



Can smart speaker technology make energy management more interesting?

Defining the essential features that drive desired energy conservation outcomes.

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Executive Summary

People have been interacting with smart speaker technologies for more than five years. Smart speakers provide an easy and hands-free way to do our daily life. Smart speaker technologies have several features that make them addictive and engaging which include tone and personality, memory and personalization, gamification techniques, sound features, and multimodal designs.

Energy conservation is sadly a dull topic for most people. This project aims to uncover the features that make smart speaker technologies successful and how we can leverage these features to engage people in energy conservation actions. The research was gathered through testing smart speaker applications on Google Home and Alexa, reading articles and books, listening to podcasts, and interviewing smart speaker design experts.

Introduction

Smart speaker technologies have been around for more than 5 years and more features are continuing to be developed. Users of smart speakers can ask multiple things such as the weather, listening to music, setting up an alarm, broadcasting morning news, and the list is endless. More importantly, users can ask all of these questions without having to open their phones or browse a website.

Energy conservation plays a key role in reducing climate change. Not only does energy conservation reduce carbon emissions, but it also can save energy costs. Unfortunately, energy conservation is a boring topic for most people. Smart speaker technologies have components that can make energy conservation more exciting. These components include hands-free interaction, personalization, sound effect, voice, gamification techniques, and more. This project aims to explore critical design features of smart speaker applications that can be leveraged to increase engagement and promote behavioral change towards energy conservation.

Background

Smart speaker technologies have been around since 2014 with the launching of the first Amazon Echo, followed by the first Google Home in 2016 (Mutchler, 2018). Since then, other companies also created their own smart speakers and a lot of features have been developed including personalization, addition of synthetic voices, and multimodal designs. By 2021, around 35% of the US population, equivalent to 90 million adult population, adopt smart speakers (Kinsella, 2021). In 2020, 26% of Canadians own smart speakers (Summerfield, 2020).

Benefits and challenges

One of the benefits of smart speaker adoptions is it is faster than typing. In addition to that, the hands-free elements allow us to access information while doing something else such as cooking, cleaning, or exercising. However, smart speaker technologies also come with its challenges such as privacy concerns and imperfect text-to-speech technology.

Environmental Scans

Some of the sectors that use smart speaker technologies include utilities, banking, insurance, education, entertainment, transportation, and more. The majority of smart speaker applications in banking, insurance, and utilities provide users information about their services. TD Bank and Bank of Montreal (BMO) applications, for example, allow customers to check the nearest ATM/Branch locations and learn more about different types of accounts that they provide. Capital One application even allows customers to check their balance, track spending, and pay bills. In the fast food industry, companies such as Pizza Hut, Domino's, McDonald's, and KFC applications allow customers to order items and track orders.

Car sharing companies such as Uber and Lyft use their smart speaker applications to allow customers to book the service. In the entertainment and game industry, users can play multiple games such as Jeopardy!, math and number games, and even classic games such as Magic 8 Ball and Tic Tac Toe. Hydro Ottawa application allows customers to learn about current price and rates, tips on reducing electricity usage, current power outages, and current bills. TELUS application allows users to get help for their internet issues but also access information about their internet data usage, billing, and internet services.

Analysis

Research Approach

Information on this report is gathered through testing multiple different smart speaker applications on Google Home and Amazon Alexa, reading books and reports, listening to podcasts, and interviews with smart speaker experts. In addition to that, some of the information is also collected through attending events such as VOICE Summit 2021, Women in Voice, and Voice Con LIVE.

Some of the challenges of this approach include the inability to test some speakers due to location limitations and account linking limitations, as well as the inability to reach out to some smart speaker experts.

Findings

In this section, I will be explaining some of the features and qualities that make smart speaker technologies effective, engaging, or addictive based on 5 - 6 smart speaker application examples. Smart speaker applications are same as applications on mobile phones. People can install and uninstall applications from the smart speaker devices. Throughout the rest of the report, I will refer to these smart speaker applications as the application(s). Here is a review of design elements, features, qualities that make an application more engaging and addictive.

Tone and Personality

Tone and personality are two important elements of smart speaker application design. The tone is very powerful to set the entire mood and quality of the application. Personality is very closely related to tone because the tone is used to show the personality itself. The tone also shows the characteristics of a brand. Different tones can be applied based on the different situations/sections in the smart speaker application. For example, greetings can be fun and friendly, however, the tone can be serious and knowledgeable when conveying important information.

Some of the best practices of using tone can be seen in applications such as TELUS and KFC. In TELUS application, the digital assistant uses a friendly and funny tone during greetings. An example of the greeting for recurrent users in TELUS application includes: *“Kreshna, it is really great to talk to you again. How have you been? What can I help you with?”*. The words and intonation they used in these greetings show a casual and friendly tone. When the user responds too slowly, the digital assistant will playfully say:

“You have gone too quiet. I can almost hear myself breathing. While you’re here, is there anything else I can help you with?” or *“Hey you just got here. Every time I lose a customer, they make me work another shift!”*.

[Recording 1. Please refer to the audio below or Telus.m4a file]



On the contrary, as heard in the recording, TELUS application uses a serious and a more neutral tone when conveying information about data, roaming, and bills. The application does so by telling the information as it is without any jokes or jargon and with neutral intonation. While the distinct tones for different situations in TELUS smart speaker applications are great, users still do not really know who this digital assistant is and users will always think that they are speaking to a computer.

The different tone can ultimately shape the personality of an application. Some smart speaker applications chose to create a personality and some only used different tones without necessarily defining the personality or persona. KFC Canada application is a great example of applying an already existing brand persona onto the smart speaker application. The KFC skill provides customers a unique voice experience guided by the voice of Colonel Sanders. At the introduction, KFC introduces users by saying the following:

[Recording 2. Please refer to audio below or KFC.m4a file]



“Hold on just a moment a minute. Colonel Sanders here. You have been doing a mighty fine job, Alexa. No doubt about that. But in terms of fried chicken, I might have a certain expertise that might be of support. Welcome to KFC skill. You can order a meal, talk chicken to me, or ...”

When the user asks to order chicken but the user has not connected the KFC account to the Alexa application, the KFC skill will say:

“Well, call me old fashioned here but I think you need to connect your KFC account with Alexa”

KFC uses Colonel Sanders to introduce users to the founder of KFC. In the introduction, the skill also allows users to know that he is very knowledgeable about fried chicken and he is very fun to interact with because users can also hear chicken-related jokes. Using casual words such as “a mighty fine job” and “no doubt about that”, combined with the intonation provides an effective way to show the personality of the KFC Canada skill. It is also a good example where the same tones are consistent throughout the skill because it follows Colonel Sanders’ personality. How KFC Canada created Colonel Sanders’ voice will be discussed further in a later section of the report.

Memory and Personalization

Personalization allows smart speaker applications to deliver content based on the user's previous usages of the application, user preferences, and linking databases related to the user or responses the user gives. Personalization is one of the ways to make an application more interesting for users because the contents are tailored to each specific user. Depending on the use cases, personalization in an application may require data such as name, address, account information, and other data or user flags.

For example, an application may use the address associated with the device to integrate it with their service. As heard in recording 3, in BMO skill, it uses the address of the user that is stated in the application to show the nearest branch or ATM locations. This way, the application does not have to ask for the address of the user which would have been more complicated. On the contrary, as heard in recording 4, the same task in TD application was not really successful due to the inability to understand the postal codes.

[Recording 3. Please refer to audio below or BMO.m4a file]



[Recording 4. Please refer to audio below or TD.m4a file]



There are several ways of implementing personalization in an application. Firstly, the application can flag users and keep track of their usages. For example, the application can keep track of whether this is the first time the user uses the application or whether the user has used a particular service in an application before. This data would then be stored in a database which

will then be used for personalizing content for users. Secondly, the application can also allow account linking where the user has to sign in to their account in the application. These two approaches require different technical and privacy-related solutions. Examples of account linking can be seen in some smart speaker applications such as TELUS, Uber, Lyft, KFC, Domino's, and more. In the KFC skill, users can reorder items from recent orders. In this sense, the application can suggest items based on previous orders by extracting data from the user's database. In the TELUS application, account linking is used for extracting information about a user's billing and plans. These two methods can be implemented simultaneously and can be a great way to make an application more engaging.

Memory and personalization are tricky topics because, on one hand, the application wants to keep track of user's data to create a more personalized experience. On the other hand, if too much data is collected, users might feel as if their privacy is being jeopardized. Greetings is one of the ways applications implement personalization.

Memory and Personalization: Greetings

Greetings are very important because it is the first interaction that users have with an application. Users can feel more excited to come back to an application when greetings are personalized. One example of unique and engaging use of greetings to make the application more engaging can be seen in TELUS application. If it is the first time users access the TELUS application, users are welcomed with the user's name which makes the experience more personalized. Beyond that, the greetings continued to be more personalized depending on when and how often users come back.

If users come back on a certain day, it would recognize today's day of the week:

"Hey Ruli. I hope you have been enjoying your Saturday. What can I help you with?"

When a user comes back for the second time during the day, the application would say:

"Hey Ruli! I love it when people come back on the same day. It means I must be doing something right. Tell me what I can help you with?"

When user comes back within a few minutes, the application would say:

"Hey Ruli. You came back so soon. I must be doing something right. What can I help you with?"

A similar case of using a personalized greeting can be seen in Jeopardy! skill where in addition to being greeted by the name at the beginning, the greeting is personalized according to the user's application usage. For example, if the user has not come back in a while, such as more than a week, the application would greet the user by saying:

"Welcome back, Ruli! I have not seen you in a while. It is good to have you back"

Greetings can be a powerful way to engage users to explore the application and increase user's usage.

Memory and Personalization: Account Linking

Another way to provide a personalized experience for users is to link the user's account to the application. Account linking is used when the smart speaker application requires authentication. Account linking allows the application to access an account in another system using the smart speaker.

Some applications rely heavily on account linking than others to create a great user experience. The best way to make account linking optional for other parts of the application where account linking is not necessary. This way, users can still have a good experience with the application. Examples of this implementation can be seen in KFC and Hydro Ottawa applications. In these two applications, sections where users do not need account linking, users can still experience other parts of the applications such as accessing tips on how to save electricity in the Hydro Ottawa application and accessing chicken jokes in KFC applications. However, it is important to recognize that some applications such as Uber and Lyft rely heavily on account linking because the entire focus of the application is being able to book a car-sharing ride.

Different applications utilize and implement account linking differently. In Hydro Ottawa and Telus applications, account linking allows users to access information about their bills. In food-related applications such as KFC, Domino's, McDonald's, account linking allows users to order their meals and track their orders. In Uber and Lyft applications, account linking allows users to order ride-sharing vehicles.

The most common and easiest way to implement account linking is through the smart speaker application itself such as Google or Alexa application on the user's phone. This is the case for Uber, KFC, and TELUS applications, users are directed to the sign-in page of their website. Then, users can input the user's email and password of their accounts. Image 1 below shows the example of the steps for KFC skill.

Uber, KFC, and TELUS provide a smooth experience for users to link their accounts. However, to make the experience better, the application itself can guide the user step by step on how to link their account. For example, instead of just reminding users by saying: *"I am sorry, I think I need an account linking for that"*, without any follow-up questions. It would be better if the application can say do the following:

Application: I am sorry, I think I think you need to link your KFC account. Would you like me to guide you?

User: Yes, please!

Application: First, you can start by going to the Alexa/Google application on your phone. Once you are done, please say "Done"

User: Done

Application: You can go to *Skills and Games* and search for the KFC skill. Let me know when you are done!

User: Done

Application: Once you are in the KFC skill, you can click settings and click Link on the account linking section

User: Done

Application: You are almost there! You should now be directed to the sign-in page. Please insert your email and password.

User: Done

Application: You are all set! Is there anything else I can help you with?

User: No

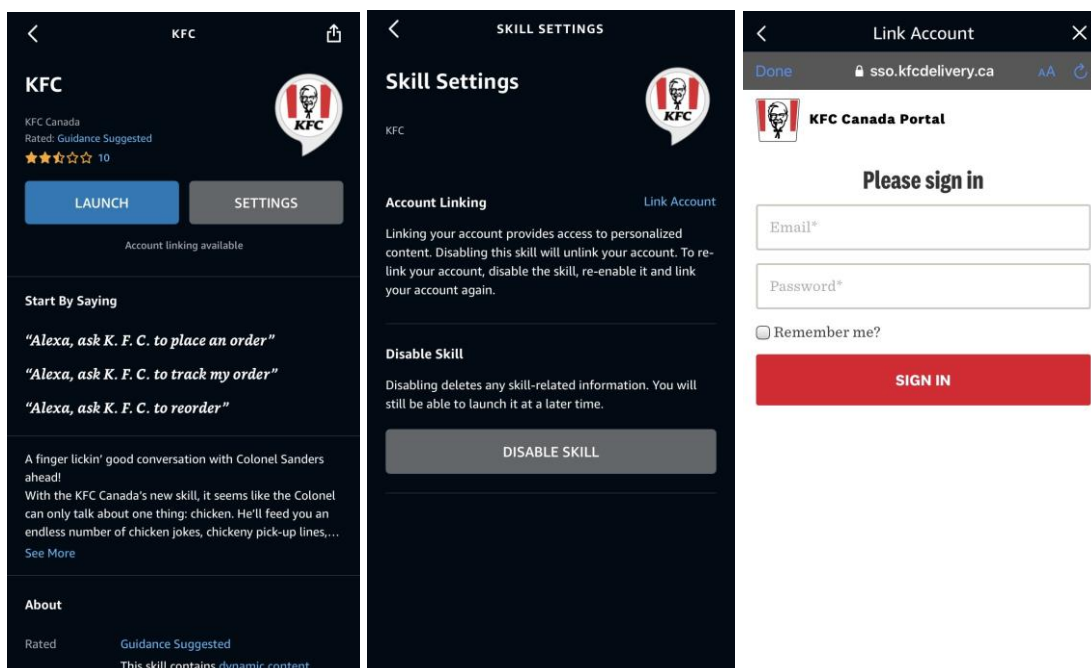


Image 1. Example account linking steps in KFC skill

Gamification Techniques

Gamification is incorporating game elements and principles in a non-game situation. Gamification techniques have been used in mobile applications in multiple sectors such as education, health, and marketing. One example of this is the Nike+Run mobile application that allows you to share your run time, distance, health impact and provide you points and badges in comparison with other users. Duolingo, a language learning application, also uses gamification techniques to reward learners for consistent learning engagement. Gamification techniques can

also be seen in our everyday lives. In some restaurants, they offer stamp cards, and every time a customer completes 10 visits, they get a free item from their menu.

In smart speaker applications, gamification techniques are also used to increase application usage. To do this, the application creates a reward or point system based on certain activities so that users are motivated to gain this reward and thus encouraged to come back to the application without them realizing it. Successful gamification techniques in a smart speaker application involve contents that are simple yet familiar. One good example of the application of gamification techniques can be seen in Bamboo Math application where children in kindergarten through 5th Grade can learn math for free. Learning math is not necessarily something that children look forward to. The application uses a leveling-up approach to gamification. In this case, the levels serve as a “gamified” aspect of the learning journeys, encouraging children to go through different challenges. This is one of the examples of how gamification techniques can turn a boring problem into an interesting one.

Sound

As more brands create smart speaker applications, each brand tries to come across as audibly distinct by establishing its sonic branding. When you hear “Ba Da Ba Ba Ba”, you know that it is McDonald’s. Other examples include the familiar sound of Netflix Intro as you enter the platform or the intro song to Jeopardy!. In the Jeopardy! skill, the introduction song is longer but the song builds this feeling of excitement to the viewers or participants as the show starts. In the case of Netflix, it is short and distinct, but reminds people that they are entering Netflix, not other streaming platforms. These are some of the examples of good sonic branding because they are distinct and memorable.

In the case of smart speaker applications, good sonic branding includes inserting audio to the section of the application that needs to be highlighted or emphasized. As heard in recording 5, Jeopardy! skill uses an exciting and welcoming sound at the beginning of the skill.

Voice and sound effects are examples of sound features that make smart speaker applications engaging.

Voice

Voice is the user's first interaction with the smart speaker application. Most smart speaker applications use built-in Alexa/Google Home voice. However, some also incorporate other voices at the beginning of the application, such as a voice of a public figure associated with the brand. With the rise of voice technologies, it becomes easier for a smart speaker application to purchase this. Companies are also increasingly developing voices that are more human-like.

One example of this is the KFC skill where the brand is tied to the figure of its founder, Colonel Sanders. KFC Canada skill uses Artificial Intelligence to recreate the voice of Colonel Sanders. Specifically, it uses the Amazon Web Services (AWS)’s Amazon Polly, neural text-to-

speech technology to incorporate the Southern accent that is associated with Colonel Sanders' voice (Schwartz, 2020).

One other example of this is with Jeopardy! skill where they use Alex Trebek's voice only at the beginning. Alex Trebek was the Jeopardy's host for over 30 years and it is perfectly strategic for the skill to use his voice. Although they only use his voice during the welcome section, his voice still functions as a good reminder to users that they are part of this legendary television show.

[Recording 5. Please refer to audio below or Jeopardy.m4a file]



As you can see from these two examples, an application can use real recordings of a person or use a neural text-to-speech technology to integrate a distinct voice. For applications that use recording of a real person, it may be difficult to have to record every response. Moreover, it is harder to customize the responses in the future as it will require new recordings again. With neural text-to-speech technology, it is easier to implement because there is no need to record every response and the application can easily add more responses in the future.

Sound Effect

The sound effects can enhance the user experience because they can set the tone of the experience and can make it easier to convey the application's personality to the users. One of the examples of sound effects is earcons. Earcons are short distinct sounds that deliver messages, feelings, and situations to users. The most common way of implementing earcons can be seen in in-game/gamified applications such as Jeopardy!, Song quiz, and Bamboo Math. All of them use distinct sound effects when users get the answer correctly and when users do not. If earcons are carefully designed, users can easily associate these earcons with the brand.

Another possible implementation of sound effects is in situations where there is a long silence or there is a need to confirm something to users. For example, when processing information, instead of leaving the user waiting for the response or saying "Let me fetch you the details about your billing", there could be an earphone that sounds as if someone is typing the details of your account information to get the billing information.

Multimodal Designs

Multimodal design refers to user interfaces that include not only voice features but also visual elements. In the United States, the adoption of smart display has grown from 2.8% in January 2018 to 25.8% in January 2021 (Vailshery, 2021). In the beginning of 2020, out of 16%

of adults in the United States that own smart speakers have at least one smart display (Kinsella, 2021). Video chat is likely the drive behind the growth in smart displays adoption (Kinsella, 2021).

Multimodal smart speakers are better suited for situations where complex information needs to be delivered such as looking at recipes, shopping, games, and tracking orders. Multimodal designs are also great for educational purposes. Bamboo Learning, which includes several applications such as Bamboo Math, Bamboo English, Bamboo Music, and more, makes great use of creative designs and animations on the screen to enhance the educational experience for kids. As seen in Image 2, the visuals in Bamboo Math are very tidy and creative. Sun Life application uses the screen to introduce users to its digital coach. With the latest Alexa Echo Show, you can also shop on Amazon with your smart speaker application or even make a video call.



Image 2. Example of visuals in Bamboo Math skill.

Image source: <https://bamboolearning.com/math>

Recommendations for BC Hydro

Smart speaker technologies have features that make them engaging and addictive. These features include tone and personality, memory and personalization, gamification techniques, audible features, and multimodal designs. Some of these features can be implemented to BC Hydro smart speaker technology to increase usage and engage people in energy conservation. Here are some of the most critical features that can be leveraged in the BC Hydro smart speaker application to encourage behavioral change.

Recommendation 1: Establish tone and personality for the smart speaker application

According to Darling et al. (2015), “People hesitated significantly more when asked to strike a robot with a personified or experienced story, compared to robots without stories”. That is why designing a personality for the BC Hydro application is crucial in delivering a great user experience. It will make the smart speaker application more personable and unique, thus encouraging usage. To create a personality that is tied to BC Hydro’s brand, BC Hydro can also create an icon of Dave Mix, who appears a lot on TV and BC Hydro’s Youtube channel. Some of the traits that Dave Mix can embody to represent the BC Hydro brand may include fun, friendly, supportive, knowledgeable, and trustworthy.

Fun and friendly traits are important to make energy conservation build and maintain relationships with customers thus customers are more likely to come back. The knowledgeable and trustworthy can show the users that they can trust Dave for any billing-related and energy conservation information. Dave Mix could be the go-to person for energy conservation advice but can also be trusted for information such as billing that is more personal. The traits that BC Hydro embodies can be conveyed through several ways such as the choice of words, colors on the screen, sound effects, voice, intonation, and tempo. For choice of words, this might look like choosing certain words that encourage users to collaborate on the energy conservation goals instead of commanding users to do multiple things. The differences in the choice of words can make a difference as seen below:

Smart speaker application

“Your bill is \$150,23. It looks like your energy bill is higher than last month. I would be more than happy to show ways to save energy. Would you like to hear it?”

Smart speaker application

“Your energy bill is \$150,23.”

Notice that the second utterance shows a plain and unhelpful response. The first one, on the other hand, shows a supportive, knowledgeable, and friendly way to convey information about your energy bill. In addition to that, the first response also puts the energy bill in perspective by saying “higher than last month”. This will encourage users to pay attention to their energy usage.

Based on how Dave Mix presents information on the BC Hydro youtube channel, Dave Mix already conveys the five traits aforementioned. For people who own smart speakers with screens, the icon could look something similar to Image 1. For first-time users, Dave Mix should give 2-3 sentences of the introduction. An example prompt look something like this:

“Hi Ruli, welcome to BC Hydro. Dave from BC Hydro is here! You might have seen me on TV or the BC Hydro Youtube channel. I like to drive around BC with my electric vehicles. Let’s save energy with me! What can I help you with today?”

For returning users, BC Hydro can prepare different variations for each response to make people think that they are talking to a real person. For example, for the greeting, the application can say different things according to the time and day in which the user accesses the application. If the user accesses the application on the weekend, the application might say.

“Hi Ruli, welcome back! I hope your weekend has been going great. Today, I have been thinking a lot about how much I saved electricity by unplugging unnecessary devices. What can I help you with today?”

Another example is when the application cannot understand what the user is saying, instead of repeating the same questions, the application can ask for clarification in different ways such as the following:

Example 1: *“Would you mind repeating what you say?”*

Example 2: *“Sorry I do not quite get that. Which services are you interested in again?”*

Preparing different variations for each response, combined with distinct tone and personality, can make users feel more comfortable engaging in the application because users can feel that they are talking to a person and not a robot. Making users feel more comfortable can increase engagement and awareness about energy conservation.

Recommendation 2: Personalization

Personalization is another feature that BC Hydro should implement in its smart speaker application to encourage behavioral change. As mentioned before, energy conservation is a boring topic for most people. By incorporating personalization in the application, some contents can be tailored for each user and thus make the application more interesting for users. Personalization for BC Hydro applications can be implemented through flagging users and using information associated with account linking.

First of all, by flagging users, the application can keep track of usage, responses, and preferences of users. For example, if a user has visited the application more than 10 times, for example, the application can offer a different menu at the beginning, providing the ones that have not been used before. For first-time users, it might be a good idea to ask a few questions at the beginning to personalize the experience and store the data in a database. An example interaction might be:

Smart speaker: Personalized experience can get you the most out of this application. Would you like a personalized experience?

User: Sure

Smart speaker: I will ask you a few questions. It will take 5 minutes. Are you ready?

User: yes

Smart speaker: Let's start with, do you drive?

User: Yes

Smart speakers: Do you drive an electric car or petrol car?

User: Electric car

Smart speaker: We have some energy-saving tips related to microwave, dishwasher, TV, and computer. Do you own a microwave?

User: Yes

Smart speaker: Do you own a dishwasher?

User: Yes

Smart speaker: Do you own a TV?

User: Yes

It is important to balance out privacy and personalization. Therefore, asking only a few items for personalization is more than enough. The smart speaker application should ask about items that relate the most to energy-saving tips.

Through flagging users, the application can also remember which services on the application that users have accessed before. If a user has used a particular service in the application, the application can ask if the user wants to hear it again or if the user is interested in other related services. A possible question might be:

“You asked about your energy conservation tips last time. You can ask about the same information or hear about other services. Which one would you like?”

If the user chooses to hear about other services, the application can suggest similar services that users have never used before. Before leading the user to a specific service, the application can also ask about what related services users are interested in by asking the following:

“We have information about EV programs, rebate programs, and energy conservation tips. Which one would you like to hear?”

In addition to a service-related personalized experience, the smart speaker application can flag users to provide personalization based on particular energy-saving tips. When the application conveys energy saving tips, the application can say:

“Make sure you unplug all unnecessary devices at night. Have you tried this before?”

The application can then store the response in a database. If the user said no to the question, the application can ask if they are interested in trying this tip. The application can then store the information that the user is interested in trying this tip. This way, the application can suggest more tips that they have not heard before. When users come back to use the speaker next time, the application can personalized user’s experience by asking:

“We shared with you a tip regarding how to save energy with the dishwasher. Did you get a chance to try it?”

Providing a personalized experience based on user's usage can encourage behavioral change because it allows the application to suggest other services that users have never used before and encourage users to try new ways to be involved in energy conservation.

The second way of providing personalization is through account linking. Through information from account linking, firstly, BC Hydro smart speaker application can greet the user by their name according to the name associated with the BC Hydro account. Through account linking, the application can also incorporate information such as:

User's current bill and last month's bill

Being able to access the user's bill from last month and the current bill, the smart speaker application can respond according to whether the bill is higher or lower than last time. If the bill is higher than last month, the application might say the following:

"Your bill is higher than last month. That is okay, it happens sometimes. Would you like to hear how you can save energy?"

The application can also congratulate users if the current bill is lower, for example:

"Your bill is lower than last month. Congratulations! We have more information related to this such as information about our X, Y, and Z services. Which one would you like to hear?"

If the bill is the same as last time, the application should still offer if they would like to hear energy-saving tips. In both three scenarios, offering users to hear about energy-saving tips can encourage users to pay attention to what they can do to save energy regardless of their energy bill. However, if a user's bill is always consistent in the same range (e.g. \$90, \$95, and \$98) for more than 3-4 months, it is a good idea for the application to suggest something different. The application can instead suggest users explore other services or offer them to join the trivia if they have not.

Using data from the customer's bill last month and current bill, the application can respond accordingly and ask different questions to keep the conversation going. Suggesting related services and offering energy-saving tips can also encourage users to learn more about energy conservation.

User's address

If the linked account has information about the user's address, it can be useful to tailor the application experience based on the area. For example, if a user owns an electric vehicle, the smart speaker application can offer information about the nearest available EV charging stations based on the user's neighborhood. Similar efforts have been done by CIRRANTiC, a Munich-based technology company that created a smart speaker application with the ability to notify nearby EV charging stations (Arianne Walker, 2021). In addition to that, using the user's address, the application can also detect any stores nearby that have promotions and offers related to

energy-saving devices. This way, users are more aware of easy and affordable ways to engage in energy conservation.

Recommendation 3: Apply Gamification Techniques

Gamification technique is another crucial feature that should be applied to BC Hydro's smart speaker application. Gamification gives incentives using rewards systems to engage users. To make the gamification successful, gamification techniques in the application must involve contents that are simple yet familiar. In the smart speaker context, simple here means it does not involve complicated rules, interactions, or responses.

A gamification technique for BC Hydro's smart speaker application can include multiple energy conservation challenges. For first time users, the application can offer if they would like to enter the challenge. In the challenge, every day, the application will challenge users to do one energy-saving action. These actions may include turning off lights, running laundry on cold water, unplug unused electronics, and more. In addition to that, to make it more exciting, the challenge can be played against other households in the neighborhoods. If a user has linked their BC Hydro account to the smart speaker application, the application can use the zip code information to determine the neighborhoods.

Users will get points for each energy conservation action they have completed. The more they engage, the more points they get. By the end of the month, if their bill is lower than the previous month, they will get extra points. The challenge will include a leaderboard that allows them to see where they are compared to other households. The monthly winner of the leaderboard can achieve a badge or reward. The reward can include free energy-saving LED light bulbs or other items that users can try to save energy.

An example challenge could look like the following:

Application: Let's save energy! The challenge of the day is turning off unnecessary lights. Have you done this?

User: Yes

Application: Great! You received one point. You are ahead of others in your neighborhood. Good job! Keep up the good work.

User: Thank you!

Another possibility of gamification techniques for BC Hydro application can be a trivia about the historical facts around energy conservation, current events about energy, or fun facts about best energy practices around the world, as well as the latest technological advancements that promote energy conservation. The trivia can include questions that are relevant to everyday life while still focusing on interesting energy conservation facts. Some of the questions might be related to historical facts about electric vehicles, energy facts about electric vehicles, recently developed technology that makes it easier to conserve energy, energy usage at home during COVID, and energy conservation from less commuting and flying during COVID.

In this game, users can play by answering questions and entering a leaderboard. To make it more engaging, new questions are added every week. Users can also invite and challenge their friends and family, as well as comparing their performance with them. This way, users can be motivated to play while learning more about energy conservation. The monthly winner of the leaderboard can achieve a badge or reward. The reward can include free energy-saving LED light bulbs or other items that users can try to save energy.

To conclude, applying simple and familiar gamification techniques can simultaneously encourage usage and influence behavioral change. The energy conservation challenge or trivia can make users learn ways to conserve energy while also having fun. Gamification techniques themselves are not complete without other design elements such as tone, voice, sound effect, background sound, and visuals which I will dive into next.

Recommendation 3: Incorporate sound features

Sound is another crucial feature that should be carefully considered. First of all, BC Hydro should create a sonic branding. Creating sonic branding is very important for BC Hydro's smart speaker application because it can make the application distinct from another. In addition to that, sonic branding can establish emotional connections with users by creating a familiar feeling when users reenter the application. When users are familiar and comfortable with the application, users will be more likely to listen to energy-saving tips or engage in other services in the application. BC Hydro can create sonic branding by creating a jingle or a sonic logo that represents the company. If there is an existing sonic logo that is already used in TV commercials, the application can use this sonic logo.

In terms of voice, the application can use the voice of Dave Mix who already appears in BC Hydro's TV commercial and Youtube channel. Having a unique voice is recommended to create a distinct persona and make users remember more about the application. Voice and sound effects can be a powerful combination. Sound effects make the application more engaging because users can feel the interactivity of the application. However, it is important to note that this feature should be executed properly. Too many sound effects can be too distracting and too little can be awkward. The volume of the sound effect should also be similar to the volume of the smart speaker's voice, if not a little lower. If the volume is too loud, it can make the users feel uncomfortable, and too little will not be effective.

Here are some of the possible ways BC Hydro smart speaker application can apply sound effects:

- At the beginning during greetings
- At the start of each service. For example, if the user wanted to know the bill. Apply a sound effect before conveying information about the bill. This can be done for each service provided in the application
- If the bill is lower than last month, provide a sound effect after saying congratulations. The sound effect can be clapping hands or people cheering

- At the start of the challenge to welcome users. In addition to that, have a separate sound effect for when users have done the challenge.
- Apply sound effects before conveying energy conservation tips

Findings from conversations with smart speaker experts

Interviews were conducted with five different smart speaker experts to build on the ideas of features that make smart speaker applications successful. To increase engagement and encourage behavioral change, one of the creators of smart speaker applications suggested trying to understand what the users want from a smart speaker on a daily basis. That will encourage them to come back. A speech system analyst in a technology company strongly advised BC Hydro to implement personalization to make energy conservation more interesting for each user. They also suggested using plain language and not using idioms or terminologies. If any terminologies appear, try defining them in one sentence. It is best not to assume that users already understand the terminologies. Even if the terminology is as simple as insulation or CO₂, it is better to define them.

The communication team which helped design a smart speaker application advised BC Hydro to conduct a consumer survey to better understand how users want to use smart speaker technologies for utilities. A conversational designer at a conversational AI company suggested that a multimodal can is great for conveying a lot of detailed information which requires graphics to support it. In terms of gamification, they suggested really thinking about the rewards. Rewards spark motivation and without the proper rewards, the gamification would not work very well. One last piece of advice she has is to design for edge cases, to really think about what could go wrong, because users can ask about irrelevant things.

Summary & Conclusions

Some of the features that contribute to the success of smart speaker applications include tone and personality, personalization, gamification techniques, sound elements, and multimodal designs. If all these features are well thought out in an application, they can contribute to the success of the application.

For BC Hydro smart speaker application, some of the smart speaker features that could be leveraged for energy conservation include tone and personality, personalization, gamification techniques, and sound elements. It is recommended that the personality of the application include fun, friendly, supportive, knowledgeable, and trustworthy. In terms of personalization, the application can flag users and incorporate account linking. In addition to that, an energy conservation challenge can be a gamification technique for the application. Lastly, the critical sound elements that can be implemented in the application include using the voice of Dave Mix and sound effects in multiple parts of the application. All of these features are recommended for the BC Hydro application because they will make the application unique, interactive, and

engaging. If the application is engaging, people are more likely to come back and thus more likely to learn more about energy conservation and engage in energy conservation actions.

The recommended next steps for BC Hydro is to narrow down the range of services that the application can provide and focus on executing those services really well. In addition to that, BC Hydro can start creating and planning the tone and personality for the application.

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