Language Proficiency and Smartphone-aided Second Language Learning: A look at English, German, Swahili, Hausa and Zulu

Eva Maria Luef[1], Bethel Ghebru[2] and Lynn Ilon[3]
[1] College of Education, Department of German Education, Seoul National University, Seoul, Republic of Korea
[2] Institute of African Studies, Hankuk University of Foreign Studies, Seoul, Republic of Korea
[3] College of Education, Department of Education, Seoul National University, Seoul, Republic of Korea
bethelg@gmail.com

Abstract: Use and development of applications for smartphones (so-called 'apps') continue to rise, and it comes as no surprise that language learning apps (such as Google Translate) are immensely popular among the younger generation. But, do these apps actual help students learn a language and, if so, how is apps usage influenced by the proficiency of the language learner? Our research focused on the use of apps related to language learning in two major Korean universities. Koreans are known to be high-tech users and avid language learners, and Korea can therefore provide a good model for how education and technology intersect. We asked students studying German, Swahili, Hausa, and Zulu to inform us about the role that smartphone apps play in their language learning, both at home and in a formal education setting (e.g., classroom). Results showed that one important determiner for how apps were used was language proficiency. We further found an interaction effect between proficiency in English and the other languages, which directly impacted app use. Our findings suggest that these rather sophisticated digital and language learning students make sophisticated choices of apps based on knowledge of apps and the language learning task at hand.

Keywords: language apps, language learning, second foreign languages, less commonly taught languages, English

1. Introduction

Language learning methodologies have undergone major shifts within the last decade. The sole reliance on printed materials has been seriously challenged by electronic resources that have become available on the internet (Benson and Chik, 2010, Sockett, 2014). While most language learning in developed countries still takes place in traditional classroom settings and many students actually prefer to be taught that way (Trinder, 2016), the advent of technology-based learning has introduced new – and often innovative – methods to foreign language teaching methodology (Katyal and Evers, 2004). In particular the introduction of smartphone applications (so-called 'apps') into learning and teaching languages has brought with it new opportunities as well as challenges that will have an impact on learning and teaching methodology for decades to come (Dakowska, 2018; Rosell-Aguilar, 2017). Digital learning tools can go beyond what is commonly taught in classrooms and incorporate features that focus on specific aspects of the language learning experience (Beetham and Sharpe, 2007), for instance, pronunciation or intensive vocabulary training (i.e., *Duolingo* or *Sounds: The Pronunciation App*). In addition, digital language resources may contain more current contents on language use, whereas textbooks are typically older. The specialization as well as up-to-dateness of electronic learning resources appeals to many language learners and it has been suggested that advanced learners in particular can benefit from enhancing their learning via digital education (Green and Oxford, 1995, Leaver and Atwell, 2002, Lee, 2011, Lee and Markey, 2014). When researching the availability of smartphone apps for learning English as a second language, however, it becomes clear that the large majority of apps are designed not just for advanced but also (or exclusively) for beginning learners (see, e.g., British Council app recommendations: https://learnenglish.britishcouncil.org/apps/learnenglish-grammar-uk-edition). A central question, therefore, is whether the proficiency level that language learners have attained plays a role in their engagement with electronic online learning sources.

1.1 Digital Language Learning

Even though digital resources for language learning can offer possibilities that extend beyond traditional classroom methods, independent learning is not pursued equally by all students of foreign languages. Some studies show that 'good learners' tend to use more diverse learning strategies than do 'poor' language learners (Gerami and Baighlou, 2011, Griffith, 2008, Naiman et al., 1976). Effective language learning during adulthood can have many roots and causes (Dörnyei, 2010). Certainly, highly successful second language students

Reference this paper: Luef, E. M., Ghebru, B., and Ilon, L., 2019. Language Proficiency and Smartphone-aided Second Language Learning: a look at English, German, Swahili, Hausa and Zulu. *The Electronic Journal of e-Learning,* 17(1), pp. 25-37, available online at www.ejel.org

emphasize more active involvement and naturalistic contexts of language practice (Green and Oxford, 1995), which might predispose them to the use of electronic resources as a supplement their learning.

Recent research has shown that unsupervised, extra-curricular online learning may enable learners to progress to a more advanced level of language proficiency as compared to those learners who exclusively rely on formal instruction (Cole, 2015). In particular, the use of informal online learning sources was strongly associated with higher motivation and proficiency (Cole, 2015). These findings run counter to a dominant paradigm in foreign language learning which prioritize expert regulation of learning environments and contents on the part of the teachers (see, e.g., Comas-Quinn, 2016, Farmer et al., 2011, Richard-Amato, 1988). In order to solve these incompatible views on how to best learn and teach foreign languages with the help of digital methods, more detailed studies are warranted to determine how independent, digital learning interacts with level of proficiency in a foreign language.

The present study aims to investigate the question of how prevalent and popular the use of digital language learning apps is among learners of different proficiency levels. Specifically, we are interested to see if higher proficiency and increased willingness to engage with digital means of language learning are correlated. In order to do so, we studied the learning methods with smartphone apps of foreign language students in one of the most digitally advanced societies – South Korea – where students are especially inclined to use learning technologies. We included students who had only recently started to learn a foreign language, as well as advanced language learners in our sample to see how useful learners of different proficiency levels find language learning apps. In addition, we investigated whether the particular language studied (English, German, Hausa, Swahili or Zulu) had an impact on students' digital learning habits. In sum, these research objectives can help find answers to the larger question of which particular demographic it is that uses smartphone apps for language learning and what these users' expectations are with regard to availability and functionality of language apps.

1.2 The Korean Context

South Korea is one of the most technology-savvy societies, with the widest internet availability and fastest internet connectivity in the industrialized world (Akamai Technologies, 2017, Broadband Commission for Sustainable Development, 2016). Especially the younger generation of Koreans readily incorporates technologies into their everyday lives, and smartphones have become the electronic appliance that people rely on the most (Park et al., 2013, Shin et al., 2011). The gamut of functions for which smartphone apps are used ranges from online-shopping, smoking cessation programs, and monitoring of health to checking air quality or maintaining social contacts via KakaoTalk, among many more (Kim et al., 2013). Currently, Korea ranks third (after China and India) in terms of average number of apps used per month (App Annie, 2017). It therefore comes as no surprise that Koreans would incorporate technology heavily into their educational regimens as well and supplement their learning with apps (Luef, Ghebru, and Ilon, 2018).

Studying foreign languages has a long and geo-politically interesting history in South Korea (see Lee, 2003) where the majority of people speak at least one foreign language (typically English) at an advanced level (Park, 2009). English is the primary foreign language that is taught in Korean schools and high proficiency in the language is a prerequisite for university admission (Park, 2009). Among Asian countries, Korea currently ranks sixth in the proficiency index of English as a second language – just behind Hong Kong (see E.F. Report, 2018) – and among the younger generation, proficiency is even higher than the population mean (Butler, 2015). Other foreign languages that are part of the high school curriculum include a number of European languages (e.g., German, French, and Spanish) and Asian languages (e.g., Japanese, Chinese). The high value of foreign language education in Korea becomes evident by the existence of foreign language high schools and a university that focuses on foreign languages (Hankuk University of Foreign Studies).

Seoul National University (hereinafter SNU) was founded in 1946 and is widely considered the premier university of the country (see Times Higher Education Ranking for 2018). The German Education Department at the College of Education provides a German program for students training to become teachers of the language. Admission of students to the program is based on a rigorous selection process where the majority of new students have previous knowledge of German. A certain percentage will be admitted, however, without prior knowledge of the language. This results in a heterogeneous student body, which may be considered as a hot bed in terms of autonomous learning methodologies. Digital learning strategies can assist students of lesser proficiency to accelerate their learning processes and attempt to catch up with the more proficient

students in their program. As German ranks among the top four of the most popular foreign languages (Ammon, 2015), a large variety of digital resources, many free of charge, are available for interested students.

A largely different picture emerges for students at the African Studies program at Hankuk University of Foreign Studies (hereinafter HUFS), a private university founded in 1954. Famous for its specialization in foreign languages, the African Studies program was introduced in 1982, with Swahili as the pioneer language, followed by Hausa and Zulu. All students who are admitted to the program have little or no prior knowledge of Swahili, Hausa or Zulu (hereinafter referred to as 'African languages'). In this regard, the student body is largely homogenous. Digital technologies can be beneficial to beginners of a language by providing them with opportunities to speed up their learning and progress faster toward their learning goals. Considering that the majority of students in African languages at HUFS have little knowledge of the languages, they can benefit from available language apps. However, a smaller learning community for African languages and, therefore, fewer digital resources can have detrimental effects on how students engage with electronic learning material.

In general, Korean students are experienced and eager language learners and, given their culturally-driven preferences for technology, they provide good models for studying the education-technology interface in language learning (Luef et al., 2018). With language learning apps, as with any new development, it is important to make predictions concerning future trends to be able to adapt to what learners will likely expect from the technology in the years to come. Language learning technology is shaping up to play a large role for education in the future and thus its use and applications need to be understood by researchers today. Investigating societies who are at the forefront of digital learning – such as South Korea – can help chart a reliable course of where learning technologies should be headed and what requirements the language learners of tomorrow demand from their digital learning sources. The aim of the present study was to investigate the use of new electronic language learning applications (so-called 'apps') by students of different foreign languages at two Korean universities. Our interest was to see which learners engaged with which learning apps. Additionally, we wanted to see if there were differences that related to which foreign language was studied and *how* the language was studied. The following research questions were explored:

1. Which learners – with regard to proficiency levels – engage with which learning apps?
2. Are there differences that relate to which foreign language was studied?
3. What was the particular method how the language was studied?

2. Methods

We focused on two aspects that we predicted to have an impact on the use of language apps: (a) the proficiency level a learner has in learning their second (or subsequent) foreign language, and (b) the interaction between proficiency levels in English (first foreign language) and second (or subsequent) foreign languages (i.e., English with either German, Hausa, Zulu, or Swahili). Although, for many students, the study of German or an African language may well be their fourth or even fifth language, for purposes of this article, we will refer to the study of this language as a *second foreign language* for purposes of ease of use. We evaluated whether the mode of language learning (in class, online, study abroad) had an influence on how students interacted with online learning apps.

2.1 Participants

Forty-three undergraduate students of German Education at SNU and thirty-nine undergraduate students of African languages (with majors in Swahili, Hausa, or Zulu) from HUFS participated in our study (N=82). Participants took classes at the respective departments during the spring semester 2017 and were recruited through a combination of purposive and convenience non-probability sampling (see, e.g., Schreuder, Gregoire, and Weyer, 2001). A number of classes during the spring semester 2017 were pre-selected and all enrolled students were asked to take part in our study. The chosen sampling techniques allowed us to identify and recruit suitable participants (i.e., students studying English and one of the other investigated languages) while, at the same time, retaining some level of randomness (as no students of the selected classes were excluded). The mean age for German students was 21.7 years; the mean age for students of African languages was 22.9 years. The majority of participants were female (German: 30 or 69.8%; African languages: 26 or 66.7%). All were recent graduates from secondary schools.

Participants completed two questionnaires; one collected information on apps they used generally and for language learning, and the other questionnaire collected demographic and individual information about their language learning experiences and status. Data collection was conducted between March and May 2017.

2.2 Questionnaires

The demographic questionnaire collected information about how long students had been studying English and the second foreign language they were majoring in, how long they had been in their respective language program at their university, how proficient they rated themselves to be in English and their second foreign language, how proficient they rated themselves in those languages with regards to the proficiency of their classmates, and how often they were in contact with native speakers of the languages. The apps questionnaire asked which apps they used for which languages, how much time per week they spent using an app, and how useful they rated each app for their language. We excluded apps that were downloaded but never used from our sample. The two questionnaires were matched for individuals. One was done in class and the other online.

The questionnaires were in English as all students were proficient in the language. Furthermore, all students owned a type of smartphone. The questionnaire covered almost all students in each of the classes and there was 100 percent participation. No students were eliminated due to absence, lack of smartphone or incomplete questionnaire. We were able to get back to any students who had not completed the questionnaire initially and ask them to complete it within a short period of time.

2.3 Statistical Methods

Although we had the necessary variety of students who were using smartphones and taking classes majoring in various languages, we had an additional challenge. Given the nature of the programs and classes under study, the students were not automatically sorted by their proficiency in the language they were studying. We had no objective measure of proficiency. Yet our ability to study the impact of proficiency on the use of language apps was dependent upon classifying students by proficiency levels. Nevertheless, students have a fair idea of their own proficiency relative to others. To solve this problem, we included several possible proxy measures of proficiency in our questionnaire to students. For determining proficiency we therefore asked several questions: (a) how students rated themselves on proficiency, (b) how they compared themselves to their classmates in terms of language proficiency, (c) the number of years students had spent in the language program, and (d) the number of years students had spent studying the language. Table 1 shows the proxy measures (questions), how we measured them and a shortened reference name we will use to explain how we developed a composite proxy measure.

Table 1: Proficiency questions

Proxy measure (question)	Measurement scale	Shortened name
In which year of your foreign-language studies are you?	Measured in years	Years in language program
For how long have you been studying the language that you are majoring in?	Measured in years	Years studying language
How good are you in the foreign language you are majoring in?	1=beginner 2=low proficiency 3=medium 4=good 5=excellent	Self-evaluation concerning language proficiency
Compared to the other students in your class, how good are you in the foreign language you are majoring in?	1=less than the others 2=as good as the others 3=better than most	Self-evaluation compared to other students
Have you been to a country where the language is spoken for more than a semester?	1= no 2= yes	Travel in country of language

We were not sure which of these self-report measures would be reasonable to build a composite measure. Thus, in order to build a composite variable for proficiency, we began by looking to see which of these five measures were correlated. Our assumption was that, if modestly correlated (positively or negatively), then they were likely different measures of the same construct – language proficiency. Table 2 shows the bivariate correlations:

Table 2: Correlations amongst proficiency measures

	Years studying language	Self-evaluation compared to other students.	Self-evaluation concerning language proficiency.	Years in language program.	Travel in country of language.
Years studying language	x	**.64**	**.76**	.17	.44
Self-evaluation compared to other students.	**.64**	x	**.67**	-.07	.44
Self-evaluation concerning language proficiency.	**.76**	**.67**	x	.06	.50
Years in language program.	.17	.06	.10	x	.21
Travel in country of language.	.21	.44	.50	.21	x

Correlations over .5 occur among three variables, *years of studying the language*, *self-evaluation concerning language proficiency*, and *self-evaluation compared to other students*. We used these three variables to comprise the composite.

Since all three variables chosen to form the composite had different measurements and different distributions, we began by standardizing each measurement. We used z-scores to standardize the means and standard deviations of each of the three chosen variables. We then averaged the three together to get a composite (we added a constant "5" to get a mean of five and a standard deviation of one simply because we preferred a composite with positive values; this monotonic transformation has no bearing on results.). We now had a proficiency variable that was a continuous measure.

Because our goal is to reveal patterns of responses relative to apps, we built one more variable. We used our composite proficiency variable to build proficiency groupings. To do so, we first ordered all respondents by their score on the proficiency measure. We then divided them into four groups by looking for *natural* breaks among the proficiency scores. This resulted in grouping that, while grouping like people together, had groups of different sizes. The distribution fits, roughly, what might be expected of a normal distribution of proficiency. Table 3 shows the ranges of proficiency scores and numbers of respondents in each proficiency group.

Table 3: Second foreign language proficiency groups

Proficiency group	Range of proficiency scores	Avg. proficiency compared total sample	Number in group
1 - Beginning	4.11-4.11	19th percentile	15
2 - Low	4.30-5.16	28th percentile	37
3 - Medium	5.35-5.85	70th percentile	21
4 - High	6.22-7.67	98th percentile	9

Using these two derived proficiency measures (proficiency scores and proficiency groups), we were able to assess patterns in the rest of the questionnaire.

In a similar way, we created composite scores from self-reported English ability. There were five questions asked – we used three of them given intercorrelations. Those questions were (1) For how long have you been studying English?, (2) What is your level of proficiency in English?, (3) Compared to the other students in your class, how good are you in English?, and (4) Have you been to a country where English is spoken for more than a semester? We standardized, created a composite, and then added "5" to the score to bring z-scores into the positive range. Table 4 shows the results.

Table 4: English language proficiency

Standardized proficiency score	z-score equivalent	Avg. proficiency compared to total sample
3.00	-2.00	5th percentile
4.00	-1.00	31st percentile
5.00	0.00	50th percentile
6.00	1.00	68th percentile
7.00	2.00	95th percentile

3. Results and Discussion

Proficiency was not distributed evenly across all language groups. It is interesting to note that one of the three African language (Hausa) stood out has having a relatively large number of student who rated themselves as beginners. The other two African languages and German had less than 20 percent of student who were rated as beginning students (see Table 5).

Table 5: Number of students in each proficiency group by language

	German		Zulu		Swahili		Hausa		All Languages	
	No.	%	No.	%	No.	%	No.	%	No.	%
Beginning	5	12%	2	12%	1	13%	7	50%	15	18%
Low	13	30%	12	71%	6	75%	6	43%	37	45%
Medium	16	37%	3	18%	1	13%	1	7%	21	26%
High	9	21%		0%		0%		0%	9	11%
Total	43	100%	17	100%	8	100%	14	100%	82	100%

The 82 students from the two schools who took the questionnaire were categorized into proficiency groups, as shown in Table 4, ranging from beginner level to high proficiency level. More than 70 percent of the total students that participated in the study turned out to be in the low and medium levels. This means they were, at most, in their first and second year of the language programs. The highly proficient students were only among the German program students. Only about a fifth of the German language learners were rated in the high proficiency category while none of the African language learners were at a high proficiency level.

How did these proficiency levels affect language learning app used, if at all? Students generally feel as if they learn language through formal education. Yet, many have apps on their smartphone which assist in language learning. Table 6 shows how students in Korea depend upon their smartphones for many digital learning features.

Table 6: Number of language apps used by proficiency group

	Number of apps used for language learning	Number of apps used for foreign language learning	Percentage of apps actually used for foreign language learning
Beginning	2.7	1.7	63%
Low	3	1.6	53%
Medium	3.2	2	63%
Total	3.3	2	64%

We asked three questions regarding language learning apps on students' phones. First, how many apps total did they have that they considered they could or did use for language learning. Second, which of these did

they use for English language learning? Third, which did they use for learning the new language? In many cases, students had downloaded many more apps than they actually used for both English and second foreign language learning.

The most obvious pattern in Table 5 is that those with the most proficiency have more language learning apps downloaded than those with lower levels of proficiency – nearly double the number. Also, high proficiency students tended to use most of their apps. They downloaded a variety of apps and used about 80 percent of them.

The highly proficient second foreign language learners were comprised of only students of German. We cannot exclude the possibility that the factor 'highly proficient German learner' played a more significant role leading to these results than the factor 'highly proficient second foreign language learner'. Many of the highly proficient students of German had spent prolonged periods of time in Germany, either working or living there. Therefore their use of apps for language learning may be influenced by their experiences abroad to some degree. Inversely, the group of 'beginning' language learners consisted of 50% Hausa students and this may have biased the results toward their learning experience. Low app use in beginning students could have been driven by low app use in students of Hausa. Beginners and highly proficient language students are always, however, distinct groups of language learners and their experiences largely overlap regardless of which foreign language they have acquired (see, e.g., Dörnyei, 2010). Therefore the group of proficient German students can be seen as representative for proficient language learners and beginners of Hausa as representative for beginners of a second foreign language.

There are three possible reasons for why highly proficient language students use more apps than students of lower proficiency. First, these data might suggest that students' motivation to use language apps increased with their skill level in the studied language. Advanced students could have more interest in actively working toward improving their already-good language skills, maybe aiming at becoming more native-like in their use of language. Learning motivation may rises with increasing success in the mastery of a skill and the increased use of language apps of highly proficient students in our data might reflect that general trend.

Second, higher language proficiency might offer more possibilities for students to engage with apps in an educational way. The majority of apps might be designed to train specific language features, which is generally more interesting to advanced students as they are better aware of their needs regarding their language learning. With a certain skill level in the foreign language, learners become more adept at figuring out what they do *not* know and need to practice more intensively, and apps that train specific nuances of a language are more useful to more proficient users. If more advanced students tend to hone their studies, their use of apps on their smartphones is more targeted. They know which apps help them, focus on specific apps and use them intensively. In addition, proficient language learners are exposed to a wider variety of social situations in which the foreign language can be used. They may read newspapers in the language or even talk to native speakers - something which is rarely done by beginners or intermediate language students. This expanded social range of language use might directly lead to an expanse in the use of apps, as these students would ultimately be able to use social media and apps such as Skype in a manner that is similar to how native speakers of a language are able to use such apps.

But there is another, third explanation. Many language learning apps are built to be used by users of major languages such as users who are native to English, Spanish or French, meaning the source language for the app is one of those languages. Thus, proficiency in a major world language helps in using language apps generally. It is possible that, as students advance in their *second foreign* language (given that Korean students are always learning English), they are also becoming more proficient in English. Their ability to benefit from language apps increases as their concomitant ability in English improves.

To investigate this, we looked at the relationship between English proficiency and second foreign language proficiency along with the average number of apps used in language learning as in Figure 1. More proficient students in English language did well in their second foreign language proficiency as well. At the same time, students who are good at English generally used more language learning apps – with the exception of students with the lowest English proficiency.

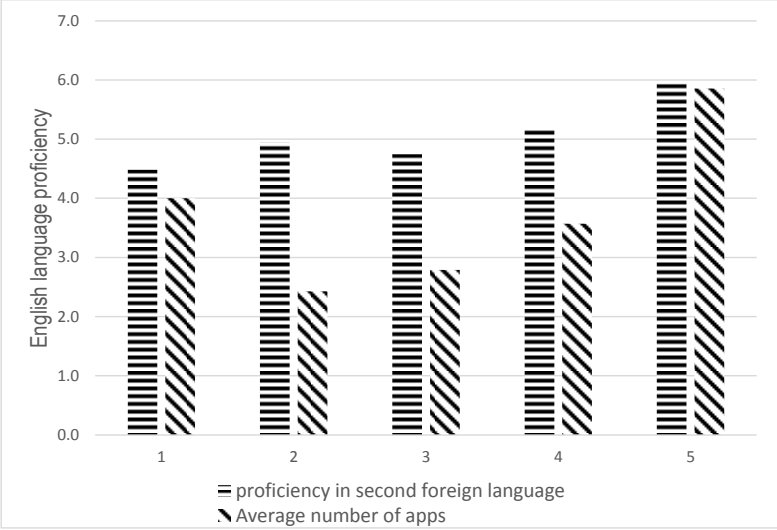

Figure 1: Comparison of English and second foreign language proficiency with number of apps (see Tables 3 and 4 for interpretation of proficiency scores).

Figure 1 shows that there is a relationship between very low and very high proficiency in both languages and more intensive app use. Students who were highly proficient in English were also generally highly proficient in their second foreign language and, at the same time, used a higher number of apps for language learning. The one exception to this overall trend was that low proficiency language learners tended to use more apps (than medium level learners, but not higher proficiency learners). Note that Figure 1 shows a slightly different result than that of Table 5. Table 5 categorized students by their proficiency in their second foreign language, whereas Figure 1 categorized students by their self-reported English language proficiency. In both cases, the general trend was that, the more proficient they were in language, the more apps they used. But, with English language learners, the lowest level users were an exception where they were somewhat more likely to use apps than the medium level proficiency English language learners. This may well be an anomaly given our sample size and the small differences in total apps used. But, it is also possible that apps use at the beginning level aids their below-average language skills.

Given that there is a fairly strong trend in using more apps the more proficient one is in a language – whether in their first or second foreign language – the question is, how likely is it that using apps is actually helpful in language learning? One might assume that this many students, who are clearly practiced in language learning and are comfortable with apps, are not making irrational decisions in downloading and using apps for language learning. But, another clue is in examining which apps are used. Table 7 shows which types of language apps are most widely used.

Table 7: Total number of language learning apps by category

App category	Total
Dictionary	86
video	39
SNS	37
Translator	37
Portal app	27
Language learning app	21
Podcast	11
News	7
Book	4
Radio	4
Music app	2
Note/ Memo	2
Forum	1
Grand Total	**278**

Students were asked to name each of the apps on their smart phone that they used, at least in some manner, for helping them learn a language. A large list of apps was obtained. We built a list by name and then categorized this list. Table 6 shows the 13 categories which resulted. Not surprisingly, dictionaries were the most widely used followed by video players, translators, and messaging (SNS) apps. SNS apps were identified to be used mostly by German language students while African language learners tended to use translator and dictionary apps. Several of the portal websites incorporate dictionary and translator functions. For example, a local Korean website called Naver incorporates dictionaries of many languages. This is in contrast to Google, for example, which creates individual apps for dictionaries and translators. These are popular portals and, given that Korea has cheap, high speed and ubiquitous cell network access, they operate effortlessly. This made it difficult to judge whether to categorize these named *apps* as separate *apps* or consider them a bundle as a *portal app*.

These categories of apps are also useful in the analysis of proficiency. Did the variety of categories of apps also vary by proficiency? We examined this in Figure 2, which shows that the variety of apps also grows as students become more proficient in the language they are studying.

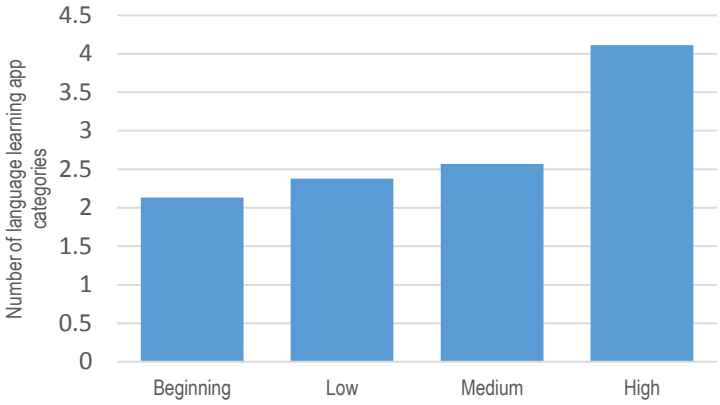

Figure 2: Average number of categories by proficiency group.

Generally, more than four diverse types of the app categories were used by highly proficient students. So, not only are more proficient students using more apps, they are using a larger variety of apps. It is not just that they are searching for more or better apps in the same category, but that they are looking for more diverse ways of exposing themselves to the language through apps.

There was a small but steady increase in app types among the lower proficiency groups (beginning, low, medium proficiency) but a relatively sudden jump from medium (2.5 app types) to high proficiency (4.1 app types). There is also a possibility that the higher number of app categories we found in the highly proficient group (of students of German) is linked to the larger variety of apps available for learning German relative to those available for learning the African languages.

As language learning gets more advanced, the contents covered increases substantially. While beginning students are limited in their use of vocabulary and grammar, proficient language students have a much larger range and amount of language learning contents that they absorb. Complexity of language learning topics increases dramatically as students reach a higher proficiency level, for instance the nuances of tenses in German or dialectal variations of Swahili. Thus a larger number of apps in total and app categories may be incorporated into the learning procedures by proficient students.

Thus, high proficiency students may be able to benefit from a broader range of app types as they can, for instance, chat via SNS messengers with their German friends or enjoy German videos on YouTube. Beginning and intermediate language learners are more restricted in what foreign language contents they can access and use in a meaningful way. In addition, the majority of advanced German students had a history of living or studying in Germany and had made acquaintances and friends there with which they stayed in contact via different communication apps. Beginners of a language tend to have less of a social network and cultural

connection to the country where the language is spoken - a fact which may restrict them somewhat in their use of electronic apps, such as Skype or SNS messengers.

This result certainly shows that there is a relationship between the use of apps and the proficiency language learning. However, we cannot determine causation. Even though the use of apps is clearly a strategy incorporated as a tool for helping to master a new language, we asked how much of the new digital learning tools are used by students.

Students estimated how much of their language mastery they could attribute to classroom learning, online learning and visiting the country of the language (or other means). We recognized, in asking, that their answers would be substantially subjective, yet such answers would give us some measure of the impact of online learning. Their responses were, in fact, instructive.

As we expected, across all the proficiency groups, classroom learning dominated the language learning process. However, a close look at the percentage of language learning spent online across proficiency groups shows a surprising outcome as in Figure 3 below. Relatively, students with lower language proficiency reported spending more time using online language learning tools than those at the higher proficiency level.

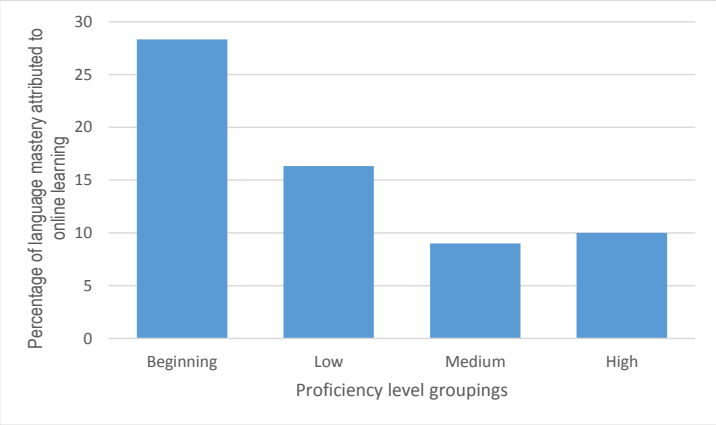

Figure 3: Percentage of online learning by proficiency group.

Lower proficiency students tended to learn more from online/ app methods. Specifically, they attributed 25% of their language mastery to online learning, whereas medium and high proficiency learners reported only 9.5% of their learning to have come from online sources. This finding is particularly interesting given what we found in the earlier tables (Table 5, Table 6) and Figure 2. Those showed a tendency of more proficient groups to use more apps and more variety of apps. Figure 3 shows that it is the beginner group that feels their mastery of the language can be attributed more to online sources than to classrooms or *real world* experiences – relative to more proficient groups. The interpretation would be that beginning groups are very focused – possibly turning to vocabulary and, possibly one language learning app or software. They spend a lot of time using this and feel that they learn a lot from these online tools. More proficient groups span out, incorporate more variety, but also incorporate more real-life and classroom experiences.

Why this is so is less clear. This is an area that needs more exploration. We have several speculations. First, beginning students may be younger and may be more prone to digital learning solutions. Online language instruction is getting more sophisticated and younger students may investigate ways to learn languages online as a flexible, self-paced way to learn a language. In language classes where students have mixed competencies, beginners may find that online resources are a good supplement to help them catch-up or keep-up with more advanced students. It is possible that all students used the same online resources, but more advanced students learn less from those resources as a means of completing their assigned classroom tasks.

4. Conclusions

The present study aimed to investigate whether the use of smartphone apps for language learning was influenced by linguistic proficiency of the learners and, further, whether proficiency levels in different first and

second foreign languages showed some interaction concerning the learners' propensity for app use. In addition, the particular method of how a language is learned (online, abroad, in class) was also investigated in order to predict app use in foreign language students.

The findings suggest that what might seem to be a simple correlation between apps use and foreign language study is more nuanced when examined in detail. Although the present study is limited by its small sample and the short range of *second d foreign* languages, it is the context of the study which sets the findings in the most interesting light. We looked at students in two of Korea's universities most suited for the study – its top university and the university specializing in foreign language study. Further, Korea is one of the most high-tech countries in the world where students regularly use technology to supplement their studies and have ubiquitous access to and readily use the internet and smartphones. Finally, these are exceptionally practiced language learners at the outset. In order simply to be admitted to the universities, they have to have scored very competitively on a college entrance exam in the English sub test – they have already mastered a second language. So, the predominant question is: how do these students, largely at the cutting edge of technology and language learning, use apps to supplement their second foreign language learning?

The results are nuanced but very informative as the world moves to online learning. First, more proficient groups tend to reach out to online sources and apps to extend their learning of language. As Table 6 demonstrated, the variety of apps used is extensive and, perhaps, even a bit surprising – video apps, music apps, news apps. So, on the one hand, as language reaches higher levels of mastery, apps appear to become a window into both a language and a culture and a means of reaching into a variety of ways of exposure.

Yet, on the other hand, beginning learners of a language showed almost the opposite pattern. Whereas they neither download nor use very many apps for learning language, they do report that their mastery of language comes, substantially, from online sources. They may not be using many apps, but there are using online sources to learn the language. These sources go beyond a mere supplement (dictionaries and translators), but are clearly an instructional tool. If our results can be trusted, then their attention is focused – it does not extend to many varieties of apps. The *trusted* part of the sentence above is that our question asking about *online sources* of learning (Figure 3) is not an exact equivalent to *apps*. We assume a parallel here if not an exact equivalent in usage of online and app tools.

There are other nuances. It is possible that with rising competence in a language, the learners become more critical of the educational efficacy of apps and may use only certain parts of apps. This can easily mean that a large variety of language apps are downloaded, possibly even accessed on a regular basis. No app, however, is used exhaustively. Experienced language learners may also be experienced *language learning tool* evaluators. They know what they want, they search for it, and they use the tools in a targeted way. The language learning *consumer* is increasingly influencing the *market* for language learning tools.

Finally, another global problem is probably at play among this experienced Korean population. The fact that most apps require students to have a good command of English to navigate through them could have an influence here. As Figure 1 showed, there was minor relationship between English language proficiency and second foreign language proficiency. The relationship is weak, but may be relevant for purposes of this discussion. Since language learning apps tend to be more available in major world language (often Western languages), it is germane to ask whether competence in one of these *major world* languages might also be a factor in using language learning apps. Future research should focus on questions, such as: Would the fact that many of these apps are designed to be used by English speakers hinder students from looking for them and downloading them on English websites? Are online tools and apps, global and networked as they are throughout the world, partly a function of whether one has, at the outset, already mastered a major world language – access to Urdu begins with mastering English, for example? Additionally, more apps that are customized to learners of certain proficiencies are needed to increase the levels of language app engagement in beginners as well as intermediate and advanced students of a foreign language.

What should certainly be discussed in the context of online/ app learning is how app learning is characterized within the framework of language methodology. An important factor is that this methodology of studying can be rather solitary (depending on which apps are used), as opposed to studying with traditional textbooks in study groups with fellow students. Advanced students might be able to better deal with a lack of social environment during studying sessions than beginner students who might need more social feedback. The

social environment that is imposed by app use can be rather unique, considering the fact that language apps are frequently used when students wait for a bus or become bored travelling. In such instances, the learner is alone with the educational content. This type of learning might be more conductive to how advanced students approach studying a language but could seem less attractive to beginning and intermediate language learners. On the other hand, certain apps can be used to learn collaboratively in study groups and the use of SNS certainly hints at some form of social learning.

Furthermore, the role of linguistic complexity should not be underestimated when discussing online language learning. Complicated linguistic structures may be hard to discern from a purely written description (as can be found in most apps). Therefore, app contents could be more accessible to advanced students who have previous knowledge of a linguistically complex problem. This could easily result in advanced students engaging more actively with language apps.

Our research has implications for language learning methodology and can advise educators wishing to encourage their students to use more electronic resources when studying a foreign language. As shown by our data, higher motivation to do so can be found among proficient students, while it may be more difficult to get students of lesser proficiency to overcome their inhibitions to learn online. Beginning students, on the other hand, seem to obtain more content from online resources than advanced students. Focusing on the benefits and advantages that are offered by electronic learning tools, while at the same time mediating the reservations some students may have about learning apps, can lead to more successful commitment of students of all proficiency levels with new learning technologies.

Acknowledgements

This work was supported by the 'Research Resettlement Fund for New Faculty' and the 'Overhead Fund 2017 of the College of Education' of Seoul National University. We thank Sinae Lee and Gou-Youn Chung for their help with data collection.

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