

THE NEXT WAVE OF DISRUPTIVE TECHNOLOGY ON LANGUAGE AND CULTURE

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Abstract

Inevitably, our world has converged to the age of westernization (americanization) and the global acceptance of the English language. The western culture is being massively imported throughout the world with the help of digital technologies and has been influencing the way we use our language and the way we behave in our daily life. This situation indicates the importance of English language education. However, teaching language to non-speaking English learners is extremely challenging due to different cultural paradigms and contexts. It begs the incorporation of the socio-cultural context in the teaching approaches to match the learning styles of local students. In this talk, I present what disruptive technologies such as Computational Linguistics (CL), Augmented Reality (AR), and Internet of Things (IoT), as new tools, can offer for the future of language education. For the first time in history, soon, almost everything on planet earth will be digitized connecting individuals to their homes, schools, devices, and communities. What is the impact on the quality of our language education and culture will become vital. More research on how to use these tools effectively, the attitude of learners and teachers towards them, and the effects on teaching and learning are of great importance to provide teachers, course designers, and policy makers with guidelines in these areas.

Keyword: Language, culture, human language technology, augmented reality, and internet of things

1. INTRODUCTION

Technologization on Language and Culture

This paper is not intended to discuss the comprehensive aspects of how technologies can support the language education and teaching practices. It only provides an insight on how the recent invention of technologies might affect the society and how it eventually may change some aspects of established language, cultures, and education through internet access.

About 200 years ago, scientists figured out that telegraph can be used to transfer information across the globe. But, the telegraph is no more used for communication and now being replaced by the radio, TV and finally the internet. The Internet has emerged since 20 years ago; however, the internet is more popular than radio and TVs. While the radio and TV channels are programmed and limited, the internet does not have this restriction. An internet user can surf the web for any kind of content for many hours without doing any other activities. It allows people to browse, read, and chat in anytime and anywhere. For these people, the boundary of space and time are now distorted and blended. The impact of the internet on youths is clearly seen from their attitude. It is not so strange nowadays to see young people resemble what they have seen on the internet. But, the impact on adults is not an exception.

Recently, the adoption of the internet has increased as many internet providers are lowering the subscription cost. According to "We Are Social" of world digital statistics, there are almost 90 million people (34% of the population) of internet user in Indonesia (Wearesocial, 2016). The Internet is now competing with the other forms of direct communication -- such as family, neighbors, colleagues, schools, and society -- and has significant influence to disrupt the belief and attitude of the society. Almost all of the internet users are active in social media. InMobi has reported that in 2014, 97% of mobile users in Indonesia access messaging apps multiple times per day (InMobi, 2016). Studies have shown

this is not the end of the trend. In contrast, this is just the beginning of Internet Era in human culture as ever.

For Indonesian, the time spent on social media -- like BBM, Facebook, and WhatsApp -- reaches 3 hours per day (Go-Globe,2016). Obviously, the companies, government, and industry are now using the internet to persuade people to buy attention to them. It connects the many parts of the world as if they are so closed and interrelated. The Internet has become a centralized station for humankind to connect for almost everything from education, advertisement, politics, religion, and entertainment. Which language people use is not only determined by the elites but also by the market and the societies. Nowadays, international products and services have become part of our culture. Many advertisements, movies, books, the label of products, the menu of restaurants are written in English. These examples show that local language is affected by international exposure through products, services, news, and media. Indeed, it blends the local daily language with English term and the language per se. It means the importance of learning English is increasing to catch up with the life. However, not everyone has an equal opportunity to learn English. In some Asian countries like India and Indonesia, only middle-class people in academia, industries, and urban areas have the opportunity to learn the language. The other groups of the society -- people who are living in rural areas, less educated, and poor -- are not having equal access to English education. This group almost never exposed to formal English education and bounded by their mother language and culture. For Indonesia, the challenge is even higher due to the existence of multicultural paradigms with multi-languages. As a result, this has been created a knowledge gap between the middle-class and the lower-class.

This paper aimed to provide an insight how we can help these people to prepare them to survive in the harsh globalized economy by making use of disruptive technologies.

2. DISRUPTIVE TECHNOLOGIES

In this paper, the disruptive technology is defined as a technology that creates new educational practices by the use of internet-based methods which eventually replace or complement the established learning practices. These technologies are mostly invented through the use of techniques in computer science. Some of the most relevant are human language technology, augmented reality, and Internet of Things.

a. Human Language Technology

The next phase of the progress in linguistics will come from the application of computer science. Human Language Technology (HLT) revolves in the field of understanding human speech and generating speech-like human. The main goal of HLT is to create software tools embedded with the knowledge of human language to facilitate the communication between human-to-human with different language and human-to-machine (Rashel, 2011). Two dominant applications are speech recognition and speech synthesis. The speech recognition is a technology that able to translate human language into text while the speech synthesis is the technology to generate voice-like human from a database or textual information. An example of speech recognition is available in Google Voice Recognition technology. Google allows the users to perform search query using human voice without the need to type the phone.



Figure 1. Google Voice Recognition Technology (iPhone Gets Google Search By Voice, 2016)

The other HLT is the speech synthesis. This technology can produce human-like voice from textual information like an e-book and mobile applications. For example, Google map use speech synthesis to remind the driver whether to turn left or right based on geolocation data.



Figure 2. Speech Synthesis from Google Map (Android mobile phone navigation, 2016)

The HLT offer a new kind of technology to help human interact with machine or computer by processing human speech and generating human-like voice.

b. Augmented Reality (AR)

AR technology makes use of real-world data such as sound, video or GPS data to generate computer-generated content by adding it content on top of image or video in real-time. The effect of AR on disrupting local culture is clearly visible after the trend of mobile applications. If you are an active internet user, chances are that you have heard that recently a new AR-based mobile app - Pokemon Go - entered our daily language especially in news and social media. This app makes use of Google map technology and AR to create monsters. The user will be asked to catch a Pokemon in a random place and will generate a small vibration as the user walk along. The game is so exciting for which some people has got accident (Theguardian, 2016).

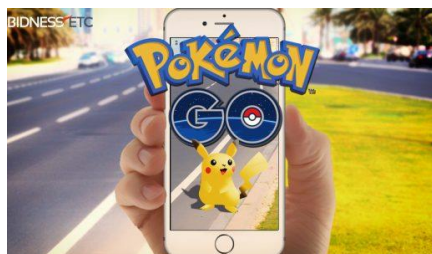


Figure 3. Pokemon Go (DicasNews, 2016)

Besides games, AR can also be used Will Powell has built a prototype real-time translation application by listening to human speech and then translates it into one of 37 languages. The application also can display the translated text onto the screen (See Figure 4). The prototype may be not yet suitable for real-time application because the server response is a little too slow for processing the information. However, future development is expected to have faster and more accurate translation.

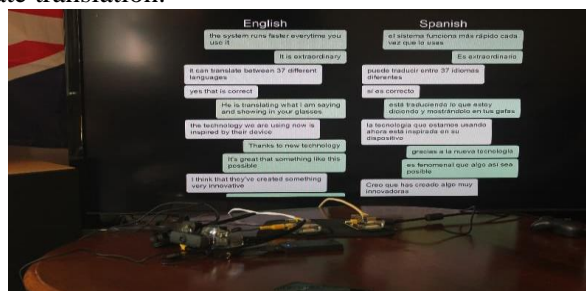


Figure 4. A transcript of a conversation is displayed on a screen (New Atlas, 2016)

These AR applications are potential to be used as a new tool to enhance the experience of the language learner by adding content to their mobile phone or wearable devices.

c. Internet of Things

The Internet of Things (IoT) is a term coined by Kevin Ashton in 2009. It refers to any real-world object equipped with internet connectivity, allowing them to send and receive data. An example of IoT is given in Figure 5. The figure shows that we can switch or monitor our home appliances such as lighting, refrigerator, washing machine, oven and stove through internet connectivity.



Figure 5. Smart Home (digitalSTROM – Smart Home, 2016)

The smart home is an example of how technology allows a human to speak with the machine. In the future, IoT device will have the ability to speak with a human through the internet. Imagine your washing machine will tell you if it has finished washing your cloth while your location far away from the house. The lighting can ask you whether it has to switch off or on.

3. IMPACT ON EDUCATION

Before we discuss how these technologies can transform the future of education, it is nice to see the current education practice. For Indonesia, many current practices in English education do not require heavy use of internet and computing infrastructures. Some of the most notable methods for teaching English are listed below:

- Grammar Translation -- Translating English to the local language.
- Natural / Direct -- Associating the meaning of English word directly.
- Audio-Lingual -- Practice Listening and speaking in English.
- Cognitive -- Understanding grammar rules and contextualizing it.
- Total Physical Response -- Coordinating physical movement with the language.
- Communicative -- Understanding through real interaction.

These teaching practices are characterized by two factors. The first factor is that these teaching methods require a confined environment in the brick-and-mortar building called schools and universities. In reality, only a few people who can afford to join these environments. Current English curricula are designed to prepare English graduate for more city and business-oriented where learning takes place within these confined environments. Students need to go to the classrooms to learn English. As a result, they have difficulties practicing English outside-the-schools as most people within the society communicate through their own local language. This factor needs to be addressed by a new system that enables students to learn English beyond the classroom.

The second factor is that the current teaching practices assume every student has similar learning speed and needs. This assumption leads to static content of material. In reality, each student has a different approach to learning, way of processing information and intellectual development levels. Felder and Brent have shown that these aspects have strong pedagogical implications (Felder and Brent, 2005). Failing to accommodate the students' needs and learning style may increase the number of drop-out due to academic difficulties. This factor calls the need for adaptive or intelligence tool to provide real-time and suitable content based on learner condition.

Studies have shown that there is no a single method suit for all context, which means that no one teaching method is inherently better to the others. To apply the same method to all type of learners, who have a different environment, attitude, and needs, is just sound inappropriate and won't work. The most obvious effect of mismatch teaching practice is that the students will get bored, tired and everything becomes a waste of time. We need to fit the method according to the learner, not forcing the learner to follow the method.

To reduce the gap between teaching practice and learners' condition, we can use the disruptive technologies. As described in previous sections, these technologies have several abilities that can mimic the act of a human. The disruptive technologies offer a new way of teaching practice and beyond the classroom. In contrast to these approaches, disruptive technologies have two characteristics. First, these technologies can use the HLT to understand and generate human speech. Imagine if your phone can translate a language in real-time. This will help the learner to understand the language anywhere beyond the classroom environment. Secondly, the AR and IoT technologies can learn through data. This technology enables a computer or a device to learn the state of a learner and provide suitable content for the learners'. In other words, several possible capabilities of these technologies as new language tools include: (i) the device can detect and display the linguistics mistake and correct it; (ii) the device can automatically translate languages; (iii) the device can generate speech. The comparison of existing teaching practice and future practice are given in Figure 6.

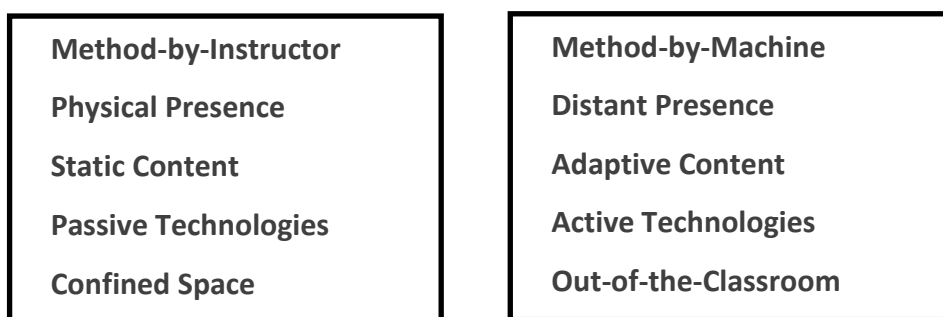


Figure 6. (left) Current teaching practices and (right) future practice using disruptive technologies

Some universities have recognized the importance of these technologies on advancing language education. For example, the Department of Linguistics at Stanford University has included computation linguistics in the curriculum to allow students to contribute in this field while others are merging with the faculty of Computer Science. These programs aim to foster better collaboration and understanding about how a computer can be used to enhance Language education.

Education will be more interesting for learners if it can include informal settings, such as homes, social media, and the internet, and more adaptable to learner condition. However, this paper is just an insight for language academia. The real challenge is the real implementation of these technologies can help the poor and rural people to have better access to education in order to improve their life and survivability. The implementation will require some changes in the architecture of schools, curriculum, and teaching practices.

4. CONCLUSION

The high penetration of internet provides an innovative and better ways for English teaching and learning practices. Recent computing technologies are emerging and in-the process of disrupting our culture and language practices. The impact of disruptive technologies is inevitable as they are reaching every corner of the society. Nowadays, almost every one of us

has a smartphone and can easily get internet access in the shopping center, providers, schools, and even from neighbors. These technologies have been affected the way we use the languages and the way we behave. Besides the negative aspects, these technologies can be used as new tools to teach English. Having a lot of options of various methods and techniques so that we are able to make an educated choice can boost the enjoyment of language learning. Implementing the most appropriate method according to learners' characteristics is the key success to the future language education.

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