Cognitive Assistive Technology for Teaching and Learning with Smart Phone
Gahangir Hossain, ASM Iftekhar Anam, Mohammed Yeasin and Akbar S. Shaik
CVPIA Lab, Electrical and Computer Engineering, The University of Memphis TN, USA

INTRODUCTION

The Three types of Learning
Surface Learning
Learning to specifically meet course requirements
Studying unrelated bits of knowledge
Memorising facts and figures to repeat
No linking or connection of learning
Deep Learning
Learning that seeks to understand and connect the concepts
Relates ideas to previous knowledge and experience
Explores links between evidence and conclusions
Critiques arguments and examines rationale
Strategic Learning
Learning to achieve highest possible grades in a course
Focussed on assessment requirements and criteria
Effort to understand knowledge to demonstrate learning
Focused on perceived preferences of lecturer

Problem Definition
What type of learning requires less cognitive load for the people who depend on assistive technology tools with mobile phone?
What is the notion of online cognitive load assessment for them?
How to make the mobile phone interface cooperate with the learning according to his cognitive load level?
Using such tools who can teach better, an expert end user or the technology inventor?

WORKING MEMORY MODEL

SMART PHONE AS AN ASSISTIVE TECHNOLOGY TOOL

R-MAP: Reconfigured Mobile Android Phone
Developed in CVPIA Lab, The University of Memphis, 2010.
What is R-MAP?
✓ A fully integrated, stand-alone system with easy-to-use interface to reconfigure an Android mobile phone.
✓ Designed and developed to facilitate day-to-day activities of people who are blind or visually impaired.

Key services
✓ Reading out load “printed text” on various types of surfaces such as “printed letter,” “medicine bottle,” “street sign” and etc.
✓ Providing a sense of direction in an open space
✓ Enhancing shopping experience through integrated barcode reading service, and
✓ Assistance for indoor navigation.

CONCLUSION

We experimented so far...
- Differences in cognitive load between expert participants (who have prior smart phone use experience) vs. non-expert (no prior experience)
while using assistive technology (R-MAP).
- Differences in cognitive load and usability between blind folded participants and participants who are blind or visually impaired.
- The impact of visual mapping capability of blind folded people over visually impaired. Also
- The impact of a mini-shallow structure interface with secondary task based cognitive load measures to the assistive technology people.
- The difference of training by blindfolded and blind subjects in operation of assistive tool like R-MAP.
- OCR performance and Usability studies of R-MAP

Future Work
- Finding sense of direction in an open space
- Navigating unfamiliar indoor locations using sparse digital maps
- Access to affective states of the surrounding individuals
- Providing guidance during extreme conditions, such as flood, hurricane, or earthquakes.

ON GOING PROJECTS

SMART PHONE MEETS THE CLOUD FOR BLIND AMBITION

Smart phone meets the Cloud for Blind Ambition
- Utilizing the service oriented computing architecture, cloud computing
- Enhancing their experience in sensing the environment they live in.
- Improving the quality of their lives.

What about the sighted users?
The application will be useful even for sighted users when they don’t want visual engagement with smart phones.

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