"Talking is the new Typing": Challenging Smartphone Users To Dictate Instead Of Type In Order To Enrich the Mobile Learning Experience

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Abstract: Research on mobile learning has found that the small keypad and smartphone monitor sizes discourage any enhanced collaboration and discussion longer than a couple of sentences. In order to ensure a well-rounded mobile learning experience for the smartphone user, an alternate method of input will have to be utilized especially as mobile devices become smaller and more integrated in our society. The purpose of this study is to develop and evaluate a mobile-based module which instructs smartphone users on how to utilize a speech-to-text app in place of typing for online assignments. Participants learn how to record, edit, copy and paste on Dragon Dictation, a speech-to-text app, and then are asked to complete three final challenges. These tasks have participants dictate 1-2 paragraphs of introduction, reflection, and feedback, common discussion assignments required of online learners. Attitudinal pre-, embedded, and post surveys were used to gather participant data. Overall, data analysis revealed that participants did see the benefits of using speech-to-text technology in place of typing on their smartphones for online assignments and that they were more comfortable and motivated to use one in the future after module completion.

Introduction

On Apple's website, there is a slogan that says, "Talking is the new typing". As mobile devices that are smaller and smarter are constantly being released and used by an ever increasing consumer base, the space needed for typing on a keypad is shrinking to the point where typing has become somewhat cumbersome and annoying for any input longer than a couple sentences. How does this limitation affect mobile learning for those who choose to learn on their smartphone devices? Will typing on the small keypad prevent in-depth, lengthy reflections being turned in by learners from their smartphones to fulfill online discussion assignments? Will learning modules which involve a lot of typing and feedback discourage users from taking them on a smartphone because of potential typos, multiple edits, and other cumbersome annoyances? What if the user has large fingers or a finger injury or has no access to an iPad, laptop, or desktop to complete their assignments? Chances are they have their smartphones with them. If only they didn't have a 3 paragraph assignment to type out on the little smartphone keypad before the approaching deadline! Until an alternate convenient form of user input emerges, speech-to-text technology can greatly assist in helping smartphone learners be able to engage in discussions for a typical online course and successfully create and turn in their written assignments.

In this mobile-based instructional module, smartphone learners are asked to use a speech-to-text app as an alternative to typing in order to complete common distance learning assignments. The purpose of this research study is to develop and evaluate a mobile-based module to instruct smartphone users on how to use a speech-to-text app and to change any preconceived attitude towards incorporating speech-to-text technology for their online learning assignments. The module is created for iPhone or iPod Touch users over 18 years of age who are interested in using speech-to-text technology for mobile learning.

Background

Tools used to convert speech into text for mobile devices are not new. They have been present for a while, with emphasis towards helping the disabled and for language assisted learning. However, the tools were more cumbersome to use due to certain inaccuracies in speech conversion and have not yet reached the efficiency needed to play a major role in asynchronous discussions for mobile learning. This, as well as the limitations of keypad typing for in-depth reflection, prevents mobile learning from being perceived as something more than a supplement to face to face learning. Because of the hand held size of the device for its mobility, users prefer to limit their text input to short messages and mostly use texting for announcements, notifications, and news (Chang, 2010). Even though mobile learning is a great motivator for a certain age group of learners to study on their devices because they could study and revise their content in their homes on their familiar devices, small screen and keypad size decreased effectiveness as a sole device for learning (Gedik, Hanci-Karademirci, Kursun, & Cagiltay, 2012). Therefore, it seems mobile devices are tools better designed for information consumption rather than in-depth text input and interactivity of the user. There are also ways around these limitations, for instance, to be mindful of user limitations to texting when designing mobile instruction (Norman, 2011). However, effective mobile learning relies heavily on collaboration, conversation, and dialogue (Kearney, Schuck, Burden & Aubusson , 2012).   How would it help the mobile users learning experience if we don't address the limitations of the device keypad with a more useful, alternative way for learners to be able to engage in reflective, in-depth input for collaboration and discussion assignments?

This is where speech-to-text technology comes in to replace texting and typing on the mobile keypad. Speech-to-text apps like Dragon Dictation and Apple's Dictation, an integrated speech-to-text tool which can be used in place of the mobile keyboard, are long overdue for use in a mobile learning environment. Speech-to-text technologies are paving the way to more efficient "hands-free, eyes-free" interaction (Kumar, Paek, & Lee, 2012). These alternate methods to typing must be implemented in order to encourage smartphone users to enhance and enrich their mobile learning.

Methods

Target Audience
The target audience for this study is anyone over 18 years of age who has access to an iPhone or iPod Touch. They are from varying socio-economic and cultural backgrounds and vary in mobile device and speech-to-text skill level. They must own an iPhone or iPod Touch, internet enabled, and must download the free Dragon Dictation app in order to be able to complete the module.

Design and Development
The module, seen in Figure 1, was created on Notepad++ and was built during a four week period. Because the Dragon Dictation app is available for a wider range of iPhone and iPod Touch operating systems, other mobile devices and speech-to-text apps were excluded from this study to encourage a wider participant count and a similar mobile device user pool. Design focus was placed on a logical linear navigation. Images and icons were used throughout the module for a pleasing design and to address visual learning styles.
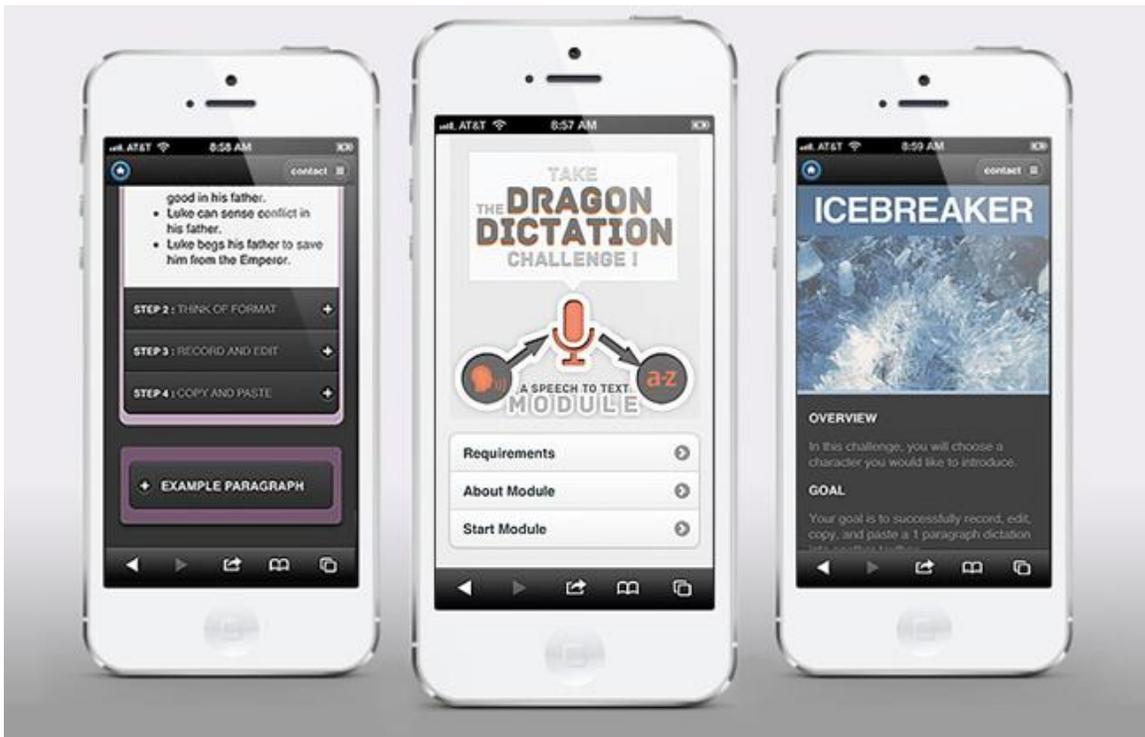

Figure 1. Module viewed on an iPhone 5

Module Layout
The following lists the layout of this mobile-based module.
1. **The Start Page** - First page of module.
   a. **Requirements Page** - Requirements and link to Dragon Dictation app.
   b. **About Page** - Briefly explains the benefits of using speech to text technology and of completing the module.

2. **Digital Consent Form** - By pressing the "I agree" button, the participant has understood and agreed to participate in the study. A PDF copy is also provided in a Call-For-Participation email.
3. **Pre-Survey** - A 26 question (Likert Scale and multiple-choice) survey on participant demographic, baseline knowledge of and attitude towards mobile devices and speech to text technology.
4. **Welcome Page** - Participants learn the module objective and overview.
5. **Activities Page** - Tutorials on recording, editing, copying, pasting using Dragon Dictation containing embedded activities, surveys, animated gifs, and videos.
6. **Dragon Dictation Challenge Page** - Three short challenges participants complete using knowledge they gained from the Activities Page. The participant records each of these challenges verbally, using Dragon Dictation, in place of typing.
   a. **Icebreaker Challenge** - Usually distance learners are required to post a self-introduction, commonly referred to as "icebreakers", in order to get to know one another. Due to the anonymity of this study, participants are asked to formulate, dictate, and paste a one paragraph introduction of their favorite movie or novel character, or a real life person they admire.
   b. **Reflection Challenge** - Another requirement for the distance learner is to write reflections on what they have learned or read to encourage cognitive thinking. Participants are asked to formulate, dictate, and paste a two paragraph reflection on their characters' point of view with several key points to support their reflections into another textbox.
   c. **Feedback Challenge** - Distance learners leave suggestions, questions, and encouragement for their classmate's work, referred to as "feedback". Participants must think of one to two sentences each of encouragement, suggestions, and questions for their character which they record, edit, copy and paste their paragraph into another textbox.
7. **Post-Survey** - A 23 question (Likert Scale, multiple-choice, and open-ended) survey on attitude towards module, mobile device, and speech to text technology.
8. **Conclusion Page** - Participants are encouraged to further explore other Dragon Dictation features and to use their newly acquired skills for their own work on their own time.

Evaluation

Evaluation of the module's design and development went through several phases.

One-on-One
The first phase of evaluation where feedback through email and discussion board from our assigned Critical Friends Group, made up of three peers as well as our educational technology instructor, were integral for problem solving and early module revisions.

Subject Matter Expert (SME)
Extensive meetings via Skype and phone with an SME were conducted, which resulted in additional revisions and problem solving from repeated module beta testing.

Small Group
The third phase of evaluation involved a small group recruitment of family, friends, peers, and volunteers from the educational technology (ETEC) students, instructors, and acquaintances during a three week period. A Call-For-Participants ad was emailed to the ETEC department. Personal emails were also sent out to individuals who were interested in trying out the module.   A 10 min Powerpoint presentation with slides was delivered to a small group of graduate students in another ETEC course to recruit participants for the study.
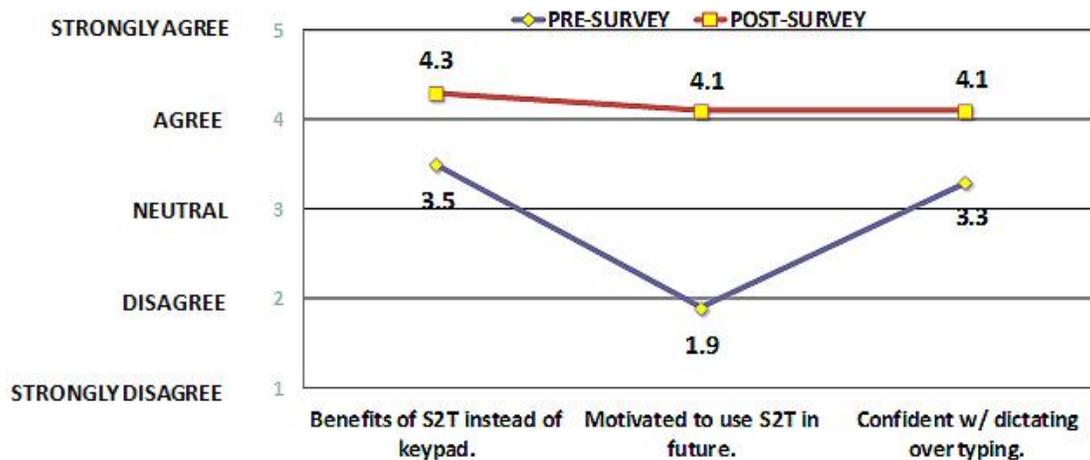
Results

A total of 21 participants completed the Pre-Survey and 10 participants went on to complete the Post Survey during the three weeks of implementation. Participant demographic taken during the Pre-Survey varied as illustrated in Table 1. Participants were asked about their learning style and if they were an extrovert or introvert due to how it may affect their performance and preferences when asked to dictate.

Table 1. Pre-Survey Demographic (n=21)

Male	Female	Age Range	Learning Style		Extrovert/Introvert	
57%	43%	22 - 25 = 10%	Touch	= 19%	Extrovert	= 33%
		26 - 30 = 19%	See	= 57%	Introvert	= 53%
		31 - 40 = 19%	See, Touch	= 5%	Don't know	= 14%
		41 - 50 = 33%	Hear, See, Touch	= 14%		
		51 - 60 = 19%	Other	= 5%		

Participant baseline skills and familiarity of their mobile device, mobile learning, and speech-to-text technology were also taken. 38% of the participants own both an iPhone and an iPad. 43% of the participants use their devices to email, phone, surf the web, play apps and games, and manage their life using calendars, and other tools for organization. 29% of participants use Dragon Dictation over 24% of those who use Apple's Dictation, however, 33% hardly dictate more than a couple of sentences and 24% never dictate on their device at all.

For the Post-Survey, Likert Scale Questions and Open Ended Questions were asked. Out of the 10 participants who completed the module, 100% strongly agreed or agreed that the module was easy to understand, navigate, and flowed in a logical manner. 80% enjoyed learning from their iPhone or iPod Touch, and 90% felt the module was useful. 100% strongly agreed or agreed that they felt more comfortable with speech-to-text after going through this module.

Discussion

The Post-Survey compared with the Pre-Survey results (see Table 2) show that overall, participant attitude towards speech-to-text technology as a means to replace typing increased. Participants commented positively about the module and the design, and most felt motivated to use a speech-to-text app in the future as illustrated in Table 4.

Table 4. Examples of Open Ended Post-Survey Comments

Participant #3	Participant #7
"As someone who never used speech-to-text, I think I will now and start using Siri and other similar apps."	"I realize that dictation is not as intimidating as I thought. Shows how simple it is to edit and copy."

To summarize the open ended comments of the Post-Survey, the participants found:

What was helpful?	**Improvements?**	**What did they like?**
Organization	Technical Issues of survey tool	Star Wars Examples
The Examples	Length	Visuals
Clear Instruction	Less words	Tutorials
Logical Navigation	Daunting at first impression	Layout and organization

Without prompting, two participants used the speech-to-text app to create their open ended comments. In Table 5, two participants who both were not familiar with speech-to-text apps and have not used one before completing the module are shown as examples.

Table 5. Example of a dictated comment and a typed comment

Participant who used speech-to-text for Post-Survey comments.	Participant who didn't use speech-to-text for Post-Survey comments.

Question: What did you really like about the module and what can be improved?			
"The examples and just the overall layout of the module was well-done, professional, aesthetically pleasing and easy to navigate in a linear fashion. I did not feel lost at any point. On my iPhone 5, after clicking the buttons for my answers in the surveys, the screen would bounce up to the beginning of the survey each time. My answers would be marked but it felt like some kind of refresh, that wasn't necessary. Not a big deal because I can scroll down to the next or continue button. I would keep it the way it is! I have no thoughts for improvement."		"The visual structure and easy flow Less directions"	
Pre-survey: I am familiar with speech-to-text apps.	Strongly Disagree	**Pre-survey: I am familiar with speech-to-text apps.**	Neutral
Pre-survey: Which speech-to-text apps have you used?	None	**Pre-survey: Which speech-to-text apps have you used?**	None

The comments of the participants who used speech-to-text were, in general, longer and more reflective than the participants who typed their comments out on their keypad.

In addition, how successfully the participant dictated the Challenges themselves was an indication of how effective the tutorials are and gauged what they truly learned. Overall, the results showed a solid understanding of the activities and challenges based on their input as shown in Table 5.

Table 5. Examples of Dictated Entries for the Icebreaker Challenge

"He is the Caped Crusader, the dark knight, and the worlds greatest detective. He is also a billionaire philanthropist, head of a multinational corporation, and adoptive father. He is vengeance, he is the night, he is Batman."	"I would like to introduce to you the Buddha. His real name is Siddhartha Gotama. He was born in Lumbini, Nepal. His favorite things to do are to meditate and teach the Dharma to anyone who is openhearted and willing to learn and listen. The Dharma is a set of teachings that explain a middle path. This means that people may lead a balanced life between living in the material world and a world where you have internal peace in your heart."
"I recently watched Les Miserables. The character played by Anne Hathaway-I can't remember what her name was-was the bright spark in the movie. I didn't really enjoy the movie that much. Her character was quite a tragic one, and she was working in a textile factory to support her daughter."	

There may be several reasons which attributed to the 50% drop-out rate of participants who started the Pre Survey but did not complete the Post Survey. One reason to speculate could be that there were no personal incentives for the participants to complete the module. The study was not required, did not offer extra credit, gift cards, or any immediate gain which could've contributed to participants lack of motivation to complete the study. Time constraints due to the module asking for 1 hour of participant time to complete the module could've been another factor. A participant commented that "The assignment for the paragraphs was a good challenge but took a little longer due to coming up with a character and all that information." A third factor could be the activities and challenges seemed to be a lot of work at first impression. A participant commented, "I had a lot of fun doing your module! At first I was daunted by how much I had to do and I was wanted to give up but I kept going and I realize that the module was easier than I thought." Another reason could be the font size and amount of information on the smartphone monitor and not accounting for limited visibility for older learners since 33% of participants were in the 41-50 age range. Finally, the survey tools were used specifically because of their responsiveness to smartphone screens and interfaces, however, technical complications could have played a role in the frustration of the user. As a result, more efficient survey tools for the mobile device should be explored and used in the future.

Conclusion

The smartphone is an amazing all-in-one tool that could be used for mobile learning when specific considerations are followed. Using speech-to-text and dictation can serve to enhance collaboration so important in mobile learning. The more the learner uses speech-to-text technology, the more comfortable and confident the learner will be when using it. It can be helpful especially with the new wave of technologies that are about to be released, like Google Glasses and iWatch from Apple. Despite the technical issues of the survey tools and drop-out rate, this mobile-based module challenged participants to see the possibilities of using speech-to-text for online assignments in place of typing. The overall attitude of the participant increased positively towards speech-to-text technology and those who used it created longer, more reflective comments. However, a greater participant and smartphone pool would better determine the overall effectiveness of speech-to-text over typing on the keypad.

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