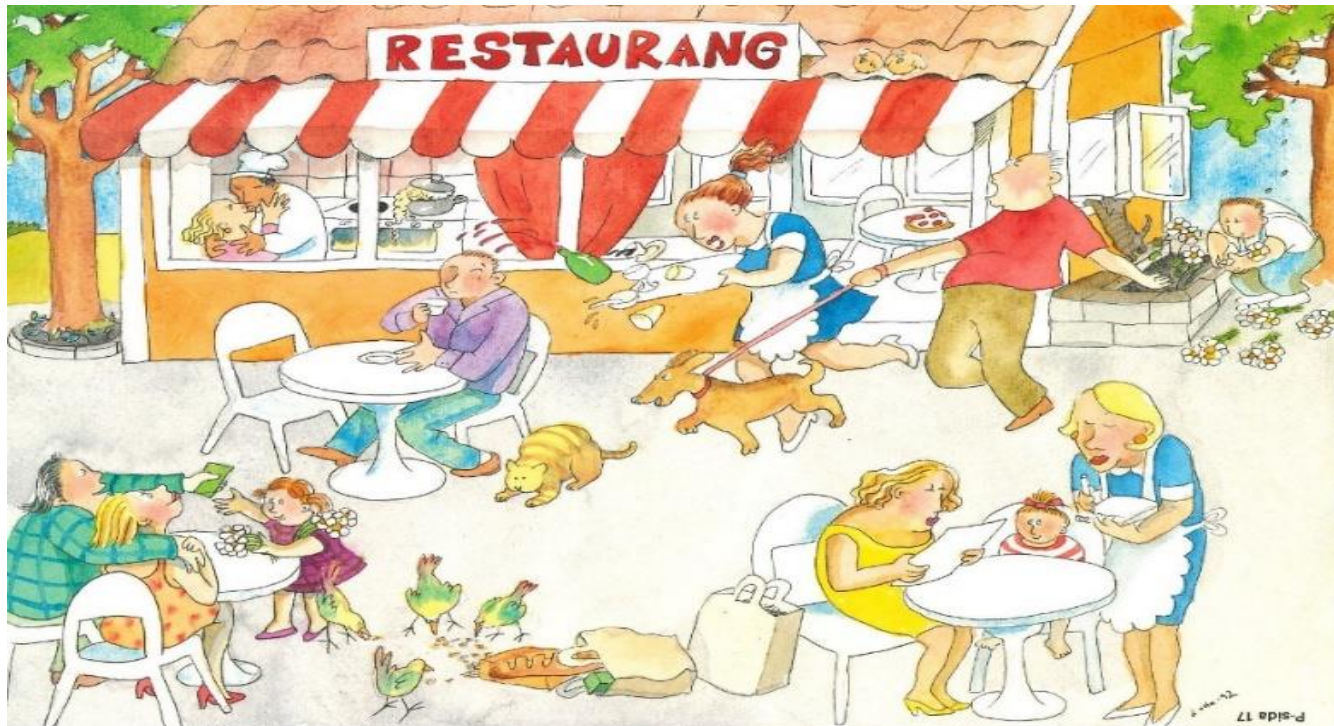
- Performance expectancy
- Effort expectancy
- Social influence
- Facilitating conditions





Speech and Language Assessment System (A-ning) Overview

The assessment and implementation process: Patient's page





The assessment and implementation process: *Speech therapist's page*

L-sida 14

UPPGIFT

A7. INFORMATIVT TAL
Beskrivande tal – Tematisk bild

INSTRUKTION/DELUPPGIFTER

Visa P-sida 17!

Patienten ska göras uppmärksam på detaljerna om de inte beskrivs spontant. Cirka tio händelser kan beskrivas med meningar i valfri ordning. En sammanhängande berättelse förväntas ej.

Beskriv den här bilden. Tänk dig att jag inte ser den. Berätta vad som händer?

POÄNGSÄTTNING

Poäng: Enligt manual

A8. INFORMATIVT TAL

Berättande tal – Förlopp

Visa ej P-sida!

Händelseförloppet ska beskrivas med minst fem moment i logisk följd.

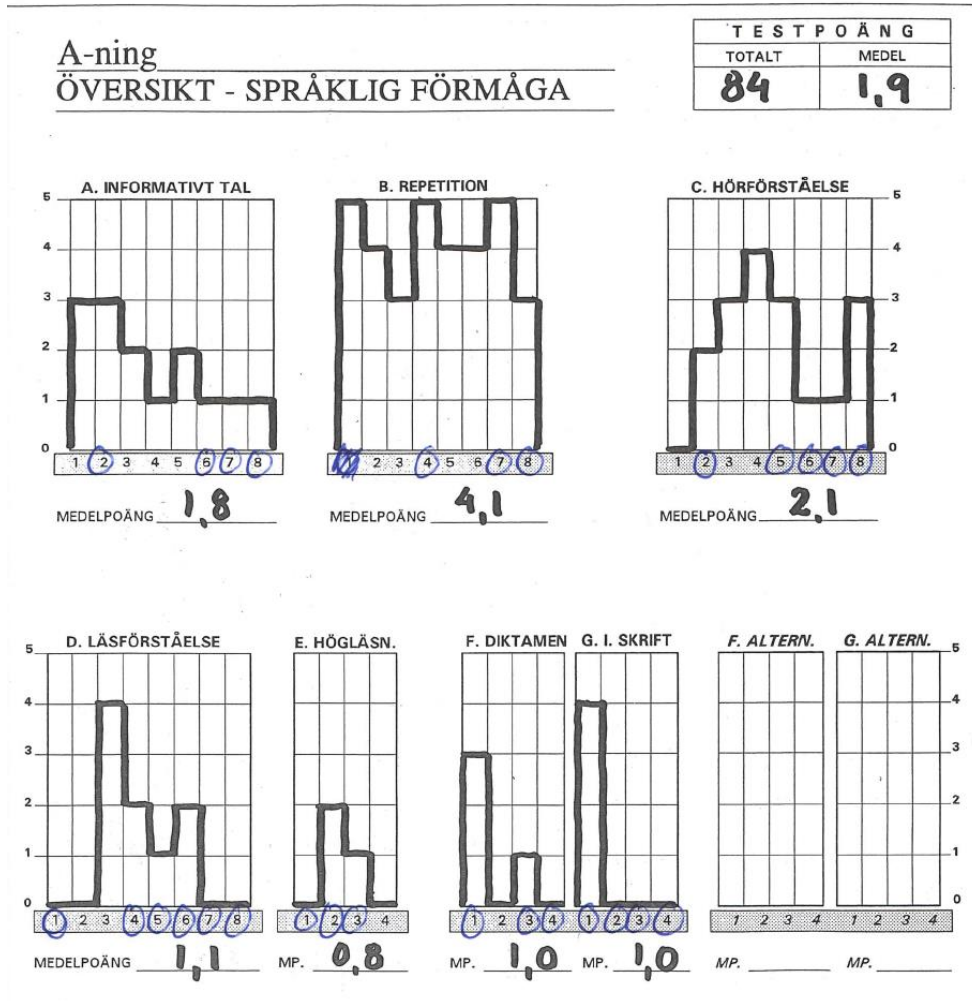
Beskriv ett restaurangbesök. Hur går det till? Vad gör man först? Vad händer sen? Tänk att du/ni berättar för någon som aldrig varit på restaurang.

Alternativuppgift kan ges om patienten är helt obekant med händelseförloppet vid ett restaurangbesök. Patienten kan då i stället berätta om ett annat händelseförlopp med minst fem kronologiska moment, t ex baka en sockerkaka eller byta däck på bilen.

Poäng: Enligt manual



Manual and pepper-pen based evaluation





Speech and Language Assessments Application

Step 1: Patient's information

← **A-ning** ↻ 🏠

Ny Patient

Förnamn

EfterNamn

Personnummer

Logoped

Afasitest pågår
 På

Skapa

Alla Befintliga Patienter

Erik	Ström			
02/11/2020	22:22			
Anna	Persson			
02/11/2020	15:43			
Awais	Ahmad			
02/11/2020	22:49			

Översikt

Förnamn
Erik

EfterNamn
Ström

Personnummer
198111150000

Logoped
Erika


Afasitest pågår
På











TESTPOÄNG	
TOTALT	MEDEL
116	3.2222...



Speech and language Assessments Application

Step 2: Patient's speech and language impairment diagnosis

← **A-ning** 

Förnamn Erik	A1. Namn, adress, ål... <input type="checkbox"/> Av  5	A2. Benämning av bil... <input checked="" type="checkbox"/> På  4
Efternamn Ström	A3. Benämning efter ... <input checked="" type="checkbox"/> På  3	A4. Satskomplettering <input type="checkbox"/> Av 0
Personnummer 19811115000	A5. Automatiserade ... <input checked="" type="checkbox"/> På  5	A6. Meningar <input checked="" type="checkbox"/> På  3
Logoped Erika	A7. Beskrivande tal- ... <input checked="" type="checkbox"/> På  3	A8. Berättande tal- F... <input checked="" type="checkbox"/> På  2
Afasitest pågår <input checked="" type="checkbox"/> På	B1. Bokstäver <input checked="" type="checkbox"/> På  2	B2. Bokstavssekvenser <input type="checkbox"/> Av 0
<input type="button" value="Uppdatera"/> <input type="button" value="Ta bort"/>	B3. Nonsensstavelser <input type="checkbox"/> Av 0	B4. Ord <input checked="" type="checkbox"/> På  3
	B5. Ordsekvenser <input checked="" type="checkbox"/> På  2	B6. Ordpar <input type="checkbox"/> Av 4

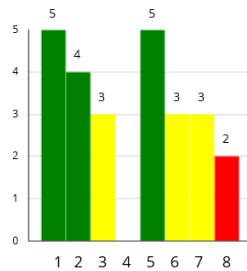


Speech and language Assessments Application

Step 3: Patient's speech and language impairment evaluation

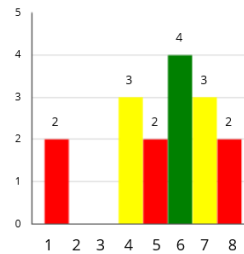
A-ning ÖVERSIKT-SPRÅKLIG FÖRMÅGA

A. INFORMATIVT TAL



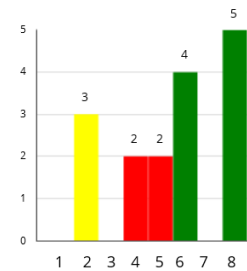
Medelpoäng : 3.57...

B. REPETITION



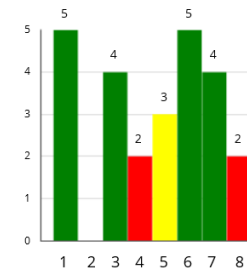
Medelpoäng : 2.4

C. HÖRFÖRSTÅELSE



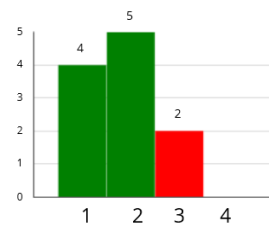
Medelpoäng : 2.6...

D. LÄSFÖRSTÅELSE



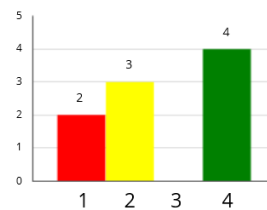
Medelpoäng : 3.571...

E. HÖGLÄSNING



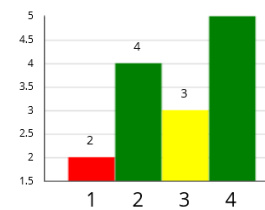
Medelpoäng : 3.6666...

F. DIKTAMEN



Medelpoäng : 2.25

G. INFORMATIV SKRIFT



Medelpoäng : 4.5

TESTPOÄNG	
TOTALT	MEDEL
116	3.2222

Study Participants

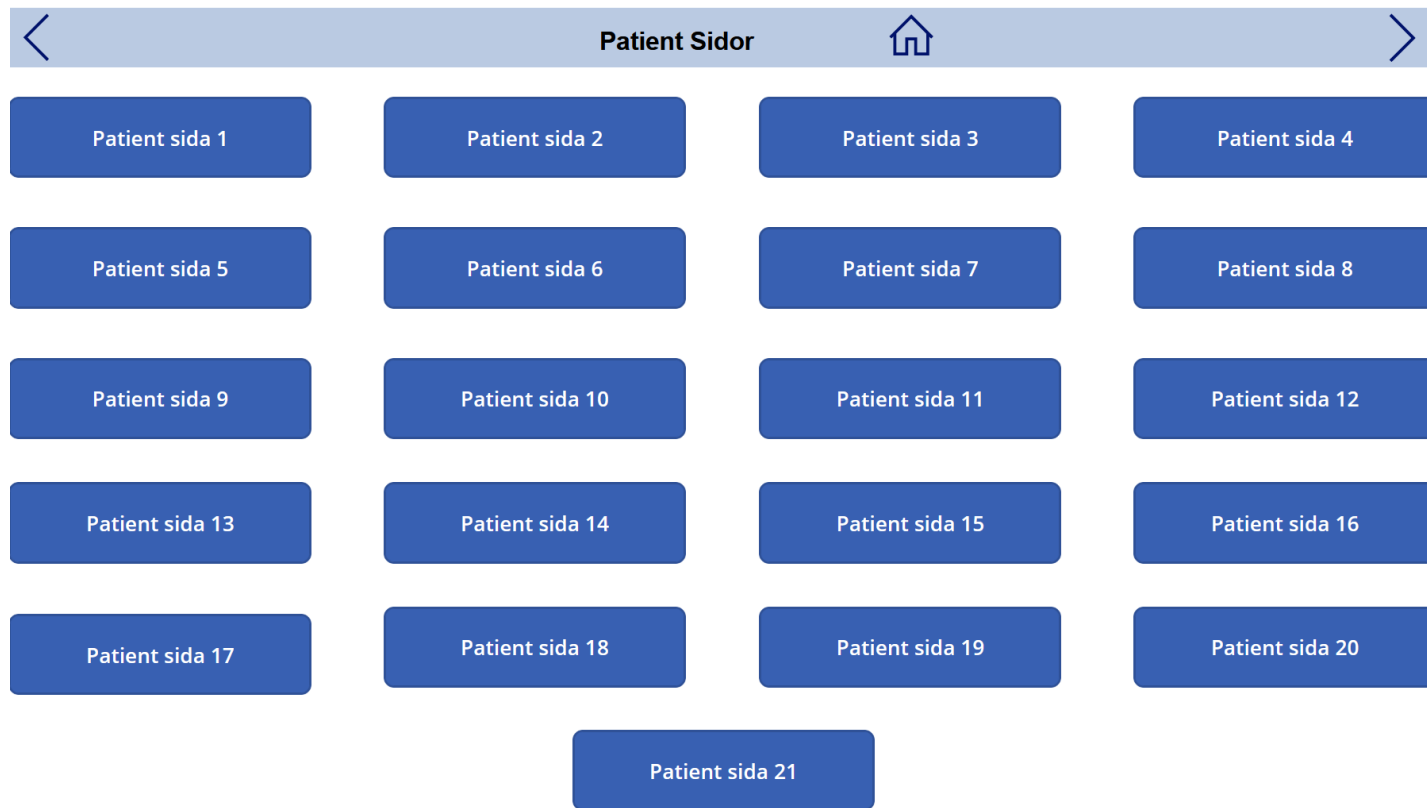


Participants	Professional role	Region	Years of experience
Participant 1	Speech therapist #1	Stockholm	25
Participant 2	Speech therapist #2	Mid Sweden Region	4
Participant 3	Speech therapist #3	Mid Sweden Region	5
Participant 4	Occupational Therapist	Mid Sweden Region	5
Participant 5	Physiotherapist #1	Mid Sweden Region	8
Participant 6	Physiotherapist #2	Mid Sweden Region	3



Speech and language assessments Application- Patients'

Interface





Study Findings

To evaluate the technology acceptance, the results were thematically analysed and categorized according to the UTAUT model's determinants.

However, these categories were not enough to cover the contents of the interviews. Therefore, privacy and security, and previous knowledge and experience about technology were added as extra categories.



Study Findings

- **Performance expectancy** explains perceived usefulness
 - Online evaluation
 - Automated and instant results
- **Effort expectancy** explains ease of use
 - Synchronization with previous workflow
 - Folders with descriptive headlines, where assignments from each category could be stored
- **Social influence:** co-workers' views about the usefulness of the system
- **Facilitating conditions:** Technical infrastructure, education and training, and personal support



Study Findings

- *Privacy and security*
- *Previous knowledge and experience*
- **Users' participation in the design and development**

User participation == User acceptance



Research contributions and Conclusions

- The relationship between a **user's personality** and his/her **behavioural intentions** to use a given technology is complex and it depends upon several different factors. Such factors are user's **trust in personal data security**, **personal integrity and privacy**, their **previous experience** with technology, and the **willingness** to learn the new technologies.
- The patient's **ability to use** a specific technology heavily depends upon the patient's **physical and cognitive health** after stroke.
- Technology acceptance evaluation shows that the developed application is **useful** and **efficient** for speech therapists. However, to enhance the performance expectancy, the potential users (speech therapists and patients) should be involved throughout the application development process and all the application functionalities should be comprehensively discussed with them.
- Online treatment might provide a better **quality of life** and **independent living** to the **patients** and their **close relatives**.
- The intention to use the technology also depends upon an **early user's participation** in system development and design.



Future Work

- This evaluation was carried out with a speech therapist and caregiver perspective which is an important part of the process. The next important step is to get the **patient perspective**, in an evaluation that preferably also should involve some **patients' relatives and friends**.
- Furthermore, the multi-stakeholder approach should include administrative staff at health centers and hospitals to get their view on **statistical features** and **security aspects**.



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THANK YOU

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