Video Storyboard and Script

Working Title of Project: The Start of It All: Roberto Busa, Punch Cards, and Digital Humanities

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|  | What's on screen? | Script  A rough draft of the narration | Time |
| 1 | Footage of phones, google screen recording, modern computing | In 2020, we take search engines and digital concordances for granted. I can’t remember a time that I wasn’t able to Google a question I had. Obviously, that wasn’t always the case. There was a time before iPhones, before Google, before personal computers, and before business computers. Any research had to be done by hand and was extremely time consuming. | 00:00 |
| 2 | Pictures of young Busa and Aquinas, screen recording of Thomas Aquinas work | Roberto Busa, an Italian Jesuit priest and scholar, began researching “What is the metaphysics of presence in St. Thomas Aquinas?” His dissertation focused on just the word “presence” as well as all peripheral words (such as “in the presence”). He created a handmade concordance that consisted of 10,000 cards – all focused on the appearance of the word “presence.” He defended his dissertation in 1946. | 00:30 |
| 3 | Display showing the multiplication of cards from 10k to 10 million | Following this project, Busa dreamed of creating a concordance all of St. Thomas Aquinas’ works. This would require creating 10 million cards! He realized the only way to accomplish his goal would be by finding a mechanical system. So, in 1949 he began searching for the right machine. | 01:00 |
| 4 | Animation of Busa flying to US; photo of Thomas J Watson, IBM headquarters | After touring 25 different Universities, Busa met with Thomas J. Watson, the founding chairmen of IBM. Busa knew that Watson would initially say that IBM would not be able to achieve this task. While waiting to see Watson, Busa saw an IBM poster that read, “The difficult we do right away; the impossible takes a little longer.” Busa took the poster with him to the meeting. | 01:20 |
| 5 | Quote written on the screen | When he sat down to meet with Watson, Busa said “It is not right to say ‘no’ before you have tried” and then showed Watson the poster. Watson agreed to help “provided that you do not change IBM into International Busa Machines” | 01:45 |
| 6 | Infographic to walk through the steps | With the partnership created, Busa outlined the five stages to needed create his concordance. First, transcription of the text as phrases onto individual cards. Second, reproduce the cards so there was the same number of cards as words in the phrase. Third, write the individual word on each of the cards. Fourth, alphabetize the cards. And, finally, print out the index for publication. | 02:00 |
| 7 | Animation walking through the example | To simplify this process, let’s do an example.  For the nursey rhyme, “Mary Had a Little Lamb” the first phrase would be transcribed onto a card. So, “Mary Had a Little Lamb.” This would be duplicated 5 times, once for each word. Then, each individual word would be written on the card. So, “Mary” plus “Mary Had a Little Lamb,” “Had” plus “Mary Had a Little Lamb” and so on. Then the cards would be alphabetized and then finally the results would be printed. Thus, we would have the Index of “Mary Had a Little Lamb” | 02:30 |
| 8 | Video of punch cards, representation of 80 characters on screen, video of playing piano, representation of a tweet on a punch card | Rather than using a basic note card like in his dissertation, Busa used punch cards.  The punch card system was developed in 1890 by Hollerith for recording the U.S. Census data. His punch card system was inspired by the player piano.  Punch cards had a limitation of 80 characters per card, so he wouldn’t be able to fit more than a line per card.  That is not much to work with when you have 10,000,000 words to work through....  For reference, a Tweet has historically been 140 characters, so it would require 2 punch cards to record a single tweet. | 03:10 |
| 9 | Vintage footage of trucks, footage compressed on a microSD, screengrab of footage being uploaded to cloud | Due to the volume of punch cards, Busa had to move truckloads of them across Italy when changing locations.  Today, this quantity of data could easily be stored on a modern microSD card and mailed in an envelope, or snuck in a shoe, or more realistically, shared over the cloud and avoid any physical transfer all together. | 03:50 |
| 10 | Footage of WW2 storage, IBM warehouses, old computers | With a theory and storage method in place, Busa then had to search across the country to find the right mechanical components. By repurposing a variety of machines, primarily left over from World War 2 and machines used for accounting purposes, Busa had found the necessary machines to begin his research. | 04:10 |
| 11 | Images and numbers of each machine | Busa used 6 machines to complete his initial mechanized test: An Automatic Punch, Collator, Record Interpreter, Reproducer, Sorter Machine, and a Tabulator. These 6 machines, along with human intervention, allowed Busa to create his concordance. | 04:30 |
| 12 | Recordings of each machine + animations where needed | The first step was to type in the line from the work, this was done using a keyboard and an Automatic Punch. The operator would type in each line twice.  The second step involved comparing the two entries using a machine called Collator. This step helped eliminate human error. In later systems, Busa would have 2 different people type out the line.  The third step was to print the letters that corresponded to the punches so that the cards could be read. The Record Interpreter completed this task.  The fourth step was replicated the cards and print the first, second, and so on word with each copy. So, like before, “Mary had a little lamb” + “mary” and then another copy with “Mary had a little lamb” + “had.” The aptly named Reproducer did this.  The fifth step was to alphabetize the cards, accomplished by the Sorter Machine.  And the final step was to count the words and print out the sum, which was done by an Alphanumeric Accounting Machine, also known as a Tabulator. | 04:50 |
|  | Screen recording of Busa’s online work: Index Thomisticus | Busa’s system worked. In 1951, he published a concordance of the poems of St. Thomas as a proof of concept. In 1980, Roberto Busa published his *Index Thomisticus* as 56 print volumes. In 1992, a CD-ROM version with hypertext was released. In 2006, a web version of the *Index Thomisticus* was launched. | 05:50 |
|  |  | Busa had created the first working system to study language used a mechanical tool. While this system was not a computer, it certainly was an important step to bring humanities over to the digital world. Prior to Busa, big tech at the time was only focused on using their machines for mathematical computations. With Busa’s research, innovative thinking, and persistence, and entire new field was ultimately born. He showed that the data from a text could help new scholarly study. | 06:20 |

\*Note... to add additional rows, place your cursor anywhere in the last row > select the **Table** menu > click on **Insert Row Below.**