Dvorak's Setbacks: Barriers to Learning the Dvorak Keyboard
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Ever wondered why keyboards look the way they do? Thought the letters were placed randomly? The common keyboard layout today, named QWERTY after the first six letters in the upper left, was developed by Christopher Sholes and Carlos Glidden in 1898. The QWERTY keyboard was designed primarily on the personal preferences of the creators and early users. However, this raises the question of if there is a more systematic and improved way to organize the keys. Psychologist August Dvorak aimed to address this question when he created the Dvorak keyboard layout in 1936. In order to test his layout's effectiveness, he ran his own experiment on members of the United States Navy and found that after 52 hours of training, Dvorak speeds were up by 74% and accuracy had increased by 68% over QWERTY. Unfortunately, whenever a properly controlled and verified study tried to replicate his results, it was found that, realistically, Dvorak typing was only as fast as QWERTY typing (Bigler, 2003).

Research on the Dvorak keyboard has been primarily focused on expert users, not the average typist. For example, college students are average typists because they frequently work on computers but may not have a high words-per-minute typing rate or know how to properly touch-type. What happens when the average typist, who is only familiar with QWERTY, makes the switch? Furthermore, when they inevitably run into problems, what can be done to overcome those obstacles and achieve at least a comparable level of typing ability on Dvorak? Is Dvorak even an improvement over QWERTY for the average user?

Literature Review

To understand the possible advantages and disadvantages of both layouts, it is important to examine their history, and the history of the QWERTY keyboard is more complex than it may at first seem. One popular theory is that it was designed to put common letter pairings far apart to prevent jamming on the typewriter (Okadome, 2007). This can often be misconstrued to mean that QWERTY was intentionally designed to slow typists down; however, that has never been shown to be the case, and there is evidence to support the opposite. First of all, the second most commonly paired letters, "E" and "R," were placed directly next to each other on the typewriter, and still remain together to this day.Earlier versions of the layout instead had the period next to the "E," which is evidence that this was a deliberate decision that contradicts the jamming theory (Yasuoka & Yasuoka, 2011). Second, when compared to completely random keyboard layouts, QWERTY actually involved less total finger travel distance to type forty different books, and less finger travel distance means faster and easier typing (Onsorodi & Korhan, 2020). Third, even in actual experiments done with children typing on keyboards, the seemingly more intuitive alphabetical keyboard layout was only faster than QWERTY for simple, one-key commands on complete beginner typists (Nicolson & Gardner, 1985). Putting this information together demonstrates a strong argument against the claim that QWERTY was made to slow the typist, and in fact was made to be effective for being the first commonly used typing layout.

If QWERTY was not designed to separate common letter pairings and slow down typists, then how was it designed? In the era it was created, what mattered most to typists was quickly recording messages received in morse code, as typewriters were mostly reserved for military use and had not become commercial right away. While the specific reasons to why revisions were made across the many different prototypes are unknown, the general idea was that the inventors of the QWERTY typewriter, Sholes and Glidden, adjusted it based off personal preference and the preferences of those using and funding their invention (Yasuoka & Yasuoka, 2011). With this

in mind, it is easier to understand how such a seemingly random layout is still popular today. It was never designed to slow typists, and it had real human preferences influence most of the decisions behind the design. Since it was one of the first of its kind, this was a serviceable amount of optimization to dominate the market, and when the Dvorak layout was first suggested, it was still too expensive to manufacture a new typewriter using a layout that nobody felt was necessary to learn. In fact, QWERTY remains so dominant that research suggests the layout of the keyboard itself shapes the way words are perceived, with words typed primarily on the right hand being viewed more positively than those typed primarily by the left hand (Jasmin & Casasanto, 2012). This impact is so significant that when making new products, companies try to name their items on the right side of the keyboard!

In contrast, the Dvorak layout has a much more well-documented history and a clear design intention behind it. The list of design characteristics of the Dvorak Simplified Keyboard are as follows: optimized balance of hand and finger loading, optimized percentage of key loading per row, many possible words from the home-row alone, optimized finger travel distance while typing, optimized hand-alteration, and avoidance of awkward finger sequences (Okadome, 2007). Important to understanding just how August Dvorak based his layout around these factors is the technique known as "touch-typing," which is when a user can type using all ten fingers and without looking down at their keyboard. Certain fingers are dedicated to certain small sections of the keyboard, allowing for quick access to any key, and this technique works well even on QWERTY. The simple way to design the keyboard around this method was to put the most common letters near the center on the home-row, so that the pointer fingers would have easy access to them, and just spread out from there. Also, placing vowels and some punctuation on the left hand helped to keep most of the work on the right hand while still using both hands frequently so one would not be overworked, and typing would not be slowed by an overreliance on one hand. Such reliance on touch-typing requires lots of practice and muscle memory, so building a new keyboard around it means the average user likely will not see any improvement until they dedicate enough time to developing the muscle memory that is required. However, it does mean that expert-level users who do make the switch can benefit from increased speeds, as demonstrated in many typing contests (Okadome, 2007).

If Dvorak is made to be objectively better than QWERTY in both speed and comfort, does it actually perform when used? Similarly, how does it fare in other important aspects, such as learnability and error reduction? To answer the question of learnability, research was performed on young children directly comparing their abilities to learn typing on both QWERTY and Dvorak layouts. The results showed that when guided to proper touch-typing technique, the children would type faster on Dvorak and made fewer errors while typing (Joyce, 1989). These results demonstrate that even with fully novice typists, Dvorak can already produce faster and more accurate typing. Also, as mentioned previously, the Dvorak layout has shown promise in professional typing contests, with a speed increase of at least 10% over those who use the QWERTY layout (Okadome, 2007). Additionally, in terms of comfort, anecdotally the Dvorak keyboard receives praise from just about anyone using it, claiming reduced wrist strain and finger fatigue (Tenebaum, 1996).

The Current Study

The purpose of this study is to examine the difficulties an average QWERTY typist has when they attempt to switch to the Dvorak layout and potentially contribute to the mass adoption of the Dvorak keyboard, much like how the French AZERTY keyboard was updated on a national scale (Feit et al., 2021). This is important because it contributes to the larger body of

Dvorak research and fills arguably the most significant gap in research on actually getting mass adoption of the layout. Anyone looking to potentially improve their typing experience would be interested in the results of this study, and the information gathered can be used to assist anyone learning the Dvorak layout. The hypothesis of this research is that the most common problems that will arise when switching from QWERTY to Dvorak are an initial decrease in speed, feelings of frustration or similar negative emotions, and QWERTY muscle memory decreasing Dvorak accuracy.

Method

Participants

Participants were nine undergraduate students from a variety of backgrounds. They were recruited via convenience sampling, as all nine had to volunteer after being informed of the experiment either through a recruitment email or word-of-mouth. Participation was further incentivized through a $10 Amazon gift card that each participant would receive.

Materials

Materials used for this study included two keyboards of similar design (one QWERTY and one Dvorak), a laptop with internet access, the website typing.com and its typing tests and Dvorak specific lessons, a phone timer, nine Amazon gift cards that were each worth $10, and a step-by-step instruction guidebook (see Appendix C) created for setting up the Dvorak layout through Windows to be used on any QWERTY physical keyboard. Participants' typing speed in words-per-minute and percentage accuracy were measured automatically during the typing tests by typing.com, and the learnability and comfort of the Dvorak keyboard were measured by responses on the provided surveys. There were a total of three surveys given to each participant: one pre-test survey that gathered information on general typing experience (see Appendix A), and two post-test surveys given after each typing test to assess what the participants' reactions were to typing on the Dvorak keyboard. The second post-test survey included two additional questions that the first did not, as they were more appropriate to ask after both sessions (see Appendix B).

Research Design

A within-subjects repeated measures design was used for the purpose of this study. All participants received the same procedure. The main independent variable of concern was the type of keyboard that was being used, operationalized as either the QWERTY keyboard or the Dvorak keyboard. The dependent variables of concern were speed, operationalized as a words-per-minute score from a three-minute typing test, and accuracy, operationalized as a percentage of correctly typed keys during the three-minute typing test.

Procedure

Each participant was asked to meet at the testing location at an agreed upon time and first review and sign the informed consent document. The location was already prepared with the proper materials ready, including having the laptop connected to typing.com, the two USB keyboards ready to plug in for typing, the digital surveys prepared, and copies of the guidebook available. First, the participant filled out the pre-test survey. Second, they performed a three-minute typing test found on typing.com using the QWERTY keyboard. Third, the participant was asked to practice the Dvorak keyboard for 15 minutes using the Dvorak lessons found on typing.com. Since typing.com split their Dvorak lessons into three parts and it was vital that subjects were familiar with all keys on the layout, they were given five minutes for each part, ensuring they did not waste all their allotted time only learning the home row in the first lesson. This was timed by a phone timer, and the duration of the testing was only meant to help

familiarize the participant with the Dvorak keyboard, so no records of their progress were tracked. Fourth, after their time was up, the participant was then asked to perform a three-minute typing test using the Dvorak keyboard.

When both of the three-minute tests were completed, the participant was asked to fill out the first post-test survey. Then the participants scheduled their next meeting within one to seven days, and they were given the handout (Appendix C) to allow them to practice on their own if they desired. The time away served as a measure of interest to see if any participants would actually practice on their own, and the variability of time spent away was necessary to accommodate scheduling time for the testing. The entire process lasted for about 30 minutes, with the second session being slightly shorter due to not needing another pretest survey. At the end of the second session, the participants were given their gift cards.

Results

Before testing the study hypothesis, the data was analyzed using descriptive statistics. The main study variables included typing performance and typing experience on both a QWERTY and Dvorak keyboard. Typing performance was operationalized as speed in words-per-minute and percentage of correctly typed keys. Typing experience was operationalized as the responses given on surveys asking for "feeling" questions and background information. For the typing performance variable, the mean, standard deviation, and range per keyboard were calculated. For the typing experience variable, the responses for each survey question were coded and categorized. The main study hypothesis was tested using inferential statistics and descriptive statistics. It was hypothesized that the most common problems that would arise when switching from QWERTY to Dvorak were an initial decrease in speed, feelings of frustration or similar negative emotions, and QWERTY muscle memory decreasing Dvorak accuracy. The inferential analysis was a paired samples t-test. In the analysis, keyboard layout was the independent variable, with participants first typing on QWERTY before then switching to Dvorak. The dependent variables were typing speed in words-per-minute and percentage of accurately typed keys.

Descriptive Statistics

For the typing performance variable, the mean typing speed was 27.1 words-per-minute with a standard deviation of 17.6 words-per-minute and a range of 7 to 64 words-per-minute, and the mean accuracy was 95.1% with a standard deviation of 5.2% and a range of 77% to 99%. The typing experience variable was broken down by each survey question. Question 1 of the pre-test survey asked about QWERTY familiarity, with two responses of below average, four average, and three above average. Question 2 asked about Dvorak familiarity, with all nine responses indicating no experience. Question 3 asked about typing style, with four responses claiming to fully touch-type and five responses claiming a more hybrid style that still requires glancing at the keys or not using all fingers. Question 4 asked about how the individual learned to type, with four responses only from typing classes, two responses only being self-taught, and three responses being a combination of typing classes and self-taught. Question 5 asked about primary keyboard use, with four responses being formal writing, one response of informal writing, four responses of both formal and informal writing, and one response of video editing. The final pretest question asked about experience on any other keyboards, with eight responses of no experience and one response of a Japanese keyboard.

For post-test questions, any repeat questions for the second session had their responses counted with the original responses from the first session. For example, Question 1 asked which of the two keyboards was preferred, and all 18 responses chose QWERTY. Question 2 asked to

identify specific problems while typing on Dvorak, with nine responses not knowing key locations in general, five responses confusing key locations with where they would be on QWERTY, three responses finding punctuation locations confusing, two responses saying the hand movements made while typing were uncomfortable, two responses finding the top and bottom rows to be more difficult than the home row, and one response not liking the placement of the vowels. Question 3 asked about emotional state while typing on Dvorak, with nine responses of some variation of frustration, eight responses of intrigue or interest, six responses of confusion, one bored response, one satisfied response, one fun response, and two responses that could not be interpreted. Question 4 asked the individual what they thought could be done to improve their Dvorak typing ability, and 15 responses were simply having more time to practice, with two responses that felt learning proper touch-typing technique would help, one response wanted to move the punctuation and another asked for more of a general compromise between the two keyboards, one response found looking at the keyboard helpful while another suggested having a blank keyboard would force memorization of the keys, one response wanted a physically different-sized keyboard, and one response was unsure if any changes made could help. Finally, Questions 5 and 6 only appeared on the very last survey, with Question 5 asking if any of the changes made on the Dvorak keyboard were beneficial, with five "Yes" responses, three "No" responses, and one unsure response. The final question asked if there had been any Dvorak practice in between the two sessions, and all nine responses said that they had not practiced.

Inferential Statistics

A paired-samples t-test was conducted to compare typing speed on both QWERTY and Dvorak keyboards. There was a significant decrease in typing speed from QWERTY to Dvorak, $t(8) = 8.66$, $p = 0.00001$. The mean typing speed of QWERTY was 42.3 ($SD = 11.9$), while the mean typing speed for Dvorak was 11.8 ($SD = 3.1$) as shown in Figure 1.

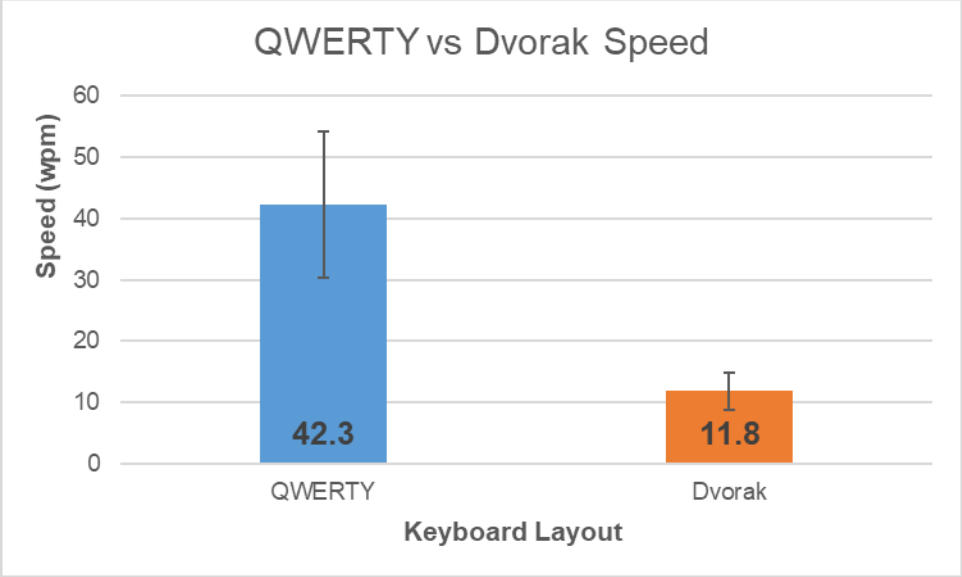

Figure 1. Mean values for QWERTY and Dvorak typing speeds, measured in words-per-minute, with standard deviations. Dvorak is significantly slower.

Another paired-samples t-test was conducted to compare typing accuracy on both QWERTY and Dvorak keyboards. There was not a significant decrease in typing accuracy from QWERTY to Dvorak, $t(8) = -0.22$, $p = 0.42$. The mean accuracy of QWERTY was 94.9 ($SD = 3.7$), while the mean typing speed for Dvorak was 95.4 ($SD = 6.4$) as shown in Figure 2.

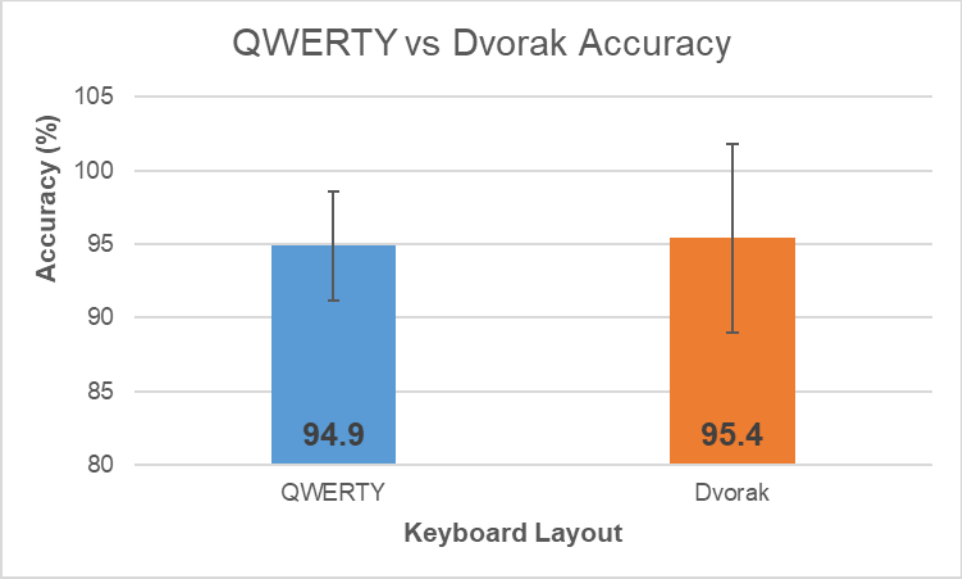

Figure 2. Mean values for QWERTY and Dvorak typing accuracy, measured by percentage of correctly typed keys, with standard deviations. There is no significant increase or decrease.

To test for improvement from session one to session two, a paired-samples t-test was conducted to compare typing speed on the first session of Dvorak typing and the second session. There was a significant increase in typing speed from session one to session two, t (8) = -4.99, p = 0.0005. The mean typing speed of Dvorak session one was 10.8 (SD = 2.5), while the mean typing speed for session two was 12.9 (SD = 3.4) as shown in Figure 3.

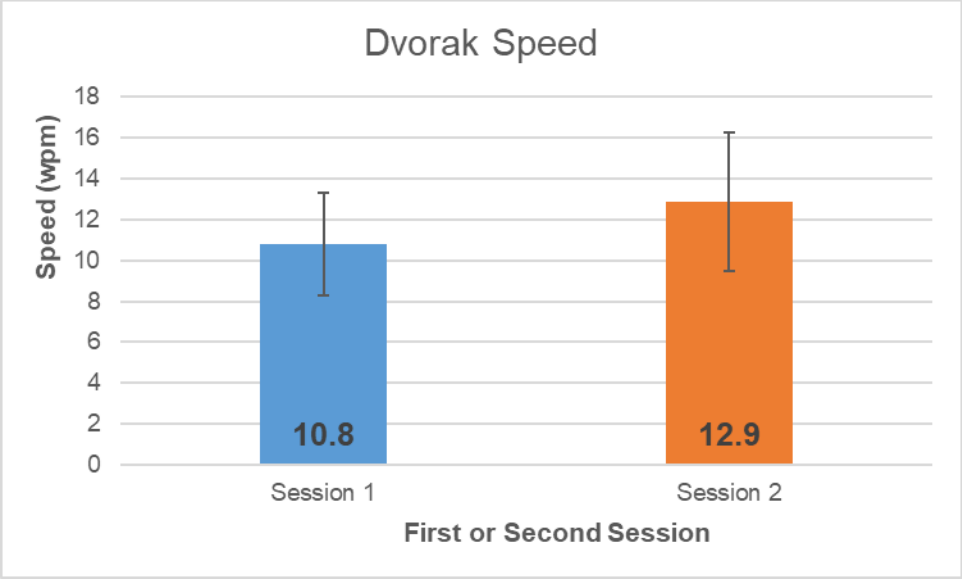

Figure 3. Mean values for Dvorak session one and session two typing speed, measured in words-per-minute, with standard deviations. There is a significant increase from session one to session two.

Another paired-samples t-test was conducted to compare typing accuracy from the first session of Dvorak typing and the second session. There was a significant increase in typing accuracy between session one and session two, t (8) = -3.51, p = 0.003. The mean accuracy of Dvorak session one was 94.4 (SD = 6.9), while the mean typing speed for session two was 96.3 (SD = 6.2) as shown in Figure 4.

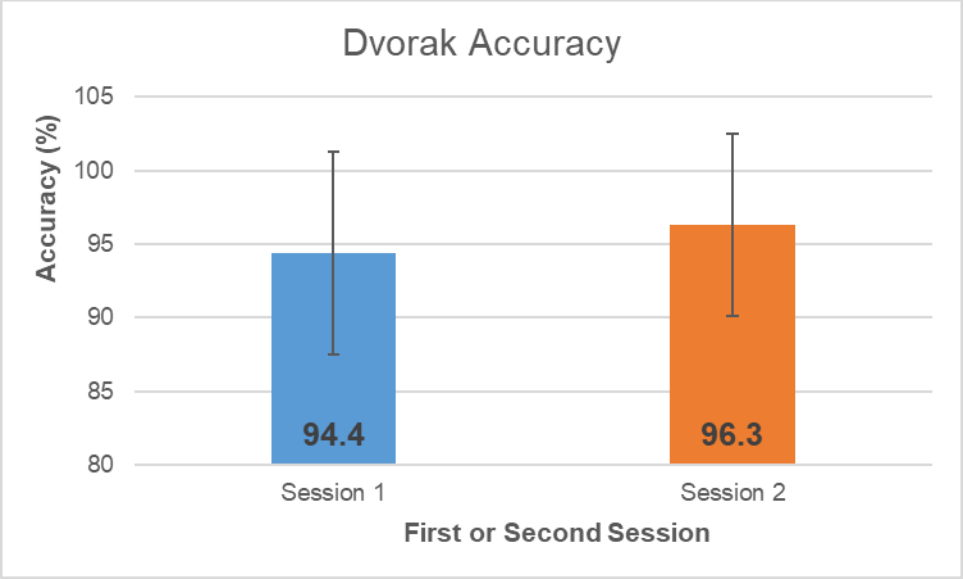

Figure 4. Mean values for Dvorak session one and session two typing accuracy, measured by percentage of correctly typed keys, with standard deviations. There is a significant increase from session one to session two.

To check if this improvement from session one to session two was only specific to Dvorak, a paired-samples t-test was conducted to compare typing speed on the first session of QWERTY typing and the second session. There was a significant increase in typing speed from session one to session two, t (8) = -2.42, p = 0.021. The mean typing speed of QWERTY session one was 41 (SD = 11.8), while the mean typing speed for session two was 43.6 (SD = 12.5) as shown in Figure 5.

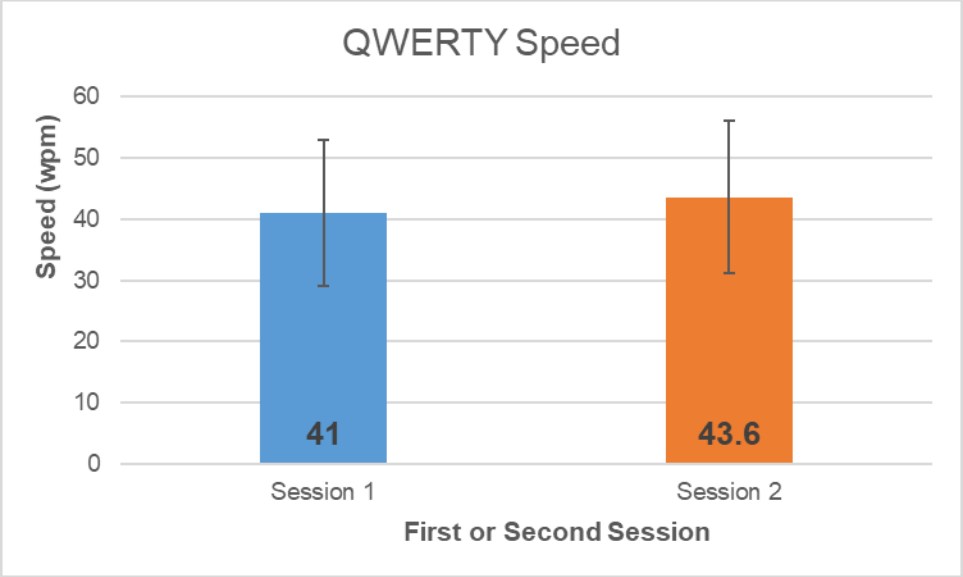

Figure 5. Mean values for QWERTY session one and session two typing speed, measured in words-per-minute, with standard deviations. There is a significant increase from session one to session two.

Another paired-samples t-test was conducted to compare typing accuracy from the first session of QWERTY typing and the second session. There was not a significant increase in typing accuracy between session one and session two, t (8) = -1.11, p = 0.150. The mean

accuracy of QWERTY session one was 94.6 (*SD* = 4.4), while the mean accuracy for session two was 95.2 (*SD* = 3.1) as shown in Figure 6.

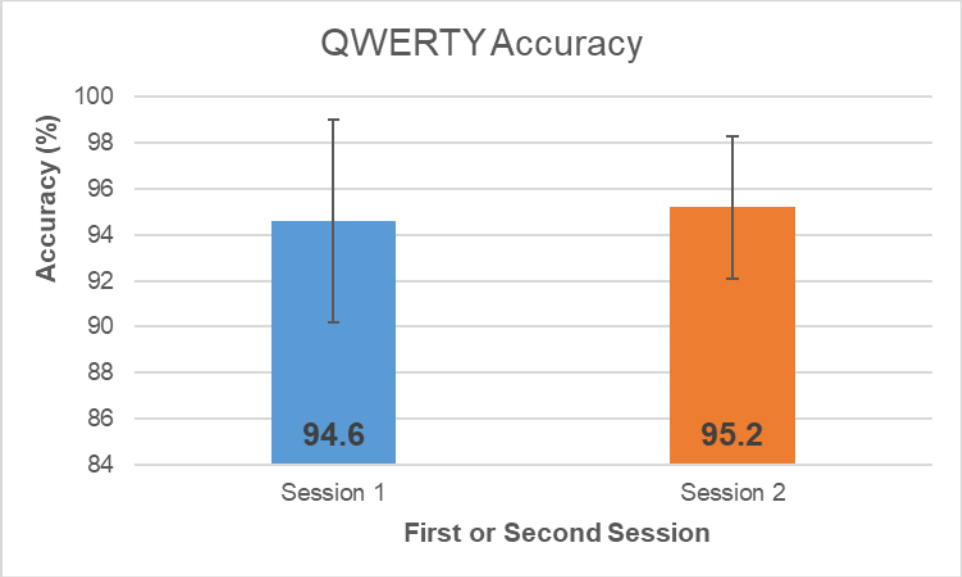

Figure 6. Mean values for QWERTY session one and session two typing accuracy, measured by percentage of correctly typed keys, with standard deviations. There is no significant increase or decrease from session one to session two.

Discussion

Overall, a couple of barriers to learning the Dvorak keyboard can be identified from the results of this research. First, there is an initial decrease in speed, as Dvorak typing speeds were roughly only a quarter of the typing speed on QWERTY. This problem may further explain the abundance of frustrated and confused responses on the survey and may also explain the lack of motivation to practice Dvorak between sessions. A potential solution to this problem comes from survey responses, as having more than a total of 30 minutes of Dvorak training time would certainly result in improved Dvorak speeds, especially when considering the significant increase in speed from session one to session two. Another potential solution comes from subverting the transition from QWERTY to Dvorak entirely by offering a Dvorak keyboard option in typing classes, since a majority of participants claimed that typing classes were impactful for learning to type. These results do support the hypothesis, as the problems that had been predicted were an initial decrease in speed and the presence of negative emotions, such as frustration. Past literature suggests Dvorak to be faster than QWERTY typing, however that is only when examining experts or complete novices. As it turns out, an average typist will find Dvorak to actually be slower, at least when only given 30 total minutes to practice on it. Perhaps more time could result in surpassing QWERTY, but, then again, maybe an average typist will always type faster on QWERTY.

A second, smaller problem that was identified was awareness. None of the participants had any prior experience with the Dvorak keyboard, and only one had any prior experience with anything other than QWERTY. This is in spite of the fact that Dvorak comes as a built-in keyboard setting that can be enabled on both Windows and Mac devices, without the need to buy a Dvorak specific keyboard. The hypothesis did not account for awareness to be a problem, although, realistically, it should have, as even the researcher had not heard of this keyboard before beginning their investigation. The reason why awareness is such a problem is because without any prior exposure to this keyboard, the participants only had a total of 30 minutes of

training time, and without the handout, they would have had no idea that they could even practice on their own. If the average typist assumes QWERTY to be the only option, they will never improve on Dvorak, much less even attempt the switch.

A third, specific problem was muscle memory. Five responses specifically identified it as a problem when switching from QWERTY to Dvorak, which could explain the significantly slower typing speeds. In order to maintain similar accuracy, participants would have to first resist the urge to default to a key's location on QWERTY, then look down at the keyboard to deliberately search for the new location. This, however, does not support the hypothesis, whichpredicted that muscle memory would result in a decreased Dvorak accuracy, but instead Dvorak actually scored slightly higher, with no significant difference between the two keyboards in terms of accuracy. What is even more interesting is that all typing scores for both keyboards improved (with the exception of QWERTY accuracy which remained the same) from session one to session two, which suggests that while learning and improving on Dvorak, QWERTY typing ability was not being overwritten. The best analogy for this discovery is similar to how learning a foreign language may be tricky because one is used to their native language, but as one improves in the foreign language, they do not become worse at speaking their native one. Past research has nothing to say on this topic, and it is one that would be interesting for future research to explore.

There were some limitations that could have a significant impact on these results. As mentioned, the very limited training time almost certainly impacted Dvorak speed scores, as they could not even get close to QWERTY typing speeds. With more time and familiarity, a proper comparison in scores could be conducted to see if Dvorak does actually result in faster typing for the average typist. Additionally, allowing the participants to see their typing results may have contributed to the overall improved scores for the second session, as research from Guadalupe and Alvero (2021) suggests any amount of performance feedback improves scores. The small sample size of nine participants meant that a trul representation of the average typist may not have been captured. While there was a fairly even split in QWERTY familiarity from the survey, it is still possible that certain demographics of typists were not represented. This is especially concerning when considering typing use responses, as a majority of responses were for writing, with a focus on formal writing. Perhaps Dvorak is better for programmers, or QWERTY is better for informal writing? Another limitation could come from the unclear instructions of the typing test, as many participants were unsure if they should correct their errors as they typed or leave them as is. This would impact mostly accuracy scores, though speed would also likely decrease when correcting mistakes. One final limitation comes from the structure of the surveys. With open-ended responses and questions that often required more clarification, truly interpreting and gaining meaningful responses was a difficult task, and many responses may have been lost in the process of misunderstanding or poor categorization.

Future research could aim to replicate this study with more time and participants to not only help solidify common obstacles while switching, but also to answer the more important question of if the switch is even beneficial in the first place. It does not matter if there are solutions to the problems faced when switching from QWERTY to Dvorak if the switch itself does not result in a meaningful improvement in typing ability. Another measure future research could incorporate is common error keys. This would allow closer inspection of which letters or areas of each keyboard tend to be problematic, and if errors can be matched to correct responses, there could be an objective measure of how many Dvorak errors were due to QWERTY muscle memory compared to how many were just simple mistakes. One final large change that future

researchers could implement is looking at other keyboard layouts, such as the Colemak keyboard, a keyboard designed to only change a couple of QWERTY keys to balance familiarity with performance (Stokel-Walker, 2013). Perhaps switching from QWERTY to Colemak produces similar problems as switching to Dvorak, and it may be similarly ineffective to make the switch. Or perhaps some keyboards are improvements with easy switches, while others are more difficult to learn and do not even improve typing ability.

In the end, there are an abundance of problems any average typist can expect to encounter if they choose to switch to Dvorak. From slower initial speeds, feelings of frustration and confusion, lack of motivation, muscle memory, and so on, the process is not an easy one. It takes time and perseverance, but for the right person the change just might be worth it. Not everyone thinks that Dvorak is for them, and that is perfectly fine. Despite the claims that Dvorak is objectively better than QWERTY, the truth is that keyboards are just tools for humans to interact with computers, and preference is the ultimate deciding factor. The main goal of this research was to initially inspire a mass migration to the "better" keyboard; however, after the final results came in, that goal has changed. Now the only hope is to raise awareness of things that are often overlooked and provide recommendations for those seeking alternatives due to their dissatisfaction with the status quo. With the free online and built-in resources available, switching to any particular keyboard is easier than ever. In fact, PKT Technologies revealed a programmable keyboard that uses individual screens for each physical key, allowing not only for quick keyboard switching that is displayed correctly, but also keys that light up in sequence or in different colors to help teach typing (PR Newswire, 2020). Regardless, whether it be QWERTY, Dvorak, Colemak, or something else entirely, the researcher hopes to help everyone find the keyboard that is just right for their specific needs.

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Appendices

Appendix A

PRE-TEST QUESTIONS:

1. How would you describe your level of experience with the QWERTY keyboard layout?

2. How would you describe your level of experience with the Dvorak Simplified keyboard layout?

3. What is your typing style (for example, touch-typing, hunt-and-peck, etc.)?

4. How did you learn to type?

5. What is your primary use for typing (for example, formal writing, informal writing, programming, etc.)?

6. Do you have any experience with other keyboard layouts? If yes, then which ones?

Appendix B

POST-TEST QUESTIONS:

1. Which keyboard did you prefer using?

2. What challenges arose when typing on the Dvorak Simplified keyboard?

3. How did you feel when learning the Dvorak Simplified layout (for example, frustrated, confused, intrigued, etc.)?

4. What techniques or changes could be implemented to make learning the Dvorak Simplified keyboard easier for you?

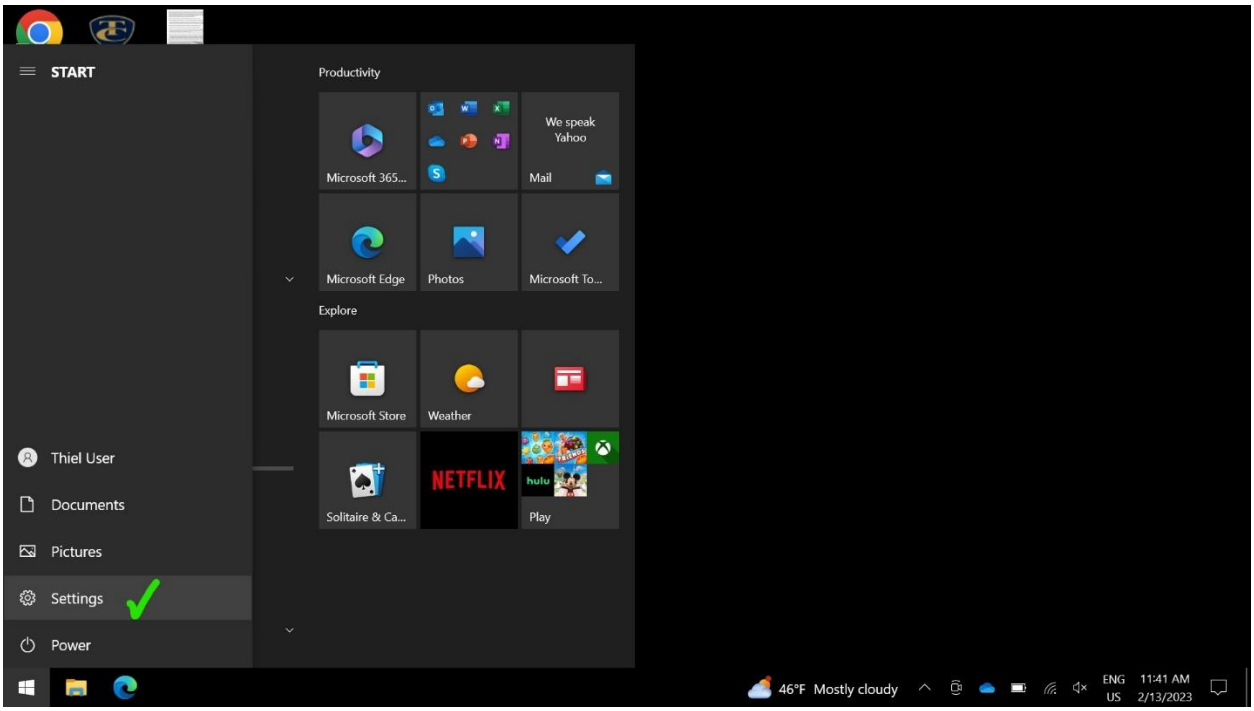
5. Did you find the changes made to be beneficial when typing?

6. Did you practice the Dvorak layout at all on your own? If yes, for how long?

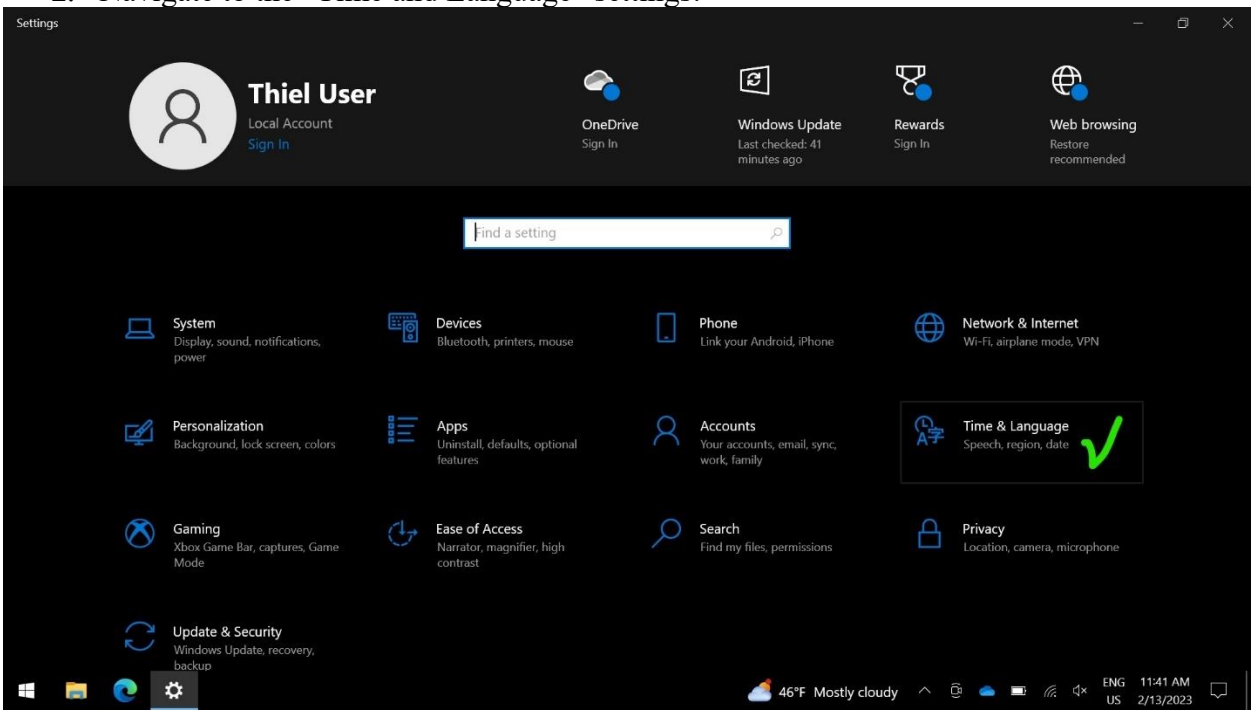
Appendix C

HOW TO SET UP DVORAK ON WINDOWS 10

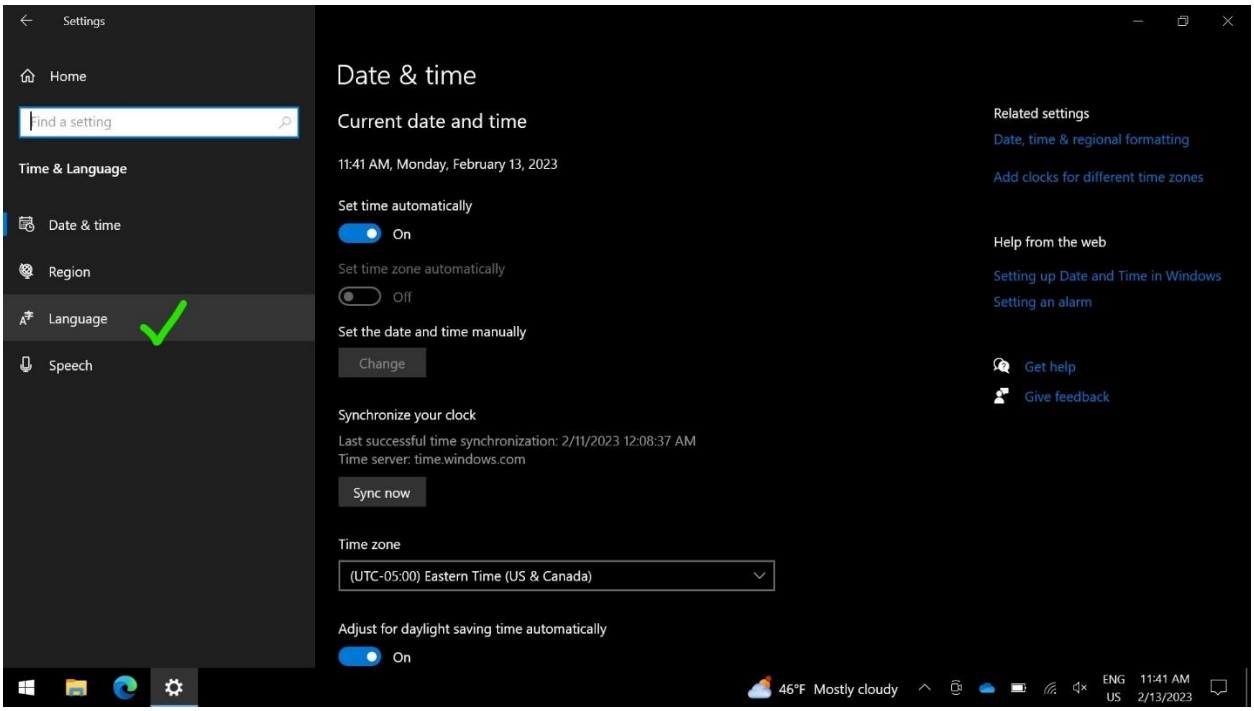
1. Navigate to the “Settings” menu:



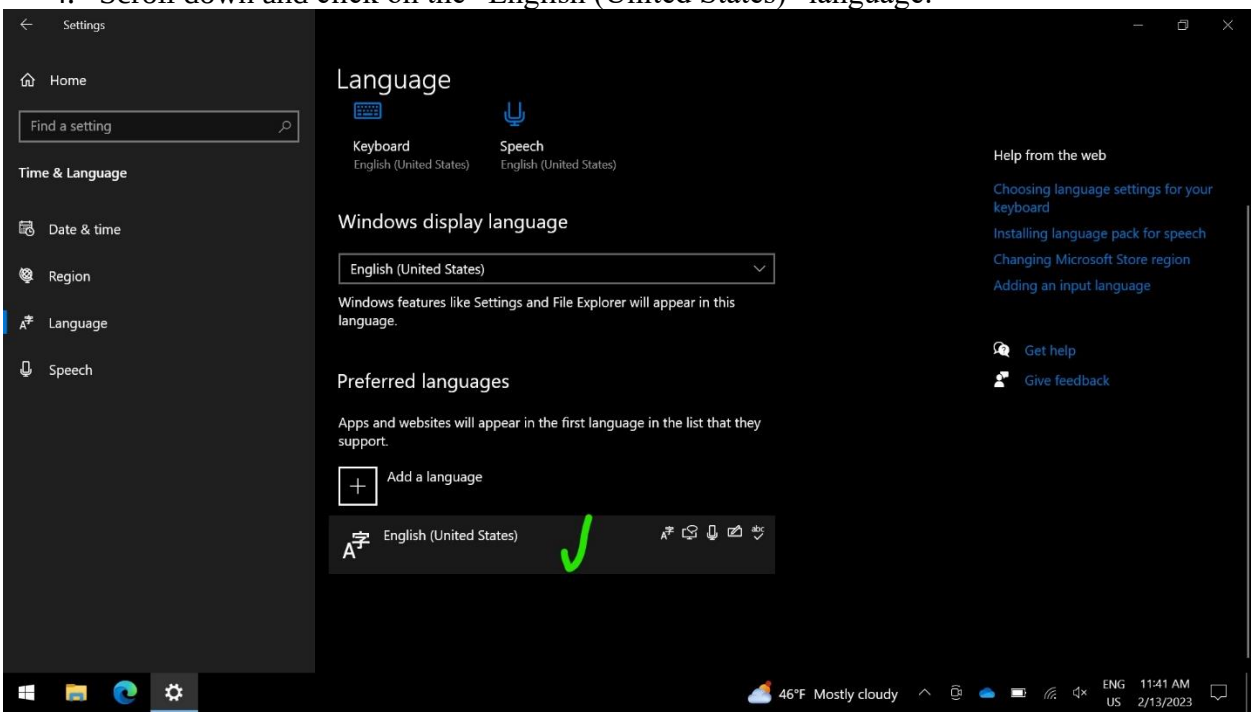
2. Navigate to the “Time and Language” settings:



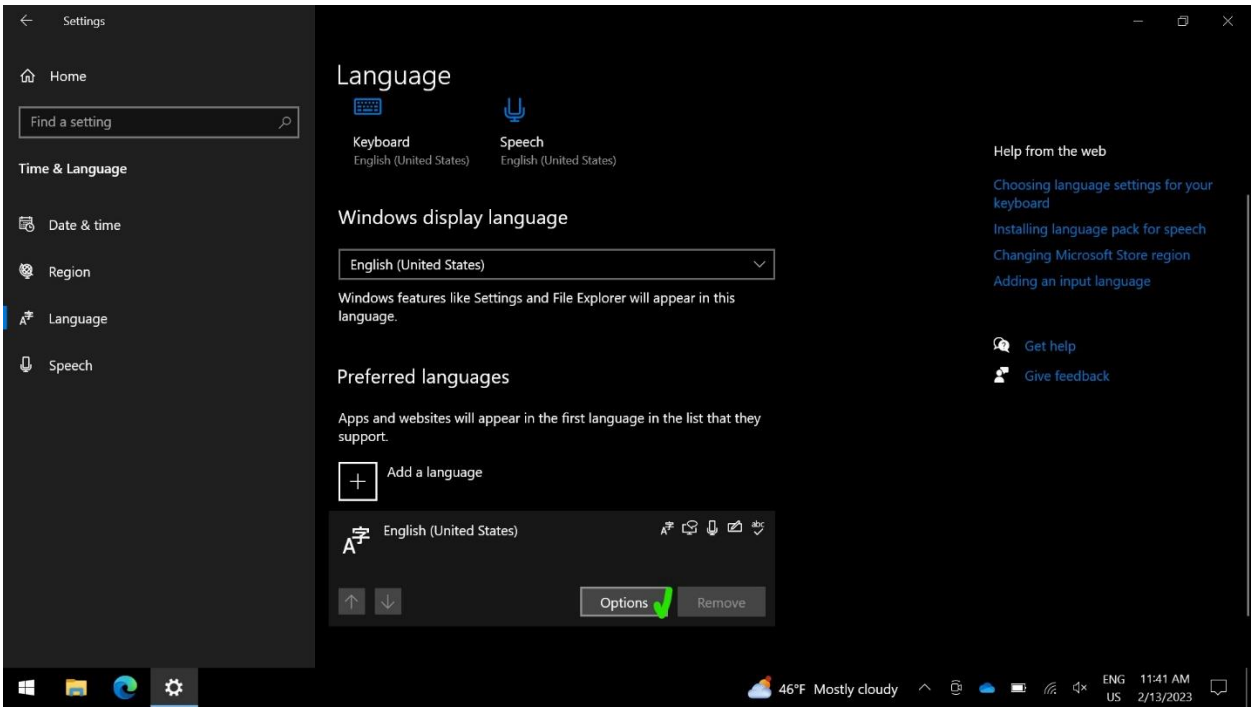
3. Navigate to the “Language” tab:



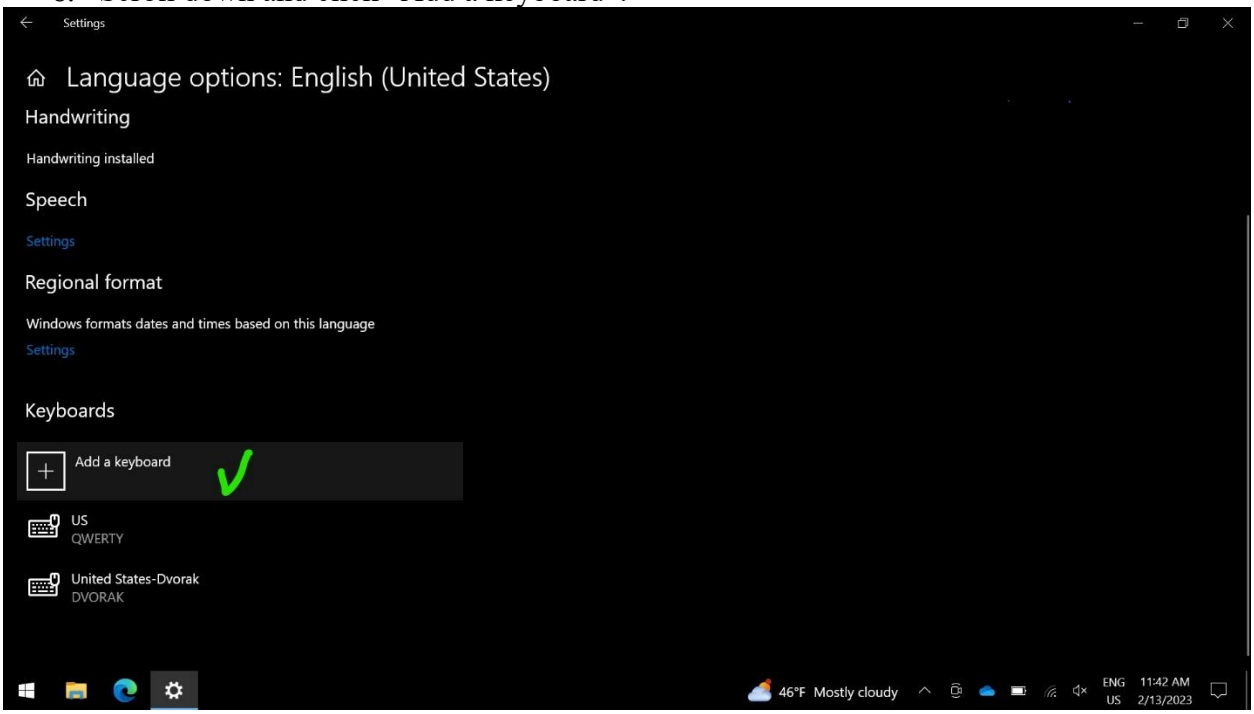
4. Scroll down and click on the "English (United States)" language:



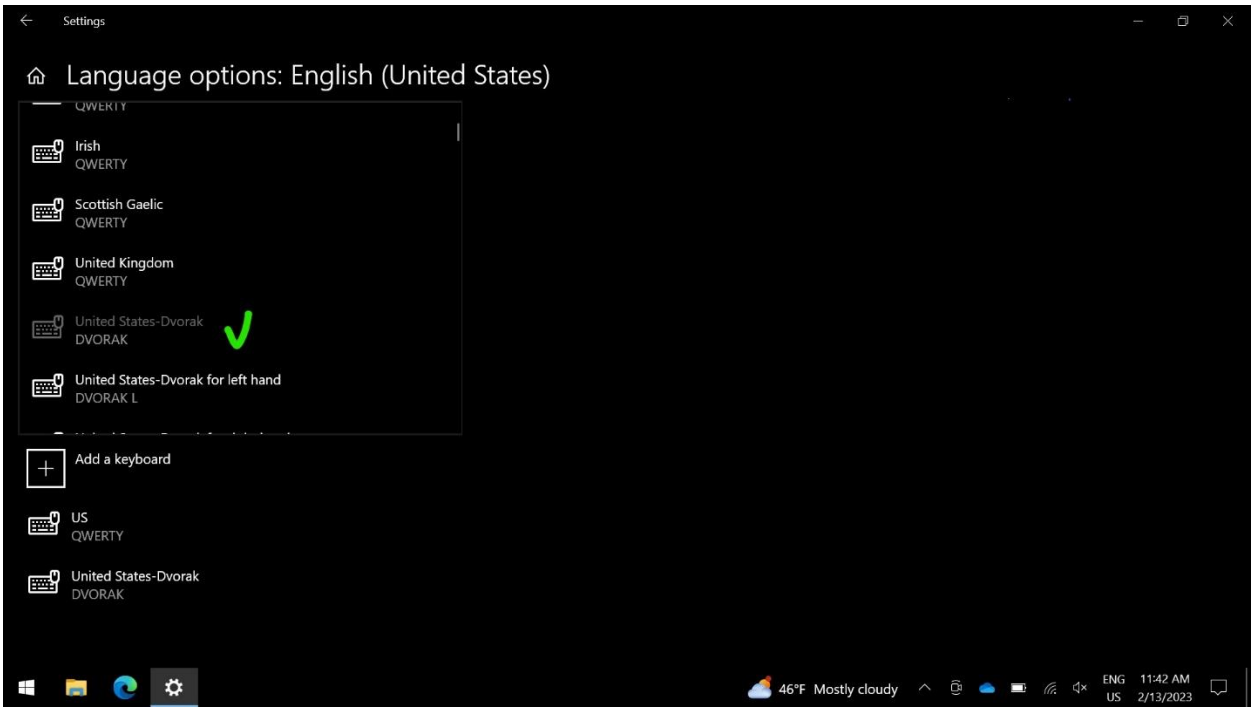
5. Click "Options":



6. Scroll down and click “Add a keyboard”:



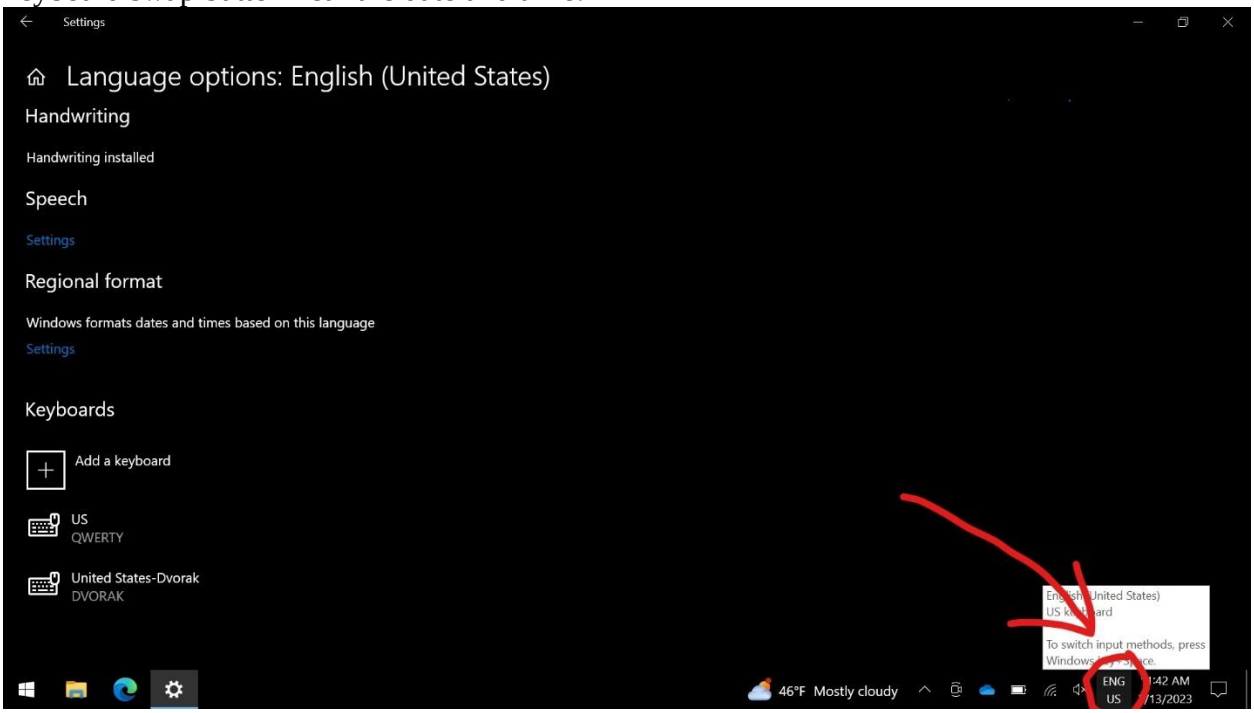
7. Find the “United States-Dvorak” option and click it:

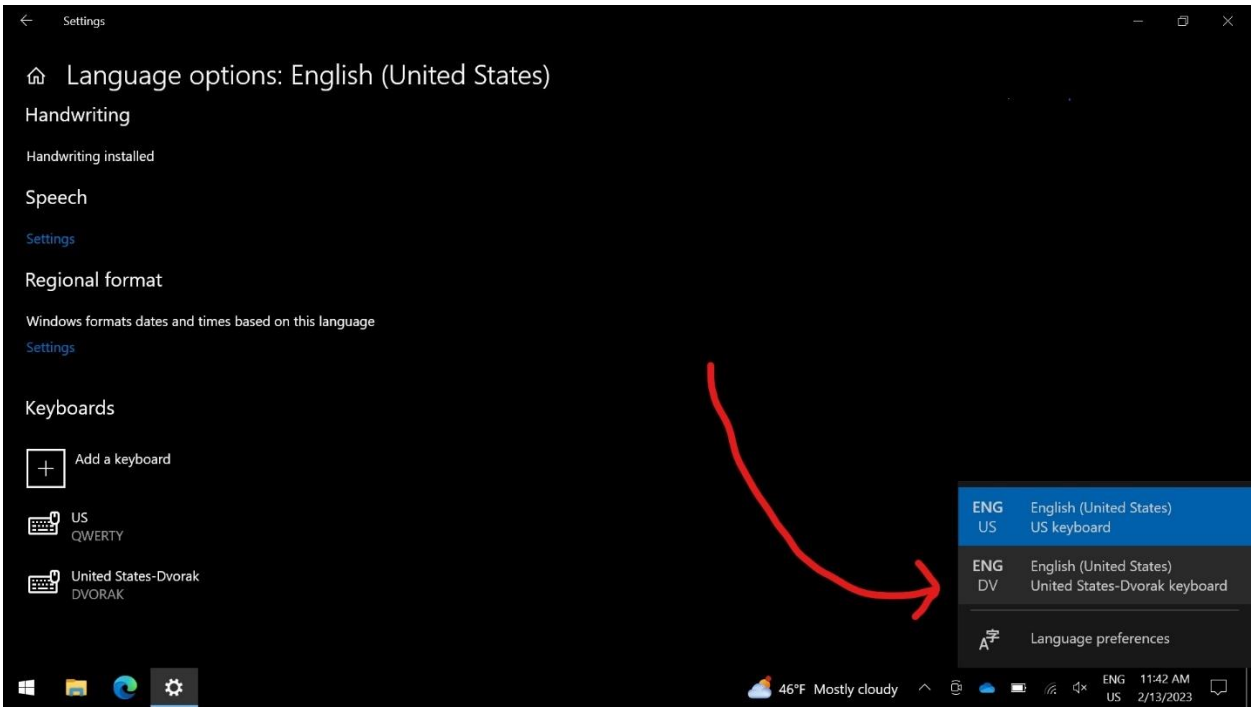


8. You are now ready to use Dvorak.

HOW TO USE DVORAK ON WINDOWS 10

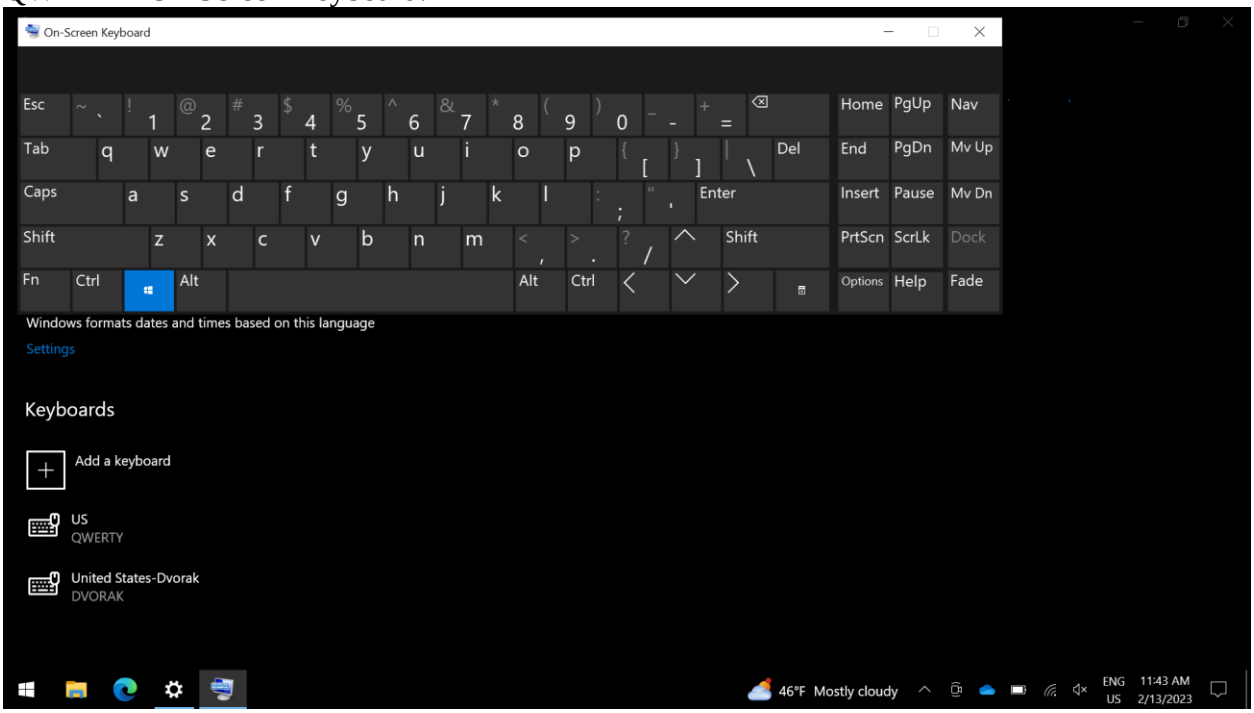
To swap keyboards quickly, either hold the “Windows” key and press “Space” or click the keyboard swap button near the date and time:



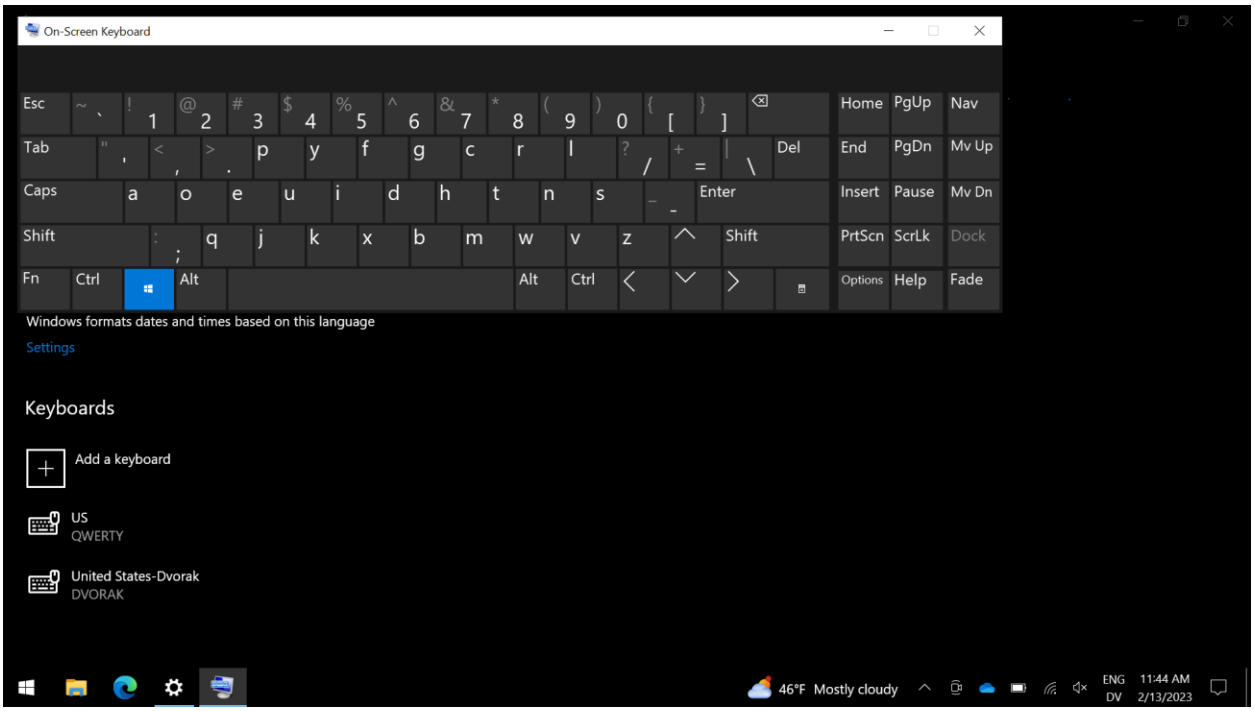


A helpful tool for knowing where your inputs are on an unlabeled or incorrectly labeled keyboard (such as a QWERTY keyboard using the Dvorak layout) is the "On-Screen Keyboard" which can be enabled by holding the "Windows" key, "Control" key, and pressing the"O" key (keep in mind your "O" key may be moved if you are still on the Dvorak layout).

QWERTY On-Screen Keyboard:

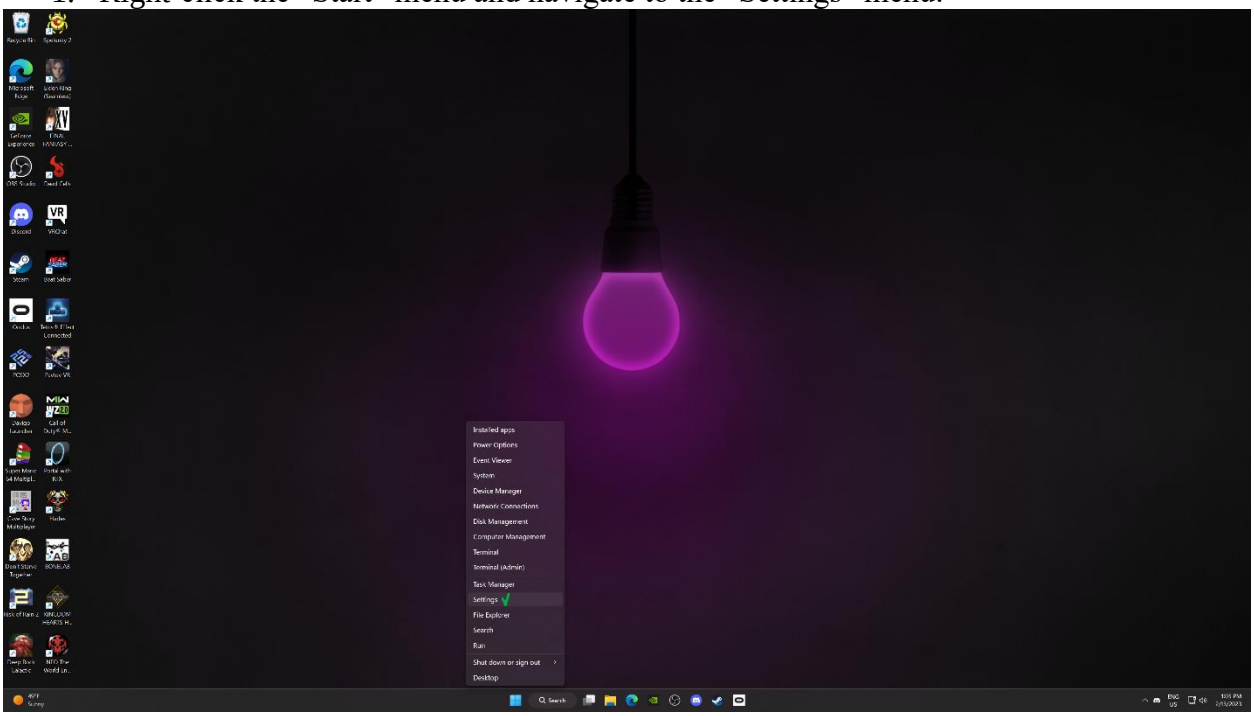


Dvorak On-Screen Keyboard:

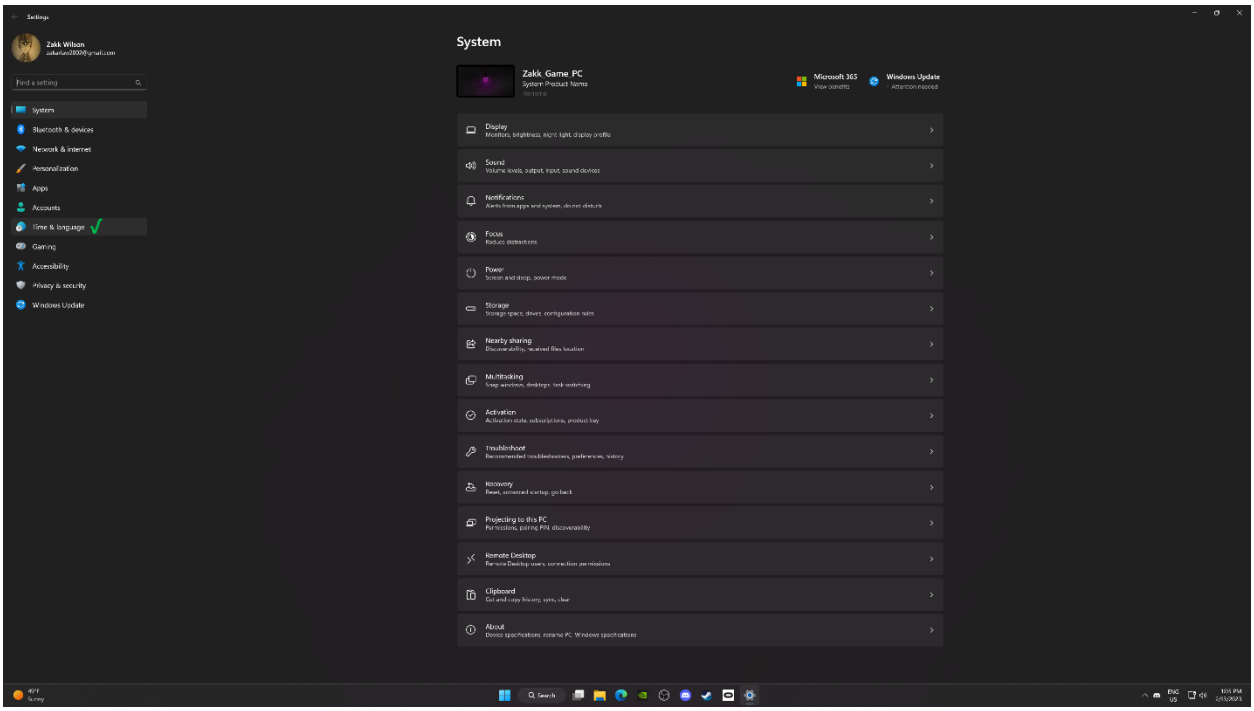


HOW TO SET UP DVORAK ON WINDOWS 11

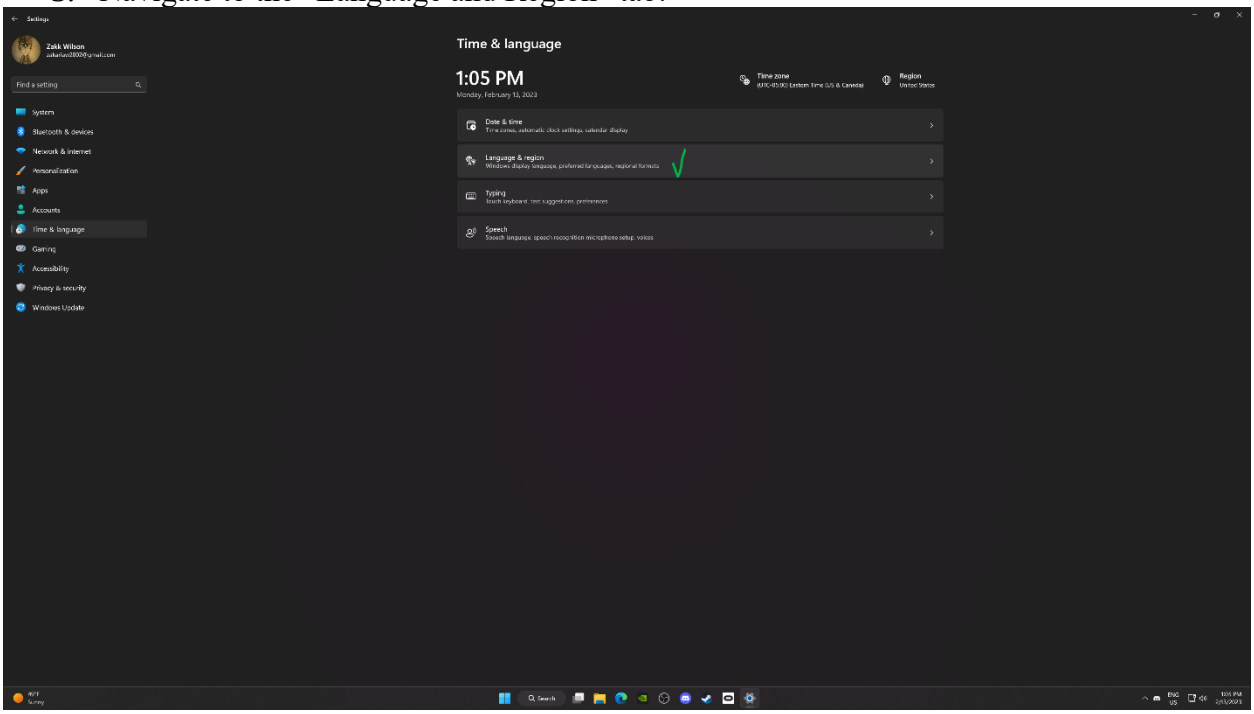
1. Right-click the “Start” menu and navigate to the “Settings” menu:



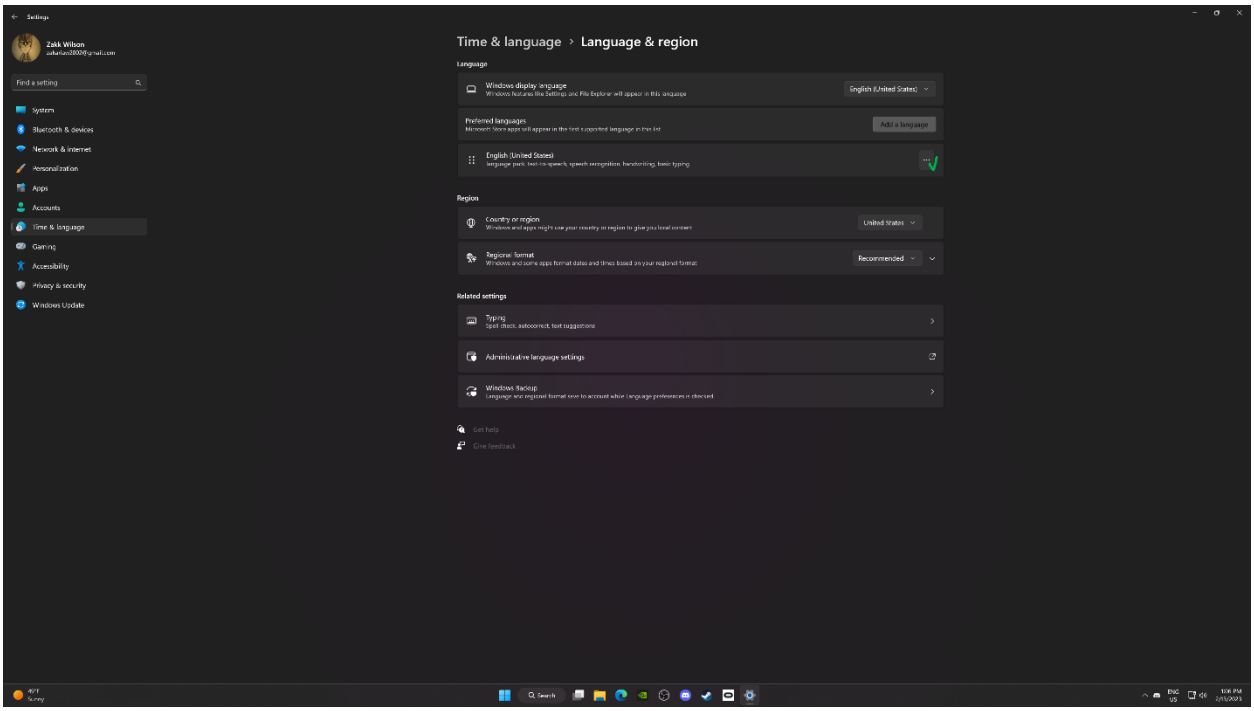
2. Navigate to the “Time and Language” settings:



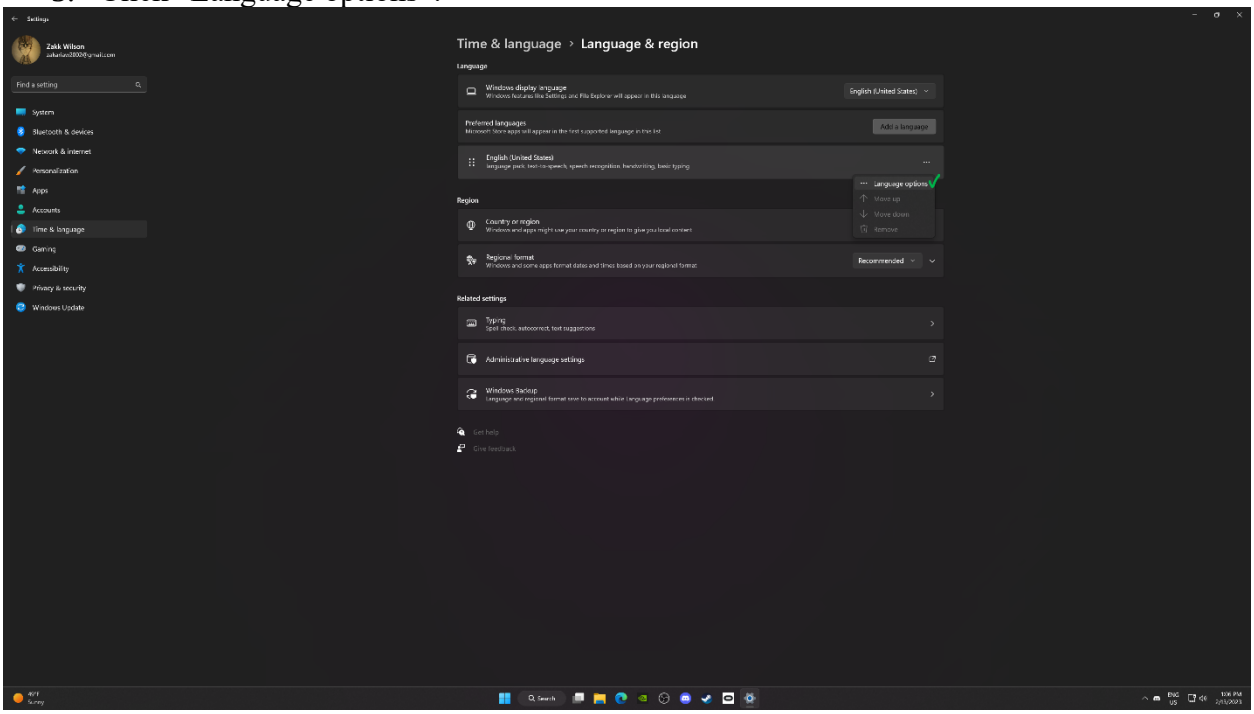
3. Navigate to the “Language and Region” tab:



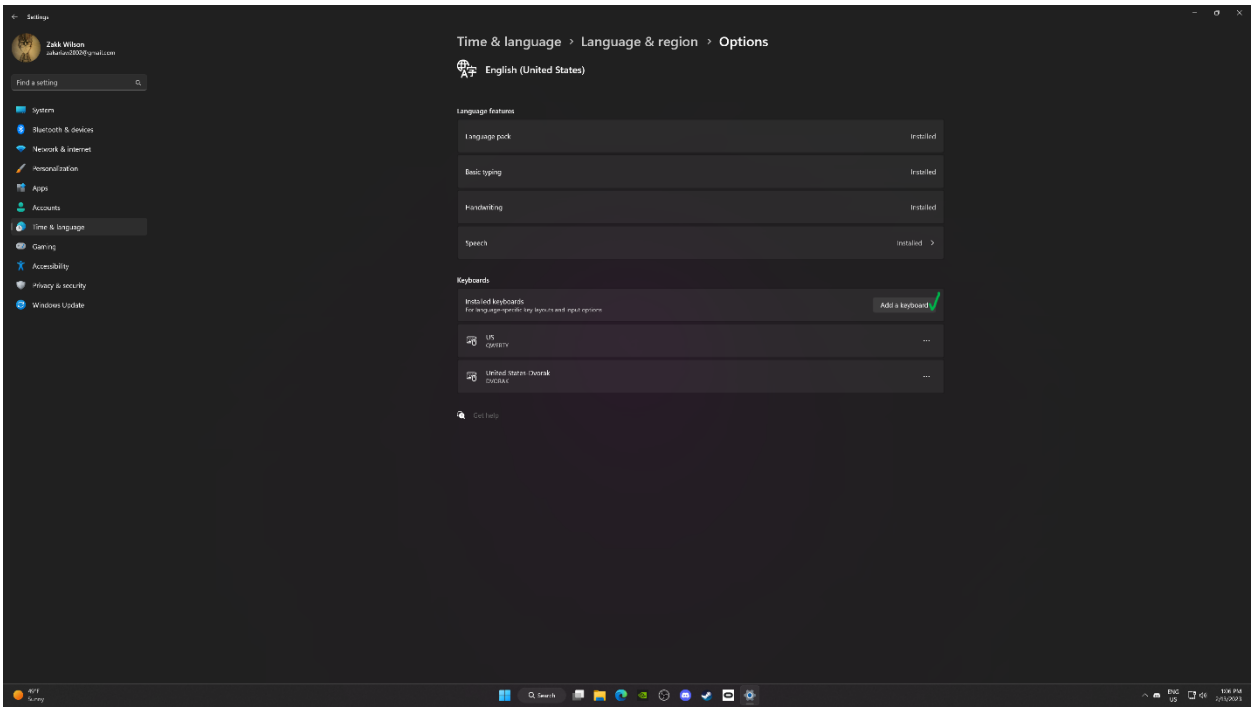
4. Under the “Language” section, click on the three dots next to “English (United States)”:



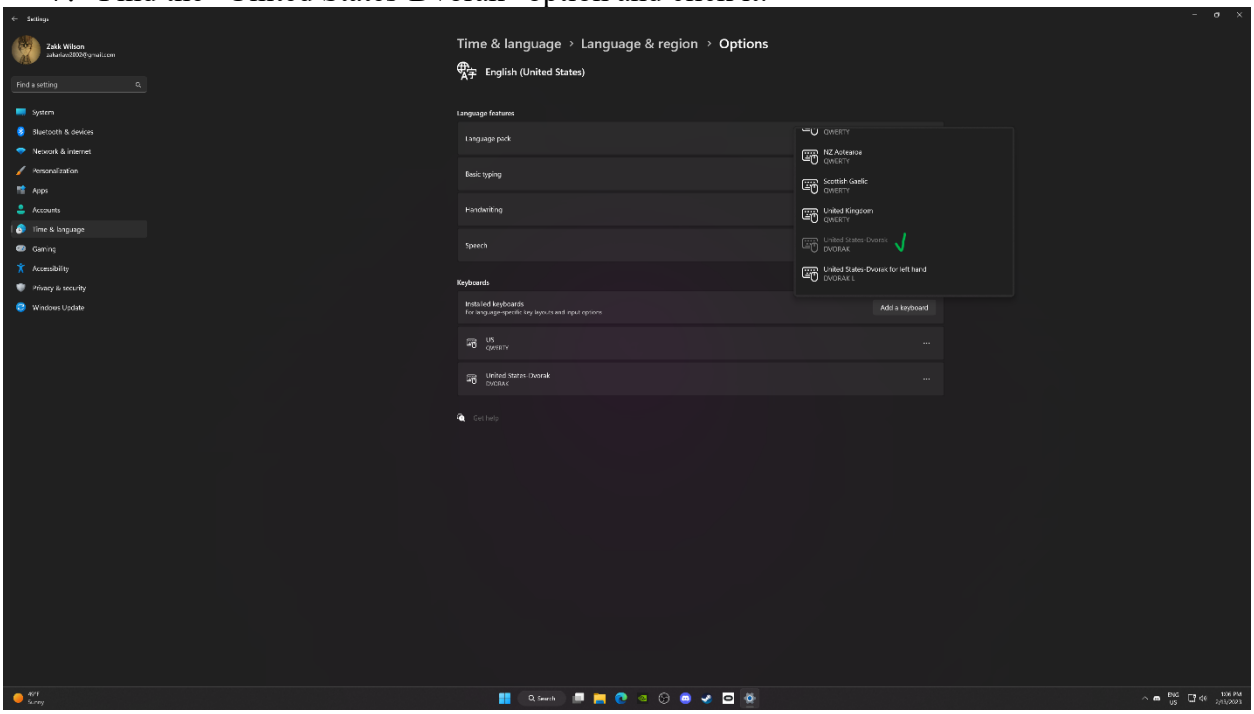
5. Click “Language options”:



6. Under the “Keyboards” section, click “Add a keyboard”:



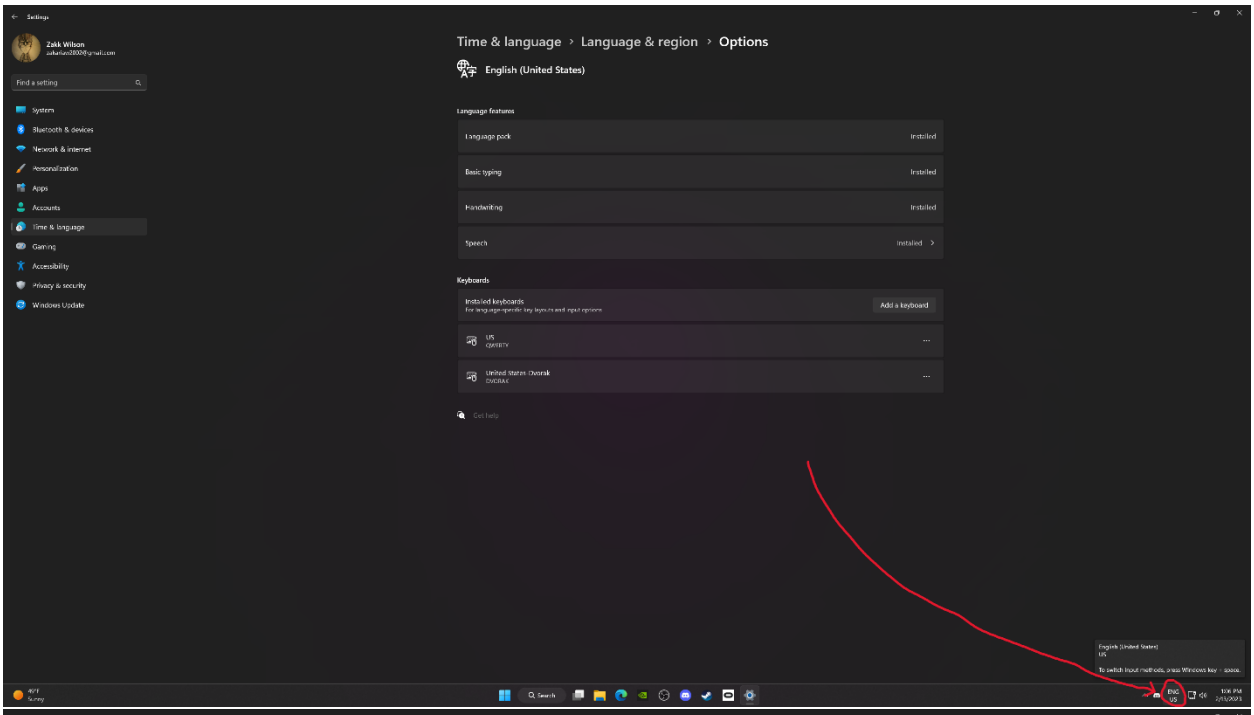
7. Find the “United States-Dvorak” option and click it:

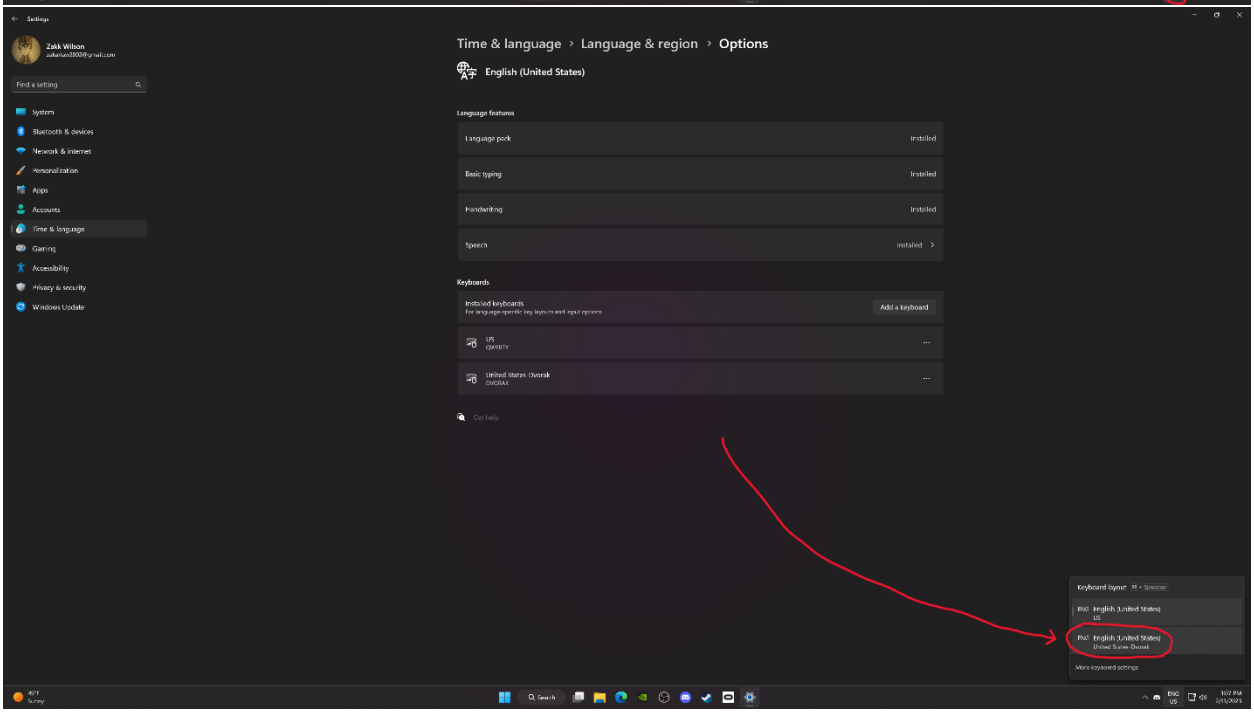


8. You are now ready to use Dvorak.

HOW TO USE DVORAK ON WINDOWS 11

To swap keyboards quickly, either hold the “Windows” key and press “Space” or click the “Keyboard Swap” button near the date and time:





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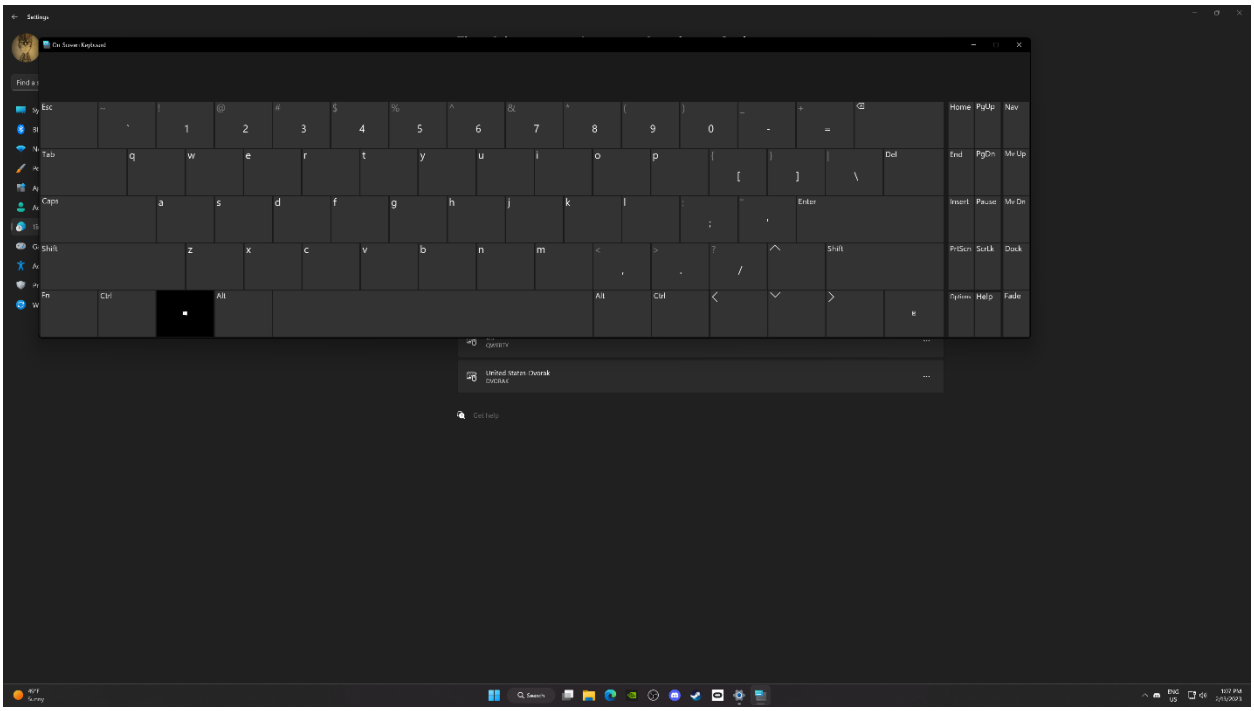
QWERTY On-Screen Keyboard:



Dvorak On-Screen Keyboard: