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Creating an educational app rubric for teachers of students who are deaf and hard of hearing

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**CREATING AN EDUCATIONAL APP RUBRIC FOR TEACHERS OF
STUDENTS WHO ARE DEAF AND HARD OF HEARING**

by

Shaunna Marie Bentrop

**An Independent Study
submitted in partial fulfillment of the
requirements for the degree of:**

Masters of Science in Deaf Education

**Washington University School of Medicine
Program in Audiology and Communication Sciences**

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**Approved by:
Christine Gustus, M.S.S.H., Independent Study Advisor**

Abstract: The focus of this study was to analyze literature and existing educational rubrics and adapt an evaluating rubric to meet the needs of teachers of students who are deaf and hard of hearing.

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Figure 1: Evaluating Rubric for Teachers of Students Who are Deaf and Hard of Hearing

Introduction

Technology is changing every day, and we are seeing this innovation in more places than ever, especially in classrooms. More specifically, since the release of the first Apple iPad there has been an overwhelming amount of possibilities that were merely just ideas become available in the classroom. Take for instance wanting to have a class trip to the Guggenheim. Now, this is possible with virtual field trips. The Guggenheim offers a free app that lets individuals explore works of art with a virtual tour and an audio tour. There are several other museums that offer this same feature, such as Musée Du Louvre, The Canadian Museum of Civilization, and the American Museum of Natural History. A teacher may want to bake a cake with the children in his/her classroom, but the school doesn't allow cooking in classes. Now, this is possible with a cake baking app called Cake Maker-Cooking Games, and there are a number of similar apps that allow the baking of all things imaginable via a tablet. With the invention of iPads, and like tablets came the surge in production of applications or apps. Apps have an interactive nature that allows users to play out real life scenarios, or scenarios that are far from reality. Some may recall the 2009 commercial for the iPhone with the ever popular saying, "There's an App for that." Never would we have thought four years later, there really could be an app for almost any and everything imaginable.

Through experience in observing multiple schools and classrooms where students who are deaf and hard of hearing are present, this researcher has witnessed teachers of the deaf utilize iPad apps with their students. These teachers worked on speech and language with their students. The students were motivated to use this interactive technology, and were fully engaged in the tasks on the iPad. Teachers were excited to utilize the iPad and its apps as a tool, and most of the time the teachers were able to track data as they taught a lesson using an app. Having the ability

to use apps and other technology not only benefits the students, but it also has benefits for the teachers who are utilizing such technology. For this reason, it is of benefit to further review the benefits of technology in the classroom, and to create an evaluating app assessment tool for teachers of students who are deaf and hard of hearing.

Literature Review

It is important to first discuss the benefits of having technology, specifically iPads and apps in the classroom. The level of information learned while using an iPad and its apps does not differ, but the level of student engagement increases (Means, Toyama, Murphy, Bakai & Jones, 2010). One reason why students are so engaged is because of the instant feedback they receive. Students are given real-time feedback in response to immediate actions when manipulating an iPad and its apps. This reduces distraction, and the idling stage of waiting for feedback (Clark & Luckin, 2013). Examples of feedback would consist of the app telling when an answer is correct or incorrect, tracking responses, or giving a report at the end of a session with information on how well the student performed. Generation Z is already being referred to as the “Technology Generation”. Those who were born between 1990-2004 have always had access to the internet (Generation Z Demographics, n.d.). The same students are able to adapt well to communicating through the internet, and most likely were using a computer before they even entered pre-school. Traditional curriculum is not so traditional anymore. Schools have made progress and have begun adapting to a variety of learning styles by developing curriculum that utilizes technology (Courts & Tucker, 2012). “One of the most compelling features of the iPad is the range of applications available. A number of applications are needed because student needs vary depending on the level and topic” (Henderson & Yeow, 2012). The iPad and apps that are

available for purchase make education and learning more adaptable, accessible, and productive when you factor in how engaged students become. Henderson and Yeow (2012) addressed the issue of quality versus quantity when they pointed out that the iPad is not meant to improve test results or grades, but is a tool to increase productivity by making things more accessible, and enhance learning through the use of apps.

Other benefits include saving money on materials such as books, writing materials, and other materials needed to make activities. With the iPad and its apps, a teacher has all of his/her materials at hand. Especially in the field of deaf education, teachers are endlessly creating activities that require lots of time, and costly materials to address certain needs of the students. Apps take away the time and cost of creating the wide variety of activities required to teach children with hearing loss. While not all apps can replace a teacher-made activity, having a similar app to an activity has its advantages. Apps also can be tailored to each individual student's needs. Most applications allow altering of settings to increase or decrease difficulty. This is especially important when a teacher has students that vary in range of ability. The benefits of having such technology in the educational setting are endless and the list continues to grow with each new app that is created (INKids.com, 2014).

While many people embrace change and technology, many other people are big opponents of having such technology brought into our classrooms. Those who oppose education entering into a technological world with the iPad believe there could be damage to the students' health, such as internet addiction, depression, or vision problems. Those opponents also believe that such a device is too pervasive and this younger generation is simply a tablet-carrying, smart-phone obsessed, technologically dependent group of students. They believe that our students would receive much benefit from less exposure to devices, not more (Harlan, 2012).

Some of these same opponents make us aware that there are other limitations to having devices such as the iPad in the classroom. One limitation is the cost. Those who argue about the cost make a reasonable argument. A device alone could be anywhere from 200-500 dollars. This cost is before even considering the cost of apps or accessories that are needed to get the best use in the classroom. Some may argue that children cannot learn information like they do from a textbook. There also is the issue that some people believe reading ability may decrease because student would not be reading to learn any longer. In a study done by the Department of Education, it was found that if we incorporate such technology in the classroom, it does not influence the amount of learning that takes place in the classroom, but it did increase the level of engagement of the students (Means et al, 2010). With attributing student engagement to the use of apps and technology in the classroom, others argue that although students are engaged, the novelty effect must come into play at some point. It is argued that while the device is new and unfamiliar, students are engaged and enthralled in the app and the device itself, but once these become familiar, the level of engagement drops (Hourcade, Beitler, Cormenzana, Flores, 2008). Another argument against technology in the classroom is the possibility that we are creating greater cultural divides between students, those who are familiar with this luxury, and those who are not (Carr, 2007). Technology is also seen as an enemy to some teachers. These teachers fear the destruction or remodeling of traditional ways of teaching. These educators are often the ones who need training on how to use technology or need guidance on how to utilize technology appropriately in the classroom (Mifsud, 2002). Larry Cuban, a professor at Stanford University, suggests that, "There is very little evidence that kids learn more, faster or better by using these machines...iPads are marvelous tools to engage kids, but then the novelty wears off and you get into hard-core issues of teaching and learning" (Hu, 2011; Clark & Luckin, 2013). After the

novelty wears off, educators must implement the use of technology so that the benefits continue to contribute to the learning environment.

Review of Published Assessment Tools for Apps

With individuals who both oppose and propose having technology, such as the iPad in the classroom, it is important to choose apps wisely. Many schools have a system where an app has to be downloaded on all iPads in the school. With a system like this, cost becomes an issue, and finding the right app becomes a difficult process. While all apps have reviews available before purchasing, these ratings are based on a five-star ranking with rather subjective comments left by users. On iTunes, raters are given the option to give between a one star and five star ranking to an app, and leave a comment. The real issue with this system is placing a value or knowing what the star means. For this study, this researcher spent time searching for the possible meaning behind a one star ranking versus a two or three star rating. All that was found were forums asking this same question, and individuals responding with their own understanding of this system. This leads one to believe that this system is subjective and vague. iTunes does however rank apps overall, and by category. These rankings are vulnerable to manipulation based on number of purchases, or the most downloads in the shortest amount of time (Arnold, 2013). Another factor in the ranking system is how much an app is actually used after it is downloaded (Programmer and Software Interview, 2014). To get past this process, many educational app rubrics and checklists were developed to help with this process. A checklist is a way of evaluating. A checklist lists a number of questions, and the evaluator either checks "yes" or "no". Checking "yes" would mean that what was being evaluated met the criteria being evaluated. If a question was not checked or checked "no", the item being evaluated would not meet the criteria

being evaluated. It is my belief that checklists are not specific enough, and does not account for gray areas. There are apps that may meet some criteria being evaluated, but not all. With a checklist, gray areas are overlooked. Checklists fail to collect direct information or specifics about an app. One checklist of most interest, and is quite popular online is one created by Kathy Schrock. Kathy Schrock is a retired director of technology for a public school. Her checklist was of interest because topic areas were consistent to the domains addressed on other popular rubrics. She too, has adapted other popular rubrics with minor edits. A rubric is also a tool for assessment, but looks different from a checklist. A rubric breaks down criteria and has a number or value to be placed to descriptions to evaluate that apps' ability to meet criteria. Each descriptor is specific and allows for users to critically evaluate an app and specific needs they wish an app to meet (Airasian & Russell, 2008). This researcher believes that as an educator, it is our job to provide students with the best resources possible. In order to do this effectively with technology, we need to be as specific as possible when evaluating educational apps.

The most widely known rubric currently, and the one that was adapted in this study was created by Harry Walker. Harry Walker is an elementary principal and a doctoral student at John Hopkins. His rubric was created as part of his dissertation. He created his rubric because of the varying response to, "What makes a good app?" The answer to this question varies depending on the audience. While Harry Walker made a rubric that identifies the areas of concern when inquiring about an app, his rubric does not address specific concerns that may be of importance in the field of deaf education. For this reason, this researcher has adapted Harry Walker's rubric into an evaluating rubric for teachers of students who are deaf and hard hearing. Harry Walker's rubric evaluates criteria that he found most important to educators in his study. His domains include: curriculum connections, authenticity, feedback, differentiation, user friendliness, and

motivation. Many of the domains for this rubric will be the same, but have been adapted and more domains have been added to address criteria that this researcher believes to be of importance for a teacher of the deaf and hard of hearing when evaluating an app. While researching checklists and evaluating rubrics, this researcher discovered Tony Vincent's evaluating rubric. Tony Vincent is known as an expert in instructional technology and he adapted his evaluating rubric from Harry Walker's rubric. Tony Vincent adapted his rubric to include thinking skills. Thinking skills were of importance to this adaption of the rubric because of the necessary explicit teaching needed to develop higher level thinking skills in deaf and hard of hearing students. "Teachers need to "cognify" their curriculum—examine their subject matter to identify and explicitly teach the thinking skills which are embedded within their subject (Martin, 2014)." When teachers of the deaf evaluate an app, this is something that is an important consideration.

Adaption of an Assessment Tool for Apps

Before adapting Harry Walker's rubric, many forms of evaluating tools were considered. Through research, as mentioned previously, a number of checklists were discovered that evaluated apps as well. The rubric format was chosen because it was felt as though evaluating checklists were too vague and subjective. The goal of this study is for teachers of the deaf and hard of hearing to be able to evaluate an app and know what the app specifically has and what the app specifically lacks. A checklist does not do this. A checklist merely answers close-ended questions. A rubric sets out specific domains or areas of importance, and then lays out specific information that lets the evaluator dictate in what ways an app qualifies for meeting a valued response. While Harry Walker chose to answer the question, "What makes a good app?" this

researcher has chosen to answer these questions, "Should my school purchase this app?" or "Will this app meet the needs of teachers of the deaf at our school?" Both of these questions will have a more objective answer after a teacher of the deaf utilizes the rubric that has been adapted for this study. This new adapted rubric has specific domains that are of importance when teachers of the deaf and hard of hearing are evaluating apps. The domains that were created for this rubric have been adapted from Harry Walker's rubric, Tony Vincent's rubric, or were new additions for the purpose of this rubric. The description of each domain is listed below.

Relevance

When considering an app, the teacher has a purpose in mind. That teacher is hoping that the app that he/she is purchasing will get the job done. The relevance domain is included in the rubric to measure whether or not the app meets the needs of what the teacher had in mind. The relevance domain addresses both targeted goals, and targeted skills. An app that completely addresses the goals, and the target skills of a lesson would receive a 4 on the rubric scale. An app that works very little or not at all on targeted skills and targeted goals of a lesson would receive a lower score, a 1 on the rubric scale.

For example, an app that would receive a 4 in this domain would be, What's in the Bag? This app is popular among several teachers of the deaf. If working on interrogatives, this app targets skills related to meeting the goal of using interrogatives or answering of interrogatives. This app is flexible in how it is used and relative to the purpose of usage.

Thinking Skills

For the deaf and hard of hearing population, there is a struggle for students to develop higher level thinking skills without being explicitly taught. This domain is included in the

evaluating rubric to assess an apps' ability to engage students in tasks that develop and encourage higher level thinking, such as analyzing or evaluating.

For example, an app that would engage students in high levels of thinking and that would receive a 4 on the rubric would be, What's in the Bag? As mentioned previously, this app requires users to think abstractly, and beyond the here and now.

Speech

The speech domain was specially added to this evaluating rubric. To adapt Harry Walker's rubric to the deaf and hard of hearing population, it was especially important to include speech as a domain. The speech domain measures whether an app targets specific goals and skills related to speech. An app such as Articulation Station would receive a 4 on the rubric scale. This app targets speech sounds and allows users to practice the target in a variety of positions, such as initial, medial, final, in words, as well as in sentences and stories. An app that practices speech sounds in just a flashcard manner would receive a 1 on the rubric rating scale.

Language

Similar to the speech domain, the language domain was specially added to this evaluating rubric to meet the needs of teachers of the deaf. The language domain measures whether or not an app allows the practice of language, and the ability to target specific language skills. For example, an app that allows for users to practice targets in a realistic format/problem based learning environment would receive a 4 on the rubric. An app that practices language in isolation, such as flashcards, would receive a 1 on the rubric scale.

An app that would meet the criteria for a 4 in this domain would be the Cake Maker-Cooking Games app that was previously mentioned. This app allows users to experience an

activity that is similar that of real life, and allows teachers to practice facilitating and expanding language while using.

Adaption

The adaption domain is also a new addition to the restructuring and adapting of Harry Walker's evaluating rubric. This domain was included to evaluate the flexibility of an app's purpose. The more curricular areas an app can be used for, the higher the score it would receive on the evaluating rubric. An app that can cover 3 or more curricular areas receives a 4, and an app that covers only one area would receive a 1.

An app that is popular among teachers of the deaf, and would receive a 4 in this domain would be, My Play Home. This app allows teachers to target a variety of skills such as, auditory training, language experience, expand vocabulary, and correct speech while using this app.

Feedback

The feedback domain carried over from Harry Walker's rubric. The purpose of this domain is to evaluate an apps ability to track progress and/or reinforce correct responses. The feedback domain is an important factor when considering the usage of an app in the educational setting. Most educators are required to document progress over time, with the use of an app, it is especially beneficial to have an app that documents and saves the child's progress over time. An app that tracks progress over time, and also saves the child's progress would receive the highest score on the evaluating rubric. An app that gives no feedback, or that do not even say whether a response is correct or not, would receive the lowest score on the evaluating rubric.

An example of an app that would receive a 4 in this domain would be, Webber Photo Articulation Castle. This app allows teachers to create user profiles for an unlimited amount of

students, track the child's progress, and score student productions as correct, incorrect, approximate, or cued.

Customization

The customization domain is similar to Harry Walker's differentiation domain. This domain evaluates an app's ability to be customized based on a student's abilities, strengths, weaknesses, and the overall needs of a student. An app that allows users to have individual profiles would be especially beneficial. When evaluating an app, it is important to consider the different levels of ability among students in a classroom. An app that can offer complete flexibility to alter user settings to meet the needs of students, would receive a 4 on the rubric. An app that lacks the ability to alter settings would receive a 1 on the rubric.

An app that would receive a 4 in this domain would be, Articulation Station. As previously mentioned, this app is a popular speech app among teachers of the deaf. This app allows for teachers to choose what sounds to target, what position to target them in, and allows for skipping over difficult or unfamiliar vocabulary for the student.

User Friendliness

The user friendliness domain is similar to that which appears on Harry Walker's rubric. This domain evaluates the ease in which a student can navigate through an app independently. If a student is able to launch and navigate an app independently, that app would score a 4 in this domain. If an app is difficult for a student, and they are unable to launch and navigate an app independently, the app would receive a 1 in this domain. This domain would depend greatly on the age level of the student who would navigate the app, and their cognitive abilities.

An example of an app that would receive a 4 in this domain would be, Bitsboards. Students can open this app, find their profile, and go straight to their set of flash cards. Students can easily navigate this independently.

Student Engagement

The student engagement domain evaluates the app's ability to keep the students' attention. This domain looks at whether or not the student remains excited and eager to use the app, or if the app is looked at negatively by the student. An app that a student is eager to use, and that holds the students' attention would receive the highest score on the rubric. Engagement is important to measure because when a student is engaged, he/she seems to learn more information. If students are highly motivated to use an app, and select it as their first choice when presented with the option, this app would receive a 4. If students adversely react to the use of the app when instructed, this app would receive a 1 on the rubric.

An app that would receive a 4 in this domain would be, My Play Home Stores. Similar to My Play Home, this app is highly motivating to students. This app allows teachers to stipulate completing an activity before using this app. This then keeps the students engaged in the first activity before moving on to the use of the app.

Report Sharing

This domain evaluates an apps ability share results, and the outlets in which it is capable of doing so. An app that allows its users to email and/or print results at any time would receive the highest score on the rubric. An app that does not allow any way of sharing information would receive a low score. This domain is something that should be evaluated because of the benefits of

tracking progress. Many educators in the field of deaf education need to track and monitor progress. This feature to an app makes its usage much more appealing.

An app that would receive a 4 in this domain would be Webber Photo Articulation Castle, as mentioned previously, this is a speech app that allows for the creation of individual profiles for each student. These individual profiles allow for tracking of student progress over time. The teacher is then able to share this progress through email, or printing.

How to Use This Rubric

It is my hope that teachers of students who are deaf and hard of hearing will find this evaluating tool of importance when considering the usage of apps. This rubric can be used by an individual teacher or by a group of teachers. Those teachers or that individual teacher can sit down with a number of possible apps that they are considering and then evaluate each one of those apps with the evaluating rubric.

For example, using figure 2, a teacher may look at the application More Grillin' and assess its value as an app for his/her curriculum.

1. The teacher would first look at the domain titled, Relevance. More Grillin' would receive a 4 for relevance. The app works completely on goals and skills related to a picnic theme.
2. The teacher would next look at the domain titled, Thinking Skills. This app would receive a 4 because it encourages students to connect past experiences to what is being stimulated in the app. For instance, a child may have experienced grilling barbeque with their family, this app has the child use that background knowledge to

- connect that experience to what the app stimulates. This allows for higher levels of thinking.
3. The teacher would next look at the domain titled, Speech. More Grillin' would receive a 2. This is not an app related to speech, but could be adapted minimally to practice speech sounds in picnic related vocabulary.
 4. Next, the teacher would look at the domain titled, Language. More Grillin' would receive a 4 in this domain because it allows for stimulation that is realistic to that of real life, and allows for problem-based learning.
 5. Next, the teacher would look at the domain titled, Adaption. This app would receive a 4 in this domain because it allows teachers to target a variety of skills such as, auditory training, language experience, expand vocabulary, and correct speech while using this app.
 6. The teacher would then look at the domain titled, Feedback. For this domain, the app would receive a 1 because no feedback available.
 7. The next domain would be Customization. In this domain, the app would receive a 4. Although there are no true settings, the teacher has the freedom to make tasks as easy or as difficult depending on instruction.
 8. The next domain the teacher would refer to is titled, User Friendliness. This app would receive a 4 because navigation is not complex and straight forward.
 9. The teacher would then refer to the domain titled, Student Engagement. This app would receive a 4 because students are highly engaged when using this app and would select it if given the option.

10. Last, the teacher would look at the domain titled, Report Sharing. This app would receive a 1 because there is no available option to share data.

The teacher would then notice that out of the 10 domains, the app scored a 4 in 7 of those domains. The teacher would then decide if that was an acceptable score and either begin implementing this app into curriculum, or wait to see if there is a similar app that would rank better.

The teacher or teachers evaluating apps may decide to have a minimum overall score to purchase an app, or decide to base the evaluation on the number of 4s the app receives. Any of these options can be used. This evaluating rubric is to be used with ease. Hopefully the use of this rubric will help teachers in a school answer these questions: "Should my school purchase this app?" or "Will this app meet the needs of teachers of the deaf at our school?"

Further Research

While creating the rubric for this study, many ideas came to mind for future research and ideas in which the rubric could be used. While this researcher believes this evaluating rubric can be a great measuring tool for evaluating an app, this evaluating rubric should be tested for validity. It should be known if any errors are present while several individuals rate a particular app using this evaluating rubric. Another suggestion for future use of this rubric would be for someone to send this evaluating rubric to a sample population of teacher of students who are deaf and hard of hearing. Then, those teachers could evaluate a number of apps used in the field of deaf education, and send the results of the evaluating rubric back to whomever would conduct this study. That person could then compile these results and make them known by all teachers of the deaf. This could provide guidance for some educators while they consider possible apps to

implement in their instruction. Another component of this idea, would be to make the evaluating rubric interactive and online. This would allow whomever to complete the rubric for any given app, and the website could continuously update average results for those apps.

Conclusion

This study first evaluated current views of technology in the classroom. While technology is widely received in most school settings, it has been stated that the issue is implementing technology successfully into current curriculum. An answer to this issue would be utilizing an evaluating rubric such as the ones adapted for this study, or for teachers of the deaf, the one that was created for this study. With use of such a tool, the issues with implementing technology, specifically iPad apps, would resolve this issue. It is this researcher's hope that teachers of the deaf will be able to use this rubric to help guide them when adapting this specific technology into their curriculum.

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Figure: 1

Domains	4	3	2	1
Relevance	The app works completely on the targeted goals and skills of the lesson	The app works mostly on the targeted goals and skills of the lesson	The app works somewhat on the targeted goals and skills of the lesson	The app works very little/not at all on the targeted goals and skills of the lesson
Thinking Skills	The app utilizes and encourages higher order level of thinking (create, analyze, evaluate, etc.)	That app mostly utilizes and encourages higher order level of thinking (create, analyze, evaluate, etc.)	The app somewhat incorporates higher order level of thinking (create, analyze, evaluate, etc.)	The app uses very little or no higher order level of thinking (create, analyze, evaluate, etc.)
Speech	Targeted sound(s) are practiced in a variety of placements and within natural examples	Some sound(s) are offered and practiced in a variety of placements within natural examples	Some sound(s) are offered and practiced in restricted amounts of examples	Some sound(s) are practiced in an isolated fashion (e.g. flashcards)
Language	Targeted skills are practiced in a realistic format/problem-based learning environment	Some aspects of the app are presented in a realistic learning environment	Skills are practiced in an artificial game/simulation format	Skills are practiced in a role or isolated fashion (e.g. flashcards)
Adaption	The app covers 3 or more curricular areas	The app covers 2-3 curricular areas	The app covers 1-2 curricular areas	The app only covers 1 curricular area
Feedback	Feedback is specific and accessible through the app at any time.	Feedback is specific and accessible only in one sitting, while using the app.	Feedback is limited to the correctness of student responses	Feedback is unavailable
Customization	App offers complete-flexibility to alter settings to meet student needs	App offers more than one option of flexibility to adjust settings to meet student needs, but not complete flexibility	App offers limited flexibility to adjust settings to meet student needs (e.g. few levels such as easy, medium, hard)	App offers no flexibility to adjust settings to meet student needs (settings cannot be altered)
User Friendliness	Students can independently use and launch the app when directed	Students need to be instructed by the teacher on how to appropriately use the app	Students consistently need to have the teacher show them how to use the app	Students are unable to use the app independently
Student Engagement	Students are highly engaged and motivated to use the app and select it as their first choice from a selection of related activities or other apps	Students are engaged and use the app as told by the teacher	Students view the app as unenjoyable and may be unengaged when directed by the teacher to use the app	Students adversely react to the use of the app when instructed by the teacher, or complain when offered the option of the app
Report Sharing	Data is available in a variety of formats to the teacher as a part of the app and may be shared through one of the available formats	Data is available electronically to the teacher on a summary page and may be screenshot to share	Data is available electronically to the teacher but is not presented on a single summary page nor is it shareable	The app does not contain a summary page