TOUCH-SENSITIVE TABLET

TECHNICALFIELD

The present disclosure relates generally to an auxiliary tool of multisensory character teaching, and more particularly, to a tactile writing board.

BACKGROUND

Learning disabilities are not necessarily related to personal intelligence, and it just a reflection that the way to wisdom is blocked. People with learning disabilities do not mean that these people can't read or have insufficient IQ. Most of the reason is that the brain language area is not active enough, so that the general character recognition process by reading, hearing or handwriting cannot produce enough brain stimulation, which makes the brain difficult to memorize some characters.

Tactile handwriting is one of the multisensory teaching methods, which is a particularly important learning method for people with learning disabilities. Multisensory teaching method refers to helping the People with learning disabilities and children to learn the 66 languages in the whole world through more than one senses such as a visual sense, an auditory sense, and a tactile sense. Therefore, for the people with learning disabilities and young children, the best teaching method is to use more of their senses, especially the tactile sense, which will effectively stimulate the brain tactile nerves of them to generate a memory for helping memorization the new characters.

The prior flash cards using the tactile handwriting principle require one card for one character. Taking the Chinese characters for example, learning four-thousands of Chinese characters requires four-thousands of cards, which costs a lot. So, most people with learning disabilities cannot afford such cost and cannot enjoy the benefits of the tactile handwriting. In additional, once the flash cards are completed, the characters on them cannot be changed. Accordingly, one set of flash cards can only be used for one language, and if someone wants to learn varieties of languages, he/she needs multiple sets of flash cards. In additional, it is costly to produce a large number of flash cards and is also not environmentally friendly. Moreover, it is extremely inconvenient to find the required card when using a large number of

flash cards.

On the other hand, about 50% of the people with visual stress in the world have learning disabilities, and they are sensitive to certain colors of light, especially white light. Symptoms of visual stress may appear as one or more of the followings when reading: words in sentences become blurred or moving, sometimes it is described as rivers or worms (referring Fig.7); or words appear to stick together and constantly floating, just like dancing (Fig.8). Since background of most books is in color white that it reflects all colors, it would cause the readers to feel uncomfortable or fatigue when reading under a strong light or even normal light, which seriously affects the reading progress.

SUMMARY

The object of the present application is to provide a transparent or semi-transparent abrasive tactile writing board with one piece of which countless characters in various languages can be learned, aiming at the technical problems in the prior art that one card is needed for one character and the visual stress cannot be relieved.

In a first aspect, a tactile writing board is provided, comprising a color filter, a substrate and a granular layer successively arranged from bottom to top, wherein the granular layer is formed by gluing granules on an upper surface of the substrate by using transparent glue, wherein the substrate and the granular layer are transparent or semi-transparent.

Furthermore, the tactile writing board having a thickness of 1.0 mm to 2.3 mm is overlaid above an electronic device.

Furthermore, the tactile writing board has a thickness of1.8 mm.

Preferably, the substrate is made of polyvinyl chloride or transparent polyethylene or transparent silica gel.

Furthermore, the substrate is made of soft polyvinyl chloride.

Preferably, the substrate is made of rigid polyvinyl chloride.

Preferably, a plurality of screen adhesive stickers is adhered to a bottom of the substrate.

Furthermore, the granular layer is a transparent sand granular layer or a transparent silica gel granular layer.

Furthermore, the granular layer has a roughness of #30 to #400 (37 to 500 micron). Preferably, the granular layer has a roughness of #150 (105 micron).

By the implementation of the present application, following technical effects can be obtained. When the tactile writing board is overlaid above the characters, such characters would be perspective on the granular layer, which stimulates the user tactilely when the user is writing on the granular layer with his/her fingers, thus enhancing the perception and memory of the user to the character, and reducing the difficulty of people of learning disabilities and children in the process of character learning. On the other hand, the color filter can prevent the lights of certain colors from entering the eyes, thereby alleviating the visual pressure of the user. The tactile writing board of the present application is convenient and efficient, low-cost and easy to be popularized. Only one tactile writing board can be operated with a tablet electronic device to obtain characters, thus enabling people of learning disabilities and children to learn countless characters in various languages both indoors and outdoors in their convenience.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig.1 is a structural diagram of the tactile writing board according to a first embodiment of the present application.

Fig.2 is a lateral diagram of the embodiment of Fig.1.

Fig.3 is a structural diagram of the tactile writing board according to a second embodiment of the present application.

Fig.4 is a lateral diagram of the embodiment of Fig.3.

Fig.5 is a rear diagram of the substrate in the embodiment of Fig.3.

Fig.6 is a statistical diagram of the research results on the influence of character background color on reading.

Fig.7 is a possible manifestation pattern of the visual stress during reading.

Fig.8 is another possible manifestation pattern of the visual stress during reading.

The reference numerals include:

100-Tactile writing board 110-Substrate 120-Granular layer

130-Screen adhesive sticker 200-Finger 300-Presswork

400-Electronic device

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present application is further illustrated with reference to the accompanying drawings and embodiments.

The present application provides a colored or colorless laminated tactile writing board comprising a color filter (unshown), a substrate 110 and a granular layer 120 successively arranged from bottom to top, aiming at the technical problems in the prior art that one card is needed for one character and the visual stress cannot be relieved. In the present application, the transparent or semi-transparent substrate is added with a granular layer. After the covering different characters with the tactile writing board of the present application, the user can facsimile the characters displayed on the granular layer with his/her fingers, then the roughness of the granular layer can stimulate the user's tactile sense, thus adding one more kind of stimulation to the user’s brain on the basis of the original character learning stimulations and reducing the difficulty of character learning. The color filter is arranged to make the tactile writing board appearing different colors or being colorless for allowing the user’s different selections, thus preventing the lights of certain colors into the eyes, alleviating the visual pressure of the user and improving the learning efficiency. The user can even learn countless characters in various languages of the world by changing the characters shown in the electronic devices (such as tablets) covered by the tactile writing board.

In order to explain the present application more clearly, the following description will be made with reference to the accompanying drawings.

Figs.1-2 have shown the first embodiment of the present application, in which the presswork 300 is covered by the tactile writing board for facsimileing. In the present embodiment, the presswork 300 can be any paper with characters, such as characters printed on the paper, handwritten characters on the paper, or various copybooks for calligraphy and the likes.

As shown in Fig. 1, the tactile writing board 100 of the present embodiment includes a color filter, a substrate 110, and a granular layer 120 on the top layer of the substrate 110.

After the substrate 110 is overlaid on the presswork 300, the users can use the finger 200 to facsimile on the granular layer 120.

The substrate 110 and the granular layer 120 are arranged to be transparent or semi-transparent, such that the user can clearly see the characters on the presswork 300 under normal illumination for facsimileing.

In addition, the total thickness of the substrate 110 and the granular layer 120 also affects the facsimileing experience. An excessively thick tactile writing board 100 is prone to floating characters due to light refraction, which is not conducive to the facsimileing process. In additional, the excessive thickness is also easy to affect the transmission of light. The optimum thickness range is tested by giving the users tactile writing boards100 of different thicknesses. Through experiments, the total thickness of the substrate 110 and the granular layer 120 may be 2.3mm at most, 0.3mm at least, and optimally 0.6mm.

In this embodiment, the facsimileing object is the presswork 300. In order to obtain a better bonding effect, a flexible film is generally selected as the substrate 110, and then a sandblasting is performed on the flexible film to form the granular layer 120, or a sand sticker is directly attached on the flexible film to form the granular layer 120.

When employing the present embodiment, the user covers the presswork 300 with the tactile writing board100 and guarantee that one surface of the tactile writing board 100 is attached to the presswork 300, and then uses the finger 200 to write on the characters displayed on the granular layer 120. Comparing with the conventional way of writing with a pen, this embodiment enables the user to increase the tactile stimulation during the writing process, thereby reducing the difficulty in the character learning.

The present application also provides a second embodiment as shown in Figs. 3 to 5, in which the tactile writing board 100 is overlaid above the electronic device 400 for facsimileing. The electronic device 400 can be a display screen of a mobile phone, a tablet computer, or a computer. In this embodiment, the tactile writing board 100can be used in combination with computer software or game for learning characters to increase the interestingness of the character learning and arouse the enthusiasm of the user, thus improving the learning efficiency.

In this embodiment, since the facsimileing object has been changed to be the electronic

device 400, the substrate 110 manufactured by the flexible film is not an optimal embodiment. In order to guarantee the stability of facsimileing, the material of the substrate 110 is generally changed to be a rigid or soft transparent or semi-transparent sheet, such as the substrate 110 made of PVC (polyvinyl chloride), transparent PE (polyethylene) or transparent silica gel and so on. In such a way, during the facsimileing process, the substrate 110 would not be deformed by the pressure given by the figures to cause a false touch. At this time, the granular layer 120 can be formed by adhering transparent sand granules or transparent silica gel granules with transparent glue on the surface of the substrate 110.

According to the amount of plasticizer added, PVC can be divided into two categories of a rigid one and a soft one. In the present embodiment, if the substrate 110 is made of rigid PVC, then a plurality of screen adhesive stickers 130 should be attached to the bottom of the substrate 110. Now, a tablet computer is used as an example of the electronic device 400 for explanation. A plurality of screen adhesive stickers 130 on the bottom of the substrate 110 is attached to the frame of the electronic device 400, such that during the facsimileing process, the sliding of the finger 200 does not drive the tactile writing board 100 to deviate from its position. Considering that the screen adhesive stickers 130 should be prevented from obscuring the screen display area during the usage, they are generally disposed at the edge or at a corner position of the back surface of the substrate 110.

If the substrate 110 is made of soft PVC, it is not necessary to stick a plurality of screen adhesive stickers 130 on the bottom of the substrate 110, and the substrate 110 is self-adhered to the electronic device 400 and would deviate from its position by the sliding of the finger 200.

The difference between the present embodiment and the previous embodiment is that the facsimileing object of the present embodiment is the electronic device 400. If such electronic device 400 has a touch function, it is easy to cause the false touch in the facsimileing process, and affect the learning experience. Therefore, it is necessary to reset the thickness to obtain a sufficiently high stability while ensuring sufficient clarity.

The experiments are carried out on 6-14 year-old experimenters by using a Chinese character on a tablet computer, and the test samples are tactile writing boards with #150 (105 micron) roughness. The experimental results are shown in Table 1.

Table1

Clear degree of the characters: 1. Unacceptable unclear 2. Acceptable unclear 3. Clear						Stability of the characters on the touch screen: 1. Unacceptable unstable 2. Acceptable unstable 3. Stable					
0.6mm	0.8mm	1.0mm	1.3mm	1.8mm	2.3mm	0.6mm	0.8mm	1.0mm	1.3mm	1.8mm	2.3mm
3	3	3	3	3	3	1	1	1	1	3	3
3	3	3	3	3	3	1	1	1	3	3	3
3	3	3	3	3	3	2	2	1	3	3	3
3	3	3	3	3	2	1	2	1	2	3	3
3	3	3	3	3	3	1	1	2	2	3	3
3	3	3	3	3	3	1	1	1	3	3	3
3	3	3	3	3	3	1	1	2	3	3	3
3	3	3	3	3	3	1	1	1	3	3	3
3	3	3	3	3	3	1	1	2	3	3	3
3	3	3	3	3	3	1	1	1	2	3	3
3	3	3	3	3	3	1	1	1	3	3	3
3	3	3	2	2	2	1	1	2	2	3	3
3	3	3	3	3	3	1	1	2	3	3	3
3	3	3	3	3	2	1	1	3	2	3	3
3	3	3	3	3	3	2	3	3	3	3	3
3	3	3	3	3	3	1	1	1	2	3	3
3	3	3	3	3	3	1	2	1	3	3	3
3	3	3	3	3	3	2	3	2	3	2	3
3	3	3	3	3	3	1	1	3	3	3	3
3	3	3	3	3	3	2	2	1	3	3	3
3	3	3	3	3	3	1	1	1	3	3	3
3	3	3	3	3	2	1	1	3	3	3	3
3	3	3	3	3	3	1	1	2	3	3	3
3	3	3	3	3	3	1	1	2	1	2	3
Average value											
3.00	3.00	3.00	2.96	2.96	2.83	1.17	1.33	1.67	2.58	2.92	3.00

Through the above experiment, when the electronic device is used as a facsimileing object, the thickness of the entire tactile writing board is limited to 1.0 mm to 2.3 mm, and the optimum thickness is 1.8 mm.

Many people with dyslexia are different from ordinary people. They are usually too allergic or too insensitive to the tactile sense. In the above two embodiments, the tactile sense is generated by the granular layer 120. However, the roughness of the granular layer 120 also affects the experience during actual use. The too smooth granular layer 120 does not produce enough tactile sense to generate sufficient brain stimulation during the facsimileing process,

while the too coarse granular layer 120 will make the user feel pain and even wear the user's skin during the facsimileing process

For solving this problem, the experiments are carried out on 6-14 year-old experimenters by facsimileing a Chinese character for determining the roughness. The experimental results are shown in Table 2.

Table2

Roughness comparison of abrasive surface: 1. Maximum roughness; 2. Moderate roughness; 3. Minimum roughness					Pain comparison: 1. Unacceptable pain; 2. Acceptable pain 3. No pain				
#30	*#60*	*#150*	*#320*	*#400*	*#30*	*#60*	*#150*	*#320*	*#400*
1	1	2	3	3	1	1	2	3	3
1	1	2	3	3	1	1	2	3	3
1	1	2	3	3	1	1	3	2	3
1	1	2	3	3	1	2	2	2	2
1	2	2	3	3	1	1	3	3	3
1	1	2	3	3	1	1	2	3	3
1	1	2	2	2	1	2	2	3	3
1	1	3	2	2	2	3	3	3	3
1	1	2	3	3	1	3	2	3	3
1	1	2	2	3	2	3	3	3	3
1	1	2	3	3	1	1	2	3	3
1	1	2	2	3	1	2	2	2	3
1	1	2	3	3	1	1	2	3	3
1	1	2	3	3	1	1	3	3	3
1	1	2	3	3	1	1	2	3	3
1	1	2	3	3	2	2	2	3	3
1	1	2	3	3	1	1	3	3	3
1	1	2	3	3	1	1	2	3	3
1	1	2	2	2	1	3	3	3	3
1	1	2	2	3	2	2	2	3	3
1	1	2	2	3	1	1	2	3	3
1	1	2	3	3	1	1	2	2	3
1	1	2	3	3	1	2	3	3	3
1	1	3	3	3	2	2	2	3	3
Average score									
1.00	1.04	2.08	2.71	2.88	1.21	1.63	2.33	2.83	2.96

Through the above experiment, it is known that the acceptable roughness ranges from #30 to #400 (37 to 500 micron), and the larger the number, the smaller the smoothness. The optimum roughness is #150 (105 micron).

Since most of the books have white background color which reflects all colors, it would cause the readers to feel uncomfortable or fatigue when reading under a strong light or even normal light, which seriously affects the reading progress. If the lights of certain colors are prevented from entering the eyes, the visual pressure of the user can be alleviated, thus helping the reading of the people of learning disabilities. Accordingly, in order to further understand the influence of the character background color on the reading, experiments of the present application had been done for finding the colors which can make the people of learning disabilities feel more comfortable, thus determining the colors of the transparent or semi-transparent substrate for the different people of learning disabilities.

In order to understand the influence of the character background color on the reading, the experimentsare carried out onthe people with learning disabilities in primary and secondary schools for discussing whether the character background color of the written paragraphs can alleviate the visual pressure and help reading, and the conclusion is shown in Table 3.

Table 3

	Best color(number of people)
White	8
Blue Gray	7
Aqua	11
Turquoise	11
Green	3
Yellow	3
Goldenrod	2
Purple	4
Peach	1
Rose	2
Gray	1
Total (number of people)	53

The experiments find that 85% of people with learning disabilities think that if the character background is colored, the readers feel more comfortable, while only15% of the people of learning disabilities think the white background is the best. Among them, aqua and turquoise are the two colors that make people of learning disabilities feel most comfortable. Therefore, the present application can provide a variety of colors for consumers to choose, which is very helpful for those with learning disabilities.

The different colors required for the transparent or semi-transparent substrate can be realized by adding a dye of a corresponding color to the raw material for producing the substrate 110, or by using a color filter disposed under the substrate 110. Accordingly, the product of the present application can be colored or colorless to satisfy the different requirement of the different users.

The above embodiment of the present application adds a granular layer on the transparent or semi-transparent substrate, sothe user overlays the tactile writing board above the characters and facsimiles on the granular layer with his/her fingers, such that the user can obtain a tactile stimulation during the writing and his/her perception and memory to the character is enhanced, thereby reducing the difficulty of people of learning disabilities and children in the process of character learning. On the other hand, the color filter can prevent the lights of certain colors from entering the eyes, thereby alleviating the visual pressure of the user.

The foregoing is a further detailed description of the present application in connection with specific preferred embodiments. It will be apparent to those skilled in the art that any various modifications or substitutions may be made to the present application without departing from the spirit of the invention, and such modifications or substitutionsshould be considered as falling within the scope of the present application.

CLAIMS:

I/WE Claim:

1. A tactile writing board comprising a color filter, a substrate (110) and a granular layer (120) successively arranged from bottom to top, wherein the substrate (110) and the granular layer (120) are transparent or semi-transparent and wherein the granular layer (120) is adhered to a surface of the substrate (110) with transparent glue.

2. The tactile writing board according to claim 1, wherein the tactile writing board (100) having a thickness of 1.0 mm to 2.3 mm is overlaid above an electronic device (400).

3. The tactile writing board according to claim 2, wherein the tactile writing board (100) has a thickness of 1.8 mm.

4. The tactile writing board according to claim 1, wherein the substrate (110) is made of polyvinyl chloride or transparent polyethylene or transparent silica gel.

5. The tactile writing board according to claim 4, wherein the substrate (110) is made of soft polyvinyl chloride.

6. The tactile writing board according to claim 4, wherein the substrate (110) is made of rigid polyvinyl chloride.

7. The tactile writing board according to claim 6, wherein a plurality of screen adhesive stickers (130) is adhered to a bottom of the substrate (110).

8. The tactile writing board according to any one of claims 1-7, wherein the granular layer (120) is a transparent sand granular layer (120) or a transparent silica gel granular layer (120).

9. The tactile writing board according to any one of claims 1-7, wherein the granular layer (120) has a roughness of #30 to #400 (37 to 500 micron).

10. The tactile writing board according to claim 9, wherein the granular layer (120) has a roughness of #150 (105 micron).