**Title:** ADAPTIVE SYSTEM FOR TOUCH-TYPING/TRAINING

Educational devices using process-oriented educational methods are disclosed to prepare pre-school children, school children, and teenagers for keyboarding. The devices include sets of gloves and indica applied to the fingers of the gloves to provide pictorial and alphanumeric representations of the computer keyboard. The visual and tactile memorization of the glove images are complemented by auditory and associative memorization provided by a story-telling educational method. Synergistic use of the gloves in the context of supervised story-telling also trains the pre-school children to develop and practice both lateral and vertical thinking skills (21-32), thus preparing them for coping creatively with the inherent hardware/software limitations of computers. The memorization of the alphanumeric representation of the computer keyboard is reinforced through synergistic use of the gloves in a variety of activities including learning the alphabet, learning word-spelling, and learning languages. To best fit the psychology of teenagers, a set of picture-rings is disclosed to specifically prepare that age-group for keyboarding.
**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

<table>
<thead>
<tr>
<th>Code</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT</td>
<td>Austria</td>
</tr>
<tr>
<td>AU</td>
<td>Australia</td>
</tr>
<tr>
<td>BB</td>
<td>Barbados</td>
</tr>
<tr>
<td>BE</td>
<td>Belgium</td>
</tr>
<tr>
<td>BF</td>
<td>Burkina Faso</td>
</tr>
<tr>
<td>BG</td>
<td>Bulgaria</td>
</tr>
<tr>
<td>BJ</td>
<td>Benin</td>
</tr>
<tr>
<td>BR</td>
<td>Brasil</td>
</tr>
<tr>
<td>BY</td>
<td>Belarus</td>
</tr>
<tr>
<td>CA</td>
<td>Canada</td>
</tr>
<tr>
<td>CF</td>
<td>Central African Republic</td>
</tr>
<tr>
<td>CG</td>
<td>Congo</td>
</tr>
<tr>
<td>CH</td>
<td>Switzerland</td>
</tr>
<tr>
<td>CI</td>
<td>Côte d'Ivoire</td>
</tr>
<tr>
<td>CM</td>
<td>Cameroon</td>
</tr>
<tr>
<td>CN</td>
<td>China</td>
</tr>
<tr>
<td>CS</td>
<td>Czechoslovakia</td>
</tr>
<tr>
<td>CZ</td>
<td>Czech Republic</td>
</tr>
<tr>
<td>DE</td>
<td>Germany</td>
</tr>
<tr>
<td>DK</td>
<td>Denmark</td>
</tr>
<tr>
<td>ES</td>
<td>Spain</td>
</tr>
<tr>
<td>FI</td>
<td>Finland</td>
</tr>
<tr>
<td>FR</td>
<td>France</td>
</tr>
<tr>
<td>GA</td>
<td>Gabon</td>
</tr>
<tr>
<td>GB</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>GN</td>
<td>Guinea</td>
</tr>
<tr>
<td>GR</td>
<td>Greece</td>
</tr>
<tr>
<td>HU</td>
<td>Hungary</td>
</tr>
<tr>
<td>IE</td>
<td>Ireland</td>
</tr>
<tr>
<td>IT</td>
<td>Italy</td>
</tr>
<tr>
<td>JP</td>
<td>Japan</td>
</tr>
<tr>
<td>KP</td>
<td>Democratic People's Republic of Korea</td>
</tr>
<tr>
<td>KR</td>
<td>Republic of Korea</td>
</tr>
<tr>
<td>KZ</td>
<td>Kazakhstan</td>
</tr>
<tr>
<td>LI</td>
<td>Liechtenstein</td>
</tr>
<tr>
<td>LK</td>
<td>Sri Lanka</td>
</tr>
<tr>
<td>LU</td>
<td>Luxembourg</td>
</tr>
<tr>
<td>LV</td>
<td>Latvia</td>
</tr>
<tr>
<td>MC</td>
<td>Monaco</td>
</tr>
<tr>
<td>MG</td>
<td>Madagascar</td>
</tr>
<tr>
<td>ML</td>
<td>Mali</td>
</tr>
<tr>
<td>MN</td>
<td>Mongolia</td>
</tr>
<tr>
<td>MR</td>
<td>Mauritania</td>
</tr>
<tr>
<td>MW</td>
<td>Malawi</td>
</tr>
<tr>
<td>NE</td>
<td>Niger</td>
</tr>
<tr>
<td>NL</td>
<td>Netherlands</td>
</tr>
<tr>
<td>NO</td>
<td>Norway</td>
</tr>
<tr>
<td>NZ</td>
<td>New Zealand</td>
</tr>
<tr>
<td>PL</td>
<td>Poland</td>
</tr>
<tr>
<td>PT</td>
<td>Portugal</td>
</tr>
<tr>
<td>RO</td>
<td>Romania</td>
</tr>
<tr>
<td>RU</td>
<td>Russian Federation</td>
</tr>
<tr>
<td>SD</td>
<td>Sudan</td>
</tr>
<tr>
<td>SE</td>
<td>Sweden</td>
</tr>
<tr>
<td>SI</td>
<td>Slovenia</td>
</tr>
<tr>
<td>SK</td>
<td>Slovak Republic</td>
</tr>
<tr>
<td>SN</td>
<td>Senegal</td>
</tr>
<tr>
<td>TD</td>
<td>Chad</td>
</tr>
<tr>
<td>TG</td>
<td>Togo</td>
</tr>
<tr>
<td>UA</td>
<td>Ukraine</td>
</tr>
<tr>
<td>US</td>
<td>United States of America</td>
</tr>
<tr>
<td>UZ</td>
<td>Uzbekistan</td>
</tr>
<tr>
<td>VN</td>
<td>Viet Nam</td>
</tr>
</tbody>
</table>
ADAPTIVE SYSTEM FOR TOUCH-TYPING/TRAINING

BACKGROUND OF THE INVENTION

1. Field of the Invention

Computers are playing an ever more important role in the economical, scientific, and educational development of our society. It is therefore not uncommon to see curricula granting them a significant role in the educational process of young children.

Children are most likely to fully utilize the resources that computers have to offer, as they become more comfortable in interacting with their physical interface, in particular the keyboard. Although computer interfacing has been greatly simplified through the standardization of the touch-typing keyboard, much is to be gained from educational systems that can help children to painlessly develop the needed keyboarding skills, as early as pre-school age.

After acquiring keyboarding skills, children will need both lateral and vertical thinking to express their ideas as freely as possible with the computer while accommodating for its hardware/software limitations.

Therefore, much is to be gained from wholistic educational systems that can motivate children, as early as pre-school age, to develop their lateral and vertical thinking skills, while preparing them for keyboarding.

2. Analytical Description of the Relevant Art

Since the invention of the first typewriter, various means and devices have been proposed to teach/train students to type, or to type more efficiently, as exemplified by the following United States and Foreign Patents.

U.S. Pat. No. 4,909,739 issued in 1990 to Ladner, et al, entitled "Interactive Typing/Training System" discloses a set of color-coded finger guides to be worn at the top of the hand, and indicating the character of the home key that each finger is to be used for in touch-typing. The color-coding of the keys of the keyboard match the color-coding of the finger guides to indicate to the typist which keys each finger

SUBSTITUTE SHEET
should be used for.

U.S. Pat. No. [2,570,908] issued in 1949 to Behr entitled "Indicator To Be Worn
On The Hands While Learning To Typewrite" discloses a device constructed so as to
be secured on the hand without impeding the use of the fingers in any way, and
showing to the typist the correct keys of a type-writer to be struck by each finger, and
the position of the keys relative to the actuating finger.

In the aforementioned patents by Ladner and Behr, the key-finger assignment of
the keyboard is indicated to the student-typist by means of devices which represent the
keys by the letters and numbers they bear, as specified by the standardized keyboard.
Such key-finger assignment cannot however be used by pre-school children, since they
do not yet know their alphabet nor their numbers. Moreover, the systems disclosed by
Ladner and Behr are to be used by students in the actual act of touch-typing, or
keyboarding. The latter training devices have therefore been specifically designed so
as not to obstruct the student view of the keyboard, nor impede the free motion of the
fingers. Such specificities are of no benefit to pre-school children, since it is highly
desirable that they do not actually use the keyboard (because of the fragility of their
joints), and are moreover responsible for the awkward characteristics of the
aforementioned hand indicators, which would make them impractical to be worn by
pre-school children.

For Teaching Typing And Language Skills" discloses a set of color-coded bands worn
on each finger of the typist, and a set of color-coded discs to be affixed on the keys of
a typewriter, whereby the color matching between bands and keys indicate to the typist
which keys each finger should be used for.

Foreign Pat. No. [925,459] issued in 1964 to Azan entitled "Dispositif pour le
guidage cybernétique des doigts dans l’apprentissage de la dactylographie et permettre
la correction de la mauvaise dactylographie" discloses a set of rings to be worn by the
student typist. The letters assigned to each ring show to the typist the correct keys of
a type-writer to be struck by each finger.

Foreign Pat. No. [931,038] issued in 1963 to Haid entitled "Typewriter Key
Markers to Teach Touch Typing" discloses rings which can be placed upon the fingers, and which have the color which marks the keys associated with any particular finger. U.S. Pat. No. 623,966 issued in 1899 to Barkley entitled "Method Of And Apparatus For Type-Writer Instruction" discloses a set of rings to be worn by a typist with the aim of acquiring speed. The letters assigned to each ring show to the typist the correct keys of a typewriter to be struck by each finger.

In the aforementioned patents by Azan, Haid, and Barkley, the disclosed key-finger assignments are based on indexing the keys of the keyboard by the letters they bear (which index said keys), and therefore could not be used by pre-school children, since they do not know their alphabet.

Although the aforementioned ring sets can in principle be used by any student-typist who knows how to read, the bare representation of the keyboard in terms of plain letters can be in practice demotivating for young learners who usually look for excitement in any learning process. Without nurturing the student with opportunities for associative memorization, the learning process may indeed be reduced to just practicing on the keyboard, and shy away many potential teenager students.

U.S. Pat. No. 4,465,477 issued in 1984 to AvGavaar entitled "Typewriter Instruction Device" discloses a device consisting of small ferromagnetic tips to be worn by the typist at the ends of his fingers, while the typewriter keys have electromagnets which attract the correct finger when a certain key has to be struck. These electromagnets could be attached at the fingertips by means of gloves, fingercots, or adhesives.

By requiring actual use of the keyboard and knowledge of the alphabet, the training system disclosed by AvGavaar is not adapted to prepare pre-school children for keyboarding for the same reasons mentioned above.

U.S. Pat. No. 4,902,231 issued in 1990 to Freer entitled "Learn To Type Via Mnemonic Devices, And Methods Of Constructing And Utilizing Same" discloses a large chart depicting the standardized computer keyboard, and mnemonic means including visual aids and phrases to help the student typist remember the locations of the keys. The chart is to be positioned within the view of the typing students.
Pre-school children do not know their alphabet, and therefore could not benefit from Freer’s mnemonic devices that are based on phrases and pictures showing the phrases. Moreover, the letters indexing the keys of the keyboard are associated in irregular patterns within either words or phrases, which makes it difficult to identify these indexing letters from the pictures. Such mnemonic devices are addressed to the student-typist who knows how to read and make sentences, and present a degree of complexity by far exceeding the level of young children. Moreover, these mnemonic devices are applied to a large chart to be positioned within the view of the student-typist, preferably on the wall of a classroom, which would be of little practicality and convenience for a pre-school child in home environment.

There is therefore a need for process-oriented educational systems that are not only attractive to the child, but also easy-to-use and easy-to-be-accessed, in order to start the keyboarding training process as early as the pre-school-age group.

The present invention differs from the prior art in that it answers the aforementioned need, and provides simple picture-based (or object-based) devices using process-oriented methods in order to:

1.) prepare the pre-school child (and any illiterate child or adult) for keyboarding before he has even learned the alphabet and the numbers;
2.) while developing his lateral and vertical thinking;
3.) and thereby realize a holistic preparation of the pre-school child (and any illiterate child or adult) towards coping creatively with the inherent hardware/software limitations of the computer;
4.) prepare teenagers for keyboarding through a learning process that is well-adapted to the behavioral characteristics of that age-group.

Further advantages, and differences from the prior art are contained in the further objects and characteristics of the invention, as disclosed in the following summary and detailed description of the invention.
SUMMARY OF THE INVENTION

The present invention relates to educational devices using process-based methods for training various age groups to memorize the key-finger assignment of the keyboard, and in particular for preparing pre-school children for keyboarding while developing their lateral and vertical thinking.

The devices disclosed comprise various sets of gloves and rings which are to be worn accordingly by pre-school children, school children, and teenagers. These gloves and rings provide various representation of the keyboard, and various mnemonic means to facilitate the memorization of the key-finger assignment. The mnemonic means include various types of indicia mounted on the fingers of the gloves and on the rings. The choice of indicia is adaptive to the needs and psychology of each individual child or teenager.

For the pre-school child who has not yet learned his alphabet, the indicia comprise pictures defining objects, which object names begin with the letter corresponding to the key of the keyboard to be struck by the proper finger. The indicia evolve with the learning process into an association of pictures and letters for teaching the alphabet to the pre-school child in the context of the key-finger assignment of the keyboard.

After the pre-school child has learned his alphabet with his/her mnemonic gloves, the set of indicia is reduced to the alphanumeric characters of the keyboard, i.e. the letters, numbers, and punctuation symbols. The child then further learns to memorize the location of the keys in the keyboard.

Towards further reinforcing the memorization of the key-finger assignment of the keyboard, the indicia are then extended to incorporate word-spelling and language vocabulary. With these new sets of indicia, the school child or teenager will be motivated to use his/her knowledge of the keyboard for learning how to spell and for learning a foreign language. In return, these new learning activities will also strengthened the memorization of the keyboard.

It is an object of the invention to meet adaptively the psychological and behavioral needs of each age group to motivate the child/teenager to learn the
standardized keyboard.

It is therefore an object of the invention to prepare pre-school children for keyboarding by providing them mnemonic means to start learning the key-finger assignment of the keyboard; yet without training them to actually practice on the keyboard to begin with, because of the fragility of their joints.

It is also an object of the present invention to provide a comfortable and protective feeling to the pre-school child to be encouraged to learn as early as three-year old. There lies the motivation for choosing the picture gloves to meet the child’s needs for control and comfort. The fact that these gloves do not give to the fingers the mobility and sense of touch that is needed by the typist actually using the keyboard is of no relevance to the scope of the present invention, since the pre-school child will not practice at the keyboard to begin with. This structural characteristic of the present invention sets it further apart from the prior art which primarily aimed at securing unhindered use of the fingers in using the keyboard, without giving prime consideration to the psychological and behavioral needs of the learner.

It is a further object of the invention to help the pre-school child memorize his pictures and their locations on his/her glove fingers. The fact that the learner typist would not be able to see the images at the tip of his fingers is of no relevance to the scope of the present invention, since the pre-school child will not practice at the keyboard to begin with. The latter structural characteristic of the present invention sets it further apart from the prior art which primarily aimed at providing the learner typist with an unobstructed view of the key-finger assignment, without giving prime consideration to the impracticalities resulting from such a requirement (e.g. upward finger like extensions leaving the top of the hands).

It is also an object of the invention to address the dual needs of teenagers for peer group communication and secrecy towards facilitating their learning of the keyboard. There lies the motivation for choosing the picture rings that have the dual characteristics of being both attractive and mysterious.

It is a further object of the invention to provide mnemonic aids in terms of column (vertical series of images on each finger), row (lateral series of images hand
wide), and matrix (array of pictures on each picture-glove) to facilitate the
memorization of the representation of the keyboard.

Another object of the present invention is to allow for tactile memorization of
the shapes and textures of the pictures, thus enabling the use of these mnemonic gloves
by a visually-impaired learner.

Another object of the present invention is to reinforce the memorization of the
glove pictures by means of auditory and mental associations in the context of
*story-telling*. For example, the puzzling *shapes* of the punctuation symbols on the right
little finger (corresponding to the P-key) could be introduced to the pre-school child in
a fun way with the intriguing story of Piggy (for the letter P):

"Once upon a time, there was a little Pig
named "Piggy".

Piggy was all pink but had a black tail.
Because of its black tail, the other little pigs
would not play with him.

So, Piggy was all alone, and very sad.
On the eighth day of Christmas, "Piggy" decided
to have fun and be happy in spite of all.
So, he went to pick the "dot" over the letter "i"
in his name "Piggy", and he attached its
black curly tail to it.
"Piggy" laughed so much when he realized
he had created a "semi-colon".

(Can you see the semi-colon on your Magic Gloves?)

Then, "Piggy" went on attaching the dot to
its black curly tail.
"Piggy" laughed so much when he realized
he had created a "question-mark".

(Can you see the question-mark on your Magic Gloves?)

"Piggy" was more and more happy about
his black tail.

When he pulled on his curly black tail,
he was so happily surprised to create a "slash".
(Can you see the "slash" sign on your Magic Gloves?).

With his new creative skills, "Piggy" felt brave enough
to go and challenge the other little pigs.
So, Piggy went and picked the "dot" from the "i"
in the name of another little Pig,
and he put it exactly above his own "dot".

When the other little pigs realized that "Piggy"
had just created a "colon", they all laughed so much.
(Now can you find the colon on your Magic Gloves?)
Now in the village, every little pig is talking about
"Piggy" and his black curly tail.

It is a further object of the invention to train the child how to relate the pictures
with one-another on each finger in the context of story-telling, thereby setting the
foundations for the intellectual framework that he/she will need later in his/her adult
life in relating concepts, systems, and disciplines altogether.

It is also an object of the invention to educate the pre-school child to

simultaneously deal with the concepts of limitation and freedom by motivating him to
invent and tell his own stories within the limitation of the glove pictures, with the
goals of:

1.) training the pre-school child to simultaneously practice his lateral
and vertical thinking;

2.) indirectly raising the child's awareness to the future necessity of
learning about the hardware/software limitations of the computer (e.g. programming
language) to be able to use it as creatively and productively as possible;

3.) exposing the child at a very early age to the art of compromise,
in teaching him the importance of accommodating for the limitations of the outside
world without suppressing his own creative abilities.

It is an advantage of the present invention to generate dynamic interactions
between parents (or care-takers) and children, thereby involving the parents, or
grandparents, in the child education at the earliest stages of the educational process.

The above as well as further objects, essential details and advantages of the
invention will become apparent from the following detailed description of the devices,
and their utilization in conjunction with the story-telling educational method.

**BRIEF DESCRIPTION OF THE DRAWINGS**

**FIG. 1** is a matrix representation of the standardized keyboard (letters, numbers, and
punctuation symbols) which indicates the key-finger assignment.

**FIG. 2** depicts elevated views of picture gloves with color-coded fingers:
2a, left glove;
2b, right glove.

FIG. 3 depicts elevated views of gloves with color-coded picture-indicia on their back portions and alphanumerical-indicia on their palm portions:

3a, back portion of left glove;
3b, palm portion of right glove;
3c, back portion of right glove;
3e, palm portion of left glove.

FIG. 4 depicts elevated views of gloves with object-indicia on their back portions and raised Braille-indicia on their palm portions for a visually-impaired person, with a side-view of the Braille representation of the letter "P" on the little finger of the palm portion of the left glove which shows the raised surfaces of the indicia on the palm portions for tactile recognition and memorization of alphanumerical symbols by a visually impaired person:

4a, back portion of left glove;
4b, palm portion of right glove;
4c, back portion of right glove;
4e, palm portion of left glove.

FIG. 5 depicts elevated views of gloves with color-coded picture-indicia on their back portions and sign-language-indicia on their palm portions for a hearing-impaired person:

5a, back portion of left glove;
5b, palm portion of right glove;
5c, back portion of right glove;
5e, palm portion of left glove.

FIG. 6 depicts elevated views of alphanumerical gloves (i.e. letters, numbers, and punctuation symbols of the keyboard) with color-coded fingers:

6a, left glove;
6b, right glove.

FIG. 7 depicts the elevated views of the gloves given in FIG. 3 in relation to the
representation of the standardized keyboard given in FIG. 1.

FIG. 8 depicts elevated views of gloves with inserted color-coded picture-indicia on their back portions and inserted picture-name-indicia on their palm portions for learning writing, spelling, and language vocabulary (English):

8a, back portion of left glove;
8b, palm portion of right glove;
8c, back portion of right glove;
8e, palm portion of left glove.

FIG. 9 depicts elevated views of gloves with inserted color-coded picture-indicia on their back portions and inserted picture-name-indicia on their palm portions for learning writing, spelling, and language vocabulary (French):

9a, back portion of left glove;
9b, palm portion of right glove;
9c, back portion of right glove;
9e, palm portion of left glove.

FIG. 10 depicts elevated views of gloves with inserted color-coded photo/object-indicia on their back portions and inserted photo/object-name indicia on their palm portions for facilitating self-expression:

10a, back portion of left glove;
10b, palm portion of right glove;
10c, back portion of right glove;
10e, palm portion of left glove.

FIG. 11 depicts a set of picture-rings to help teenagers memorize the key-finger assignment of the keyboard.

DETAILED DESCRIPTION OF THE INVENTION

In accordance with the aforementioned needs, a system is proposed for teaching which keys of the keyboard are to be struck by which fingers. The system based on gloves and rings provides a mapping of the keyboard which is to be worn accordingly onto the left hand, and the right hand. The disclosed educational devices using a
process-based educational method not only account for the learner's needs and
limitations in the three important stages of growth and development (i.e., pre-school
age, school age, and adolescent age), but also account for the needs of today's working
parents in terms of lack of time, money, and energy in dealing with the education of
their children.

Pre-School Age Group

First Phase: Picture Gloves

Although the pre-school child has not yet learned his alphabet, he is very
receptive to associations between images and spoken words. This receptivity is the
basis for providing the pre-school child with a pair of gloves carrying a series of
images on their four left/right fingers. The spatial distribution of the images on the
four fingers of each glove is determined as follows. The position of an image on the
glove matches the position of the key of the keyboard which bears the initial letter of
the (spoken) word representing the said image. This procedure is explained in detail
by comparing the standardized keyboard of Fig. 1 with the drawings of the left-hand
glove and right-hand glove in Fig. 2a and Fig. 2b, respectively.

In Fig. 2a, the little finger carries from bottom-to-top the pictures of a "Zebu",
an "Apple", and a "Quail"; thus matching the series of letters "ZAQ" of the first
column in Fig. 1. The second finger carries the pictures of a "Xylophone", a "Spider",
and a "Wheel"; thus matching the series of letters "XSW" of the second column of
Fig. 1. The third finger carries the pictures of a "Cat", a "Duck", and an "Elephant";
thus matching the series of letters "CDE" of the third column of Fig. 1. The fourth
finger carries two series of pictures slightly shifted from each other. The series of
pictures that are shifted to the left is a "Vase", a "Flower", and a "Rabbit"; thus
matching the series of letters "VFR" of the fourth column in Fig. 1. The other series
of pictures (shifted to the right) is a "Butterfly", a "Goose", and a "Tiger"; thus
matching the series of letters "BGT" of the fifth column in Fig. 1. Therefore, the
left-hand picture-glove also identifies the correspondence between left-hand fingers and
the columns of the keyboard: little finger strikes column 1, second finger strikes
column 2, third finger strikes column 3, fourth finger strikes columns 4 and 5.
This finger/column association can be reinforced during training by color-coding the keys of the keyboard to match the four different colors of the four fingers of the left-hand glove, which would have to be standardized. For example in Fig. 2a, the choice of colors is pink for the little finger, red for the second finger, green for the third finger, and yellow and orange for the fourth finger.

The tip of each finger of the left-hand picture glove in Fig. 2a shows a cluster of black dots. The number of dots in each cluster is chosen to coincide with the number printed on the matching key of the keyboard. The single dot on the little finger matches number "1" on the upper key in column 1 of Fig. 1. The two dots on the second finger tip match number "2" on the upper key in column 2 of Fig. 1. The three dots on the third finger tip match number "3" on the upper key in column 3 of Fig. 1. The fourth finger tip of the left glove shows two clusters of dots that are slightly shifted. The cluster shifted to the left has four dots to match number "4" on the upper key of column 4 in Fig. 1, whereas the cluster shifted to the right has five dots to match number "5" on the upper key of column 5 in Fig. 1. This structure is beneficial to the education of the pre-school child age group. First, it will help the child to learn how to count on the fingers of his hands while becoming familiar with the concept of symbol or abstract representation. Second, he will learn how to do that by associating each number with the finger that will be used later to strike the matching key on the keyboard.

The functional role of the right-hand picture-glove depicted in Fig. 2b is the same as above. The little finger shows a "Pear", matching the "P" key of the 10th column of Fig. 1; the second finger shows a "Ladybug" and an "Orange", matching the "LO" keys of the 9th column; the third finger shows a "Key" and an "Iron", matching the "KI" keys of the 8th column; the fourth finger shows a "Mouse", a "Jack-in-the-box", and an "Umbrella" (shifted right), and a "Nut", a "Horse", and "Yarn" (shifted left), matching the "MJU" keys of the 7th column and the "NYH" keys of column 6 in Fig. 1. The association between fingers and keyboard columns is reinforced by color-coding the little finger in pink, the second finger in red, the third finger in green, and the fourth finger in yellow and orange.
Like with the left-hand glove, the finger tips of the right-hand glove show clusters of black dots to symbolize the number printed on the matching keys of the keyboard. The little finger tip shows the number "0" itself to match the upper key of column 10 in Fig. 1. The **nine** dots on the second finger tip match number "9" on the upper key of column 9 in Fig. 1. The **eight** dots on the third finger tip match number "8" on the upper key of column 8 in Fig. 1. The fourth finger tip shows two clusters of black dots slightly shifted from each other. The right-shifted cluster has **seven** dots, and matches number "7" on the upper key of column 7 in Fig. 1, whereas the **six** dots of the left-shifted cluster match number "6" on the upper key of column 6 in Fig. 1.

By construction, the choice of images of the picture gloves is clearly not unique, and by no means restricted to the choice given in Fig. 2a and Fig. 2b. In Fig. 2a for example, one could choose the picture of a "Queen" instead of a "Quail". The only requirement is that the initial letter of the word representing the picture matches the key which occupies the same position, as illustrated above. Nevertheless, because of the associative nature of the memorizing process, enhanced memorization performance will result from choosing pictures which share some common features, and which are most appropriate to the age of each small child. For example, at an age when the child discovers the fairy tale of Snow White, a pertinent choice for the pictures on the little finger of the left hand could be a mean-looking "Queen", an "Apple", and the "Zees" of Snow White lying on her bed, plunged in a deep sleep after eating the cursed apple given to her by the mean queen. Such a pictorial representation of Snow White’s fairy tale would take definite advantage of the child’s driving-time\textsuperscript{13}, and enhance visual memorization by the child.

Such picture correlations towards enhanced visual memorization can be need-adaptively implemented throughout the child’s growth. During early childhood for example, the child could wear picture gloves illustrating family relationship. As the child grows older, he could wear picture gloves with more emphasis on cultural

or social content for example. Picture gloves could thus be manufactured according to a certain theme, following the procedure described above and using screen-printing or "decal" technologies that are known to be safe for the very young children. A cost-effective alternative to having multiple pairs of gloves is proposed as a single pair of gloves with removable pictures. For older children, the latter structure would be done by printing on the glove Velcro bases instead of pictures. The pictures would be separate entities with a Velcro back that could be easily attached on, or removed from, the complementary Velcro base of the gloves. Letters matching the keys of the keyboard should be printed on the proper Velcro bases of the gloves. This would indicate unambiguously where to put the pictures on the gloves in accordance with the touch-typing/training procedure described above. As another alternative, the pictures could also be mounted on flexible labels that would be inserted within transparent covers permanently mounted on each one of the four fingers of each hand. Such a transparent cover could be made of plastic, or knitted laces, depending on the structure of the gloves. Of course, proper setting of such need-adaptive picture gloves would require close supervision of the child by an adult.

For safety, economy, comfort, and beauty purposes, the picture gloves can be made of cotton, or any kind of see-through material. They can also be crocheted out of cotton. When crocheted, the picture gloves are stretchable, so that a pair of gloves can be worn by children with hands of different size, or by the same child during his pre-school growth. Besides this economical advantage, crocheted cotton provides comfort by not retaining sweat on the fingers, but instead letting the skin breath openly. In winter time however, picture gloves that cover entirely the hands may be needed when the child is playing outside.

In summary, these pedagogical picture gloves are:

1.) convenient and functional;
2.) safe and comfortable;
3.) fun and unique;
4.) colorful and attractive;
5.) fundamental to learning;
6.) cost-effective.

Second Phase: Alphanumeric/Picture Gloves

The pre-school age child who would be highly exposed to his glove images would visually memorize the spatial mapping of the spoken words which represent these images. Learning with this glove will be continuous and dynamic. Before reaching the school age, the child will start learning the alphabet by wearing the alphanumeric/picture gloves depicted in Fig. 3, and which show how to associate the initial letter of the name of a picture with the picture itself. As shown in Fig. 3, the alphanumeric/picture gloves provide the same pictorial representation of the keyboard as the picture gloves on the back sides of the gloves, yet with an additional alphanumeric representation of the keyboard on the palm sides of the gloves. As shown in Fig. 3a & 3d, the letters, numbers, and punctuation symbols of the keys to be struck by the fingers of the left hand are indicated on the palm-side of the corresponding fingers of the right-hand glove. For example, the letters "Q", "A", and "Z" corresponding to the keys to be struck by the left little finger are precisely indicated on the palm side of the little finger of the right-hand glove. Likewise, the letters, numbers, and punctuation symbols of the keys to be struck by the fingers of the right-hand are indicated on the palm-side of the corresponding fingers of the left hand glove. To learn the alphabet and the numbers, the pre-school child wearing the gloves would simply have to turn one of his hands to see the correspondence between each letter and the picture which occupies the same position on the opposite hand, and which picture name begins with the same said letter.

Visually-impaired learners would benefit from the same learning process by wearing Braille-Alphanumeric/Picture Gloves which provide a Braille representation of the alphanumeric keys of the keyboard on the palm sides of the gloves, as shown in Fig. 4. The palm portions of the thumbs of both Braille-Alphanumeric/Picture Gloves are left open; and the alphanumeric characters are made of raised dots to enable their tactile recognition by the person wearing the gloves, as shown in Fig. 4d by the side view of the Braille representation of the letter "P" located on the palm side of the left little finger. These raised dots could be cost-effectively implemented by using "puffy"
screen-printing techniques. The pictures on the back side of the
Braille-Alphanumeric/Picture Gloves could also be implemented as raised surfaces
using the latter techniques, or as three-dimensional objects mounted on the glove
fingers in order to facilitate their tactile recognition by the visually-impaired learner
wearing the gloves.

Hearing-impaired learners would also benefit from the same learning process by
wearing the Sign-Language-Alphanumeric/Picture Gloves which provide a
Sign-Language representation of the alphanumeric keys of the keyboard on the palm
sides of the gloves, as shown in Fig. 5.

School Age Group

Alphanumeric Gloves

When the child leaves the pre-school age and enters the school age, he will
normally know very well his alphabet and the numbers, if not more. As the child
acquires or further develops his writing/reading skills, he can be given the (additional)
opportunity to memorize the key-finger assignment of the keyboard by wearing the
Alphanumeric Gloves shown in Fig. 6. The alphanumeric gloves provide a precise
representation of the keyboard on the back-side of the glove fingers, by indicating the
letters, numbers, and punctuation symbols of the keys to be struck by the
 corresponding fingers.

To learn the alphabet in the context of the key-finger assignment of the
keyboard, the pre-school child wearing the alphanumeric/picture gloves had to turn the
palm of one his hands towards him. After learning his alphabet, the child wearing the
alphanumeric/picture gloves would have had to turn the palms of his both hands, then
bring his right palm on his left hand side, and his left palm on his right hand side, to
obtain the whole representation of the keyboard as it would appear when practicing at
the keyboard. There lies the motivation for the process-driven evolution of the
alphanumeric/picture gloves of Fig. 3 into the alphanumeric gloves of Fig. 6: providing
the child knowing his alphabet with a means for visualizing and memorizing the
keyboard as it would appear to him if he were actually practicing at the keyboard.

If a school child had previously learned his alphabet with the
alphanumeric/picture gloves, wearing the alphanumeric gloves would reinforce his visual memorization of the keyboard. If a school child had never used the alphanumeric/picture gloves, he would still be given the opportunity to learn the key-finger assignment of the keyboard by wearing the alphanumeric gloves and/or the alphanumeric/picture gloves, whatever the choice. In both cases, the child will memorize the key-finger assignment of the keyboard before even using a keyboard. As a result, learning to use the keyboard will be much easier, since the child will already know which finger strikes which key. He will therefore only need to focus his attention on developing the motor skills required for efficient touch-typing.

Visually-impaired and hearing-impaired children would also benefit from the same learning opportunities with the Braille and Sign-Language implementation of the alphanumeric gloves, respectively.

The overall process of learning the key-finger assignment of the keyboard is summarized in Fig. 7 which shows the picture gloves of Fig. 2, the alphanumeric/picture gloves of Fig. 3, as well as the alphanumeric gloves of Fig. 6, in relation to the standardized keyboard of Fig. 1.

**Word-Spelling/Picture Gloves**

As the school child simultaneously develops his reading/writing skills, much is to be gained from an educational device that teaches him proper word-spelling in the context of the key-finger assignment. By wearing the word-spelling picture gloves depicted in Fig. 8, the child’s memorization of the key-finger assignment of the keyboard is reinforced, while he learns new words and their spelling in a fun and dynamic manner. As illustrated in Fig. 8, the structure of the word-spelling/picture gloves is most simply understood as an extension of the alphanumeric/picture gloves of Fig. 3, where the letters indicated on the palm portion of each glove are replaced by the full written names of the objects represented by the corresponding pictures on the back portion of the other glove. In the illustration of Fig. 8, if the school child wearing the gloves turns the palm of his right hand towards himself, he very easily learns that the name of the top animal on his major left finger is given by the top name written under his right forefinger, i.e. "Elephant". He simultaneously memorizes
that the letter "E" is located at the top of the third column of keys of the keyboard to be struck by the left major finger.

The series of pictures or written names corresponding to the same finger would be color-coded, and mounted/printed on flexible labels inserted within transparent covers permanently mounted to the gloves. While being cost-effective, such an implementation can meet any need for picture styles and diversity.

School Age Group And Teenagers

Language/Picture Gloves

As the school child or teenager learns a foreign language, much is also to be gained from the language/picture gloves of Fig. 9 to synergistically teach the child foreign vocabulary in the context of the key-finger assignment of the keyboard. As seen in Fig. 9, the language/picture gloves are most simply understood as an extension of the word-spelling/gloves of Fig. 8 where the identification of the pictures and the writing of said picture names are both made in a foreign language. For example, in the illustration of Fig. 9 for teaching French language, the french name for "Spider" is "Araign_e", so that the "French" spider is now hanging in the middle of the left little finger. As the school-age child or teenager would have had by then multifarious opportunities to memorize the key-finger assignment of the keyboard, they could use the latter memorization to ease the learning of foreign language. For example, the visual memorization of the "French" spider in the middle of the left little finger, together with the memorization of the "A" key corresponding to that location, will provide a mnemonic means for remembering that the french name for "Spider" starts with an "A". Owing to the associative nature of the memory process, it then becomes more easy for the school child or teenager to retrieve the word "Araign_e".

Self-Expression/Picture Gloves

As the educational process evolves, the school age or teenager will progressively develop a feeling of companionship for his mnemonic gloves which will have provided him with comfort, security, and so many joyful experiences throughout the difficult stages of his growth and development. Next to, or during the adolescence, the school child or teenager experiences one of the most challenging physical and
emotional transformations of his life. Much is therefore to be gained from an educational device such as the Self-Expression/Picture gloves of Fig. 10 to alleviate the pain of this strainful transformation by encouraging the self-expression of the school child or teenager. As seen in Fig. 10, the Self-Expression/Picture Gloves are most simply understood as the following extension of the Word-Spelling/Picture Gloves of Fig. 8: the removable pictures on the back side of the gloves can now include the photos of people having a direct impact on the life of the school child or teenager, e.g. father/mother or brother/sister, and the photos of pets or familiar objects. The real names of the said people, pets, and objects are written in the corresponding finger location of the palm sides of the gloves.

By creating a real life-like situation, yet far less threatening than in reality, the self-expression/picture gloves will help the child/teenager wearing the gloves to express stressful feelings or emotions that would otherwise be difficult to verbalize. The child/teenager would then be encouraged to express himself freely, yet within the limitation of the keyboard, which would also reinforce the memorization of the keyboard.

**Teenagers**

**Picture Rings**

The picture gloves provided the pre-school child with comfort and protection, and satisfied his needs for feeling of togetherness and control. In contrast, teenagers like challenge and diversity, and they want to be treated as adults seeking independence. It is to satisfy such needs that the picture gloves have been transformed into the picture rings illustrated in Fig. 11.

As shown in Fig. 11, the ring of the left little finger carries the pictures of a Queen, an Apple, and a Zero to indicate the QAZ-keys. The ring of the left ring-finger carries the pictures of a Whale, a Sun-shine, and a Xylophone to indicate the WSX-keys. The ring of the left major finger carries the pictures of an Elephant, a Dog, and a Cat to indicate the EDC-keys. The ring of the left forefinger carries the pictures of a Rabbit, a Fish, and a Violin to indicate the RFV-keys, and a Tree, a Goat, and Butterfly to indicate the TGB-keys.
Also in Fig. 11, the ring of the right little finger carries the picture of a Pig to indicate the P-key, and various punctuation symbols. The ring of the right ring finger carries the pictures of an Owl and a Lemon to indicate the OL-keys, and some symbols. The ring of the right major finger carries the pictures of an Ice-skate and a King to indicate the IK-keys, and some symbols. The ring of the right forefinger carries the pictures of an Umbrella, Jam, and a Mouse to indicate the UJM-keys, as well as the pictures of Yarn, a Heart, and a Nurse to indicate the YHN-keys.

These rings will give teenagers the opportunity to explore and create their own world by choosing the type of objects they like, and the type of stories that they like to create with these objects. They will also provide teenagers with a healthy and challenging means of communication among peers and with their parents. The practicality and attractiveness of these rings make them also convenient to wear during a variety of activities, such as walking, watching TV, driving, etc... Yet, these rings will also discipline the thought processes of the teenagers by forcing their imagination to remain within the limitation of the keyboard.

It is known that repetition and reinforcement with the aid of visualization are key factors in psycho-motor development. It is therefore expected that the variety of learning experiences provided by all of the aforementioned mnemonic gloves constitute a unique process for the child/teenager to develop the psycho-motor skills required for touch-typing.

The invention has been described in detail with particular emphasis on the preferred embodiments thereof, but it should be understood that variations and modifications within the spirit and scope of the invention may occur to those skilled in the art to which the invention pertains.
What is Claimed is:

1. An educational device for learning a standardized keyboard comprising a first glove having fingers and a second glove having fingers, said first glove being adapted to fit the left hand of a learner, said second glove being adapted to fit the right hand of a learner, said first glove having a first set of indicia mounted on the fingers thereof, said second glove having a second set of indicia mounted on the fingers thereof, said first set of indicia on said fingers of said first glove having first shapes defining objects which object names begin with a letter corresponding to the key of the keyboard to be struck by said finger of said left hand, said second set of indicia on said fingers of said second glove having second shapes defining objects which object names begin with a letter corresponding to the key of the keyboard to be struck by said finger of said right hand.

2. An educational device for learning a standardized keyboard as claimed in claim 1 wherein said first set of indicia comprise phonetic and numeric aids as mnemonic means for remembering/learning the location of certain keys on said keyboard, and said second set of indicia comprise phonetic and numeric aids as mnemonic means for remembering/learning the location of certain keys on said keyboard.

3. An educational device for learning a standardized keyboard as claimed in claim 1 wherein said first set of indicia on said fingers of said first gloves have colors associated therewith and matching the corresponding color-coded keys of the keyboard, and said second set of indicia on said fingers of said second glove have colors associated therewith and matching the corresponding color-coded keys of the keyboard.

4. An educational device for learning a standardized keyboard as claimed in claim 1 wherein said first glove comprises a thumb portion having a first opening, said second glove comprises a second thumb portion having a second opening, said first opening of said thumb portion of said first glove and said second opening of said second thumb portion of said second glove enabling tactile recognition of said second shapes and said first shapes, respectively.
5. An educational device for learning a standardized keyboard as claimed in claim 1 wherein said shapes of said sets of indicia comprise raised or flat surfaces on said fingers of said hands.

6. An educational device for learning a standardized keyboard as claimed in claim 1 wherein said shapes of said sets of indicia comprise three-dimensional forms mounted on said fingers of said hands.

7. An educational device for learning a standardized keyboard comprising a first glove having fingers and a second glove having fingers, said first glove being adapted to fit the left hand, said second glove being adapted to fit the right hand, said first glove having a first set of indicia mounted as mnemonic means on the fingers thereof, said second glove having a second set of indicia mounted as mnemonic means on the fingers thereof, said first set of indicia on said fingers of said first glove having first shapes, said first shapes comprising raised or flat surfaces indicating the precise letters, numbers, and punctuation symbols of said keys of the keyboard to be struck by said fingers of said left hand, said second set of indicia having second shapes, said second shapes comprising raised or flat surfaces indicating the precise letters, numbers, and punctuation symbols of said keys of the keyboard to be struck by said fingers of said right hand.

8. An educational device for learning a standardized keyboard comprising a first glove having fingers and a second glove having fingers, said first glove being adapted to fit the left hand, said second glove being adapted to fit the right hand, said first glove having a first set of indicia mounted as mnemonic means on the fingers thereof, said second glove having a second set of indicia mounted as mnemonic means on the fingers thereof, said first set of indicia on said fingers of said first glove having first shapes, said first shapes comprising raised surfaces indicating the precise Braille representation of the letters, numbers, and punctuation symbols of said keys of the keyboard to be struck by said fingers of said left hand of a visually-impaired learner, said second set of indicia having second shapes, said second shapes comprising raised surfaces indicating the precise Braille representation of the letters, numbers, and punctuation symbols of said keys of the keyboard to be struck by said fingers of said
right hand of a visually-impaired learner, said first glove comprising a thumb portion having a first opening, said second glove comprising a second thumb portion having a second opening, said first opening of said thumb portion of said first glove and said second opening of said second thumb portion of said second glove enabling tactile recognition of said second shapes and said first shapes, respectively, by a visually-impaired learner.

9. An educational device for learning a standardized keyboard comprising a first glove having fingers and a second glove having fingers, said first glove being adapted to fit the left hand, said second glove being adapted to fit the right hand, said first glove having a first set of indicia mounted as mnemonic means on the fingers thereof, said second glove having a second set of indicia mounted as mnemonic means on the fingers thereof, said first set of indicia on said fingers of said first glove having first shapes, said first shapes comprising raised or flat surfaces indicating the precise sign-language representation of the letters, numbers, and punctuation symbols of said keys of the keyboard to be struck by said fingers of said left hand of a hearing-impaired learner, said second set of indicia having second shapes, said second shapes comprising raised or flat surfaces indicating the precise sign-language representation of the letters, numbers, and punctuation symbols of said keys of the keyboard to be struck by said fingers of said right hand of a hearing-impaired learner.

10. An educational device for learning a standardized keyboard comprising a first glove and a second glove, said first glove being adapted to fit the left hand, including fingers and thumb of a learner, said first glove having a first portion on the palm side of the left hand, said first glove having a second portion on the back side of the left hand, said second glove being adapted to fit the right hand, including fingers and thumb of a learner, said second glove having a third portion on the palm side of the right hand of a learner, said second glove having a fourth portion on the back side of the right hand, said first portion of said first glove having a first opening therein, said third portion of said second glove having a second opening therein, said first glove having a first set of indicia mounted on said first portion thereof, said first glove having a second set of indicia mounted on said second portion thereof, said second
glove having a third set of indicia mounted on said third portion thereof, said second glove having a fourth set of indicia mounted on said fourth portion thereof, said first set of indicia correspond to keys on said keyboard to be struck by said right hand and fingers, said second set of indicia correspond to keys on said keyboard to be struck by said left hand and fingers, said third set of indicia correspond to keys on said keyboard to be struck by said left hand and fingers, said fourth set of indicia correspond to keys on said keyboard to be struck by said right hand and fingers, said first opening of said portion of said first glove enabling tactile recognition and memorization, said second opening of said third portion of said second glove enabling tactile recognition and

11. An educational device for learning a standardized keyboard as claimed in claim 10 wherein said sets of indicia have shapes comprising raised or flat surfaces on said fingers of said hands.

12. An educational device for learning a standardized keyboard as claimed in claim 10 wherein said sets of indicia have shapes comprising three-dimensional forms mounted on said fingers of said hands.

13. An educational device for learning a standardized keyboard as claimed in claim 10 wherein said second set of indicia and said fourth set of indicia comprise mnemonic means for remembering the location of certain keys on said keyboard. said first set of indicia and said third set of indicia comprise mnemonic means for remembering the location of certain keys on said keyboard.

14. An educational device for learning a standardized keyboard as claimed in claim 10 wherein said second set of indicia and third set of indicia on said fingers of said second portion and said third portion respectively have the same colors associated therewith and matching the corresponding color-coded keys of the keyboard, and said first set of indicia and fourth set of indicia on said fingers of said first portion and said fourth portion respectively have the same colors associated therewith and matching the corresponding color-coded keys of the keyboard.

15. An educational device for learning a standardized keyboard and for simultaneously learning the alphabet as claimed in claim 10 wherein said first set of
indicia indicate the precise letters, numbers, and punctuation symbols of said keys of the keyboard to be struck by said fingers of said right hand, said third set of indicia indicates the precise letters, numbers, and punctuation symbols of said keys of the keyboard to be struck by said fingers of said left hand, said second set of indicia has shapes defining objects which object names begin with a letter corresponding to the key of the keyboard to be struck by said finger of said left hand, said fourth set of indicia has shapes defining objects which objects names begin with a letter corresponding to the key of the keyboard to be struck by said finger of said right hand.

16. An educational device for learning a standardized keyboard and for simultaneously learning the alphabet as claimed in claim 11 wherein said first set of indicia has raised surfaces which are the precise Braille representation of the letters, numbers, and punctuation symbols of said keys of the keyboard to be struck by said fingers of said right hand of a visually-impaired learner, said third set of indicia has raised surfaces which are the precise Braille representation of the letters, numbers, and punctuation symbols of said keys of the keyboard to be struck by said fingers of said right hand of a visually-impaired learner, said second set of indicia has shapes defining objects which object names begin with a letter corresponding to said key of the keyboard to be struck by said finger of said left hand of a visually-impaired learner, said fourth set of indicia has shapes defining objects which object names begin with a letter corresponding to said key of the keyboard to be struck by said finger of said right hand of a visually-impaired learner.

17. An educational device for learning a standardized keyboard and for simultaneously learning the alphabet as claimed in claim 10 wherein said first set of indicia indicate the precise sign-language representation of the letters, numbers, and punctuation symbols of said keys of the keyboard to be struck by said fingers of said right hand of a hearing-impaired learner, said third set of indicia indicate the precise sign-language representation of the letters, numbers, and punctuation symbols of said keys of the keyboard to be struck by said fingers of said right hand of a hearing-impaired learner, said second set of indicia have shapes comprising raised or flat surfaces defining objects which objects names begin with a letter corresponding to
said keys of the keyboard to be struck by said fingers of said left hand of a hearing-impaired learner, and said fourth set of indicia have shapes comprising raised or flat surfaces defining objects which objects names begin with a letter corresponding to said keys of the keyboard to be struck by said fingers of said right hand of a hearing-impaired learner.

18. An educational device for learning a standardized keyboard and for simultaneously learning writing, spelling, and language(s) vocabulary as claimed in claim 10 wherein said second set of indicia define objects which object names begin with a letter corresponding to the key of the keyboard to be struck by said finger of said left hand, said third set of indicia indicate the precise native-language or foreign-language spelling of the corresponding said objects defined by said second set of indicia, said fourth set of indicia define objects which objects names begin with a letter corresponding to the key of the keyboard to be struck by said finger of said right hand, wherein said first set of indicia indicate the precise native-language or foreign-language spelling of the corresponding said objects defined by said first set of indicia.

19. An educational device for learning a standardized keyboard and for facilitating self-expression as claimed in claim 10 wherein said second set of indicia represent people or objects whose names begin with a letter corresponding to the key of the keyboard to be struck by said finger of said left hand, said third set of indicia indicate the names of the corresponding said people or said objects defined by said second set of indicia, said fourth set of indicia represent people or objects whose names begin with a letter corresponding to the key of the keyboard to be struck by said finger of said right hand, wherein said first set of indicia indicate the names of the corresponding said people or said objects defined by said first set of indicia.

20. Educational devices as claimed in claim 18 wherein said indicia are either permanently mounted on or can be removed from said fingers of said gloves, said removable indicia are inserted within a transparent cover permanently mounted on said fingers of said gloves.

21. A process-based educational method for learning the alphabet in the
context of the key-finger assignment of the standardized keyboard, including the four identifiable steps of:

positioning a pair of gloves with fingers on the hands of the person wearing the gloves, said gloves having indicia on the back and palm portions of said fingers, said indicia on said back portions defining objects which object names begin with a letter corresponding to the key of the keyboard to be struck by said finger of said hand, said indicia on said palm portions indicating the precise letters, numbers, and punctuation symbols of the keys of the keyboard to be struck by said fingers of said hands; and orienting both said back portions of said gloves towards the person wearing the gloves;

orienting said back portion of said left hand, and said palm portion of said right hand towards the person wearing the gloves, said objects defined by said indicia on said back portion of said fingers of the left hand beginning with the letter indicated by the indicia on said palm portion of said corresponding fingers of said right hand;

orienting said back portion of said right hand, and said palm portion of said left hand towards the person wearing the gloves, said objects defined by said indicia on said back portion of said fingers of the right hand beginning with the letter indicated by the indicia on said palm portion of said corresponding fingers of said left hand;

orienting both said palm portions of said gloves towards the person wearing the gloves, locating said palm portion of the right hand on the left-hand side of the person wearing the gloves, locating said palm portion of the left hand on the right-hand side of the person wearing the gloves to indicate which finger of the hands is to strike which key of the keyboard;

said indicia include phonetic and numeric aids as a mnemonic means enabling the person wearing the gloves to memorize the location of said indicia on said fingers of said gloves;

said method provides the person wearing the gloves with tactile and visual, and numeric aids for learning the key/finger assignment of a standardized
keyboard.

22. The educational method recited in claim 21 wherein said mnemonic means for memorizing the location of said indicia on said fingers of said gloves comprise:

- telling stories dealing with the indicia mounted on the same fingers of said gloves to the person wearing the gloves, by reading, singing, or audio/visual means;

- said method provides the person wearing the gloves with mental and auditory aids to associate said indicia on said fingers with the keys to be struck by said fingers.

23. A process-based educational method for learning writing, spelling, and languages vocabulary in the context of the key-finger assignment of a standardized keyboard, including the two identifiable steps of:

- positioning a pair of gloves with fingers on the hands of the person wearing the gloves, said gloves having indicia on the back and palm portions of said fingers, said indicia on said back portions defining objects which object names begin with a letter corresponding to the key of the keyboard to be struck by said finger of said hand, said indicia on said palm portions indicating the precise spelling of the names of the objects defined by the indicia on the back portions of the corresponding fingers; and orienting said back portion of said left hand, and said palm portion of said right hand towards the person who is wearing the gloves;

- orienting said back portion of said right hand, and said palm portion of said left hand towards the person wearing the gloves, said names of said objects defined by said indicia on said back portion of said fingers of the right hand being written as indicia on said palm portion of said corresponding fingers of said left hand;

- said indicia include a mnemonic means enabling the person who is wearing the gloves to memorize the spelling of the names of the objects represented on their gloves, and for reinforcing the memorization of the key-finger assignment of a standardized keyboard; and

- said method provides the person wearing the gloves with tactile and
visual, and numeric aids for memorizing vocabulary.

24. The educational method recited in claim 23 wherein said mnemonic means for memorizing word spelling and language vocabulary in the context of the key-finger assignment of the keyboard comprise:

- telling stories dealing with the indicia mounted on the same fingers of said gloves to the person wearing the gloves, by reading, singing, or audio/visual means;

said method provides the person wearing the gloves with mental and auditory aids to memorize spelling, pronunciation, and language vocabulary.

25. An educational method for developing self-expression in the context of the key-finger assignment of the standardized keyboard, including the two identifiable steps of:

- positioning a pair of gloves with fingers on the hands of the person wearing the gloves, said gloves having indicia on the back and palm portions of said fingers, said indicia on said back portions defining people, pets, or familiar objects whose names begin with a letter corresponding to the key of the keyboard to be struck by said finger of said hand, said indicia on said palm portions indicating the precise spelling of the names of the people, pets, or familiar objects defined by the indicia on the back portions of the corresponding fingers; and orienting said back portion of said right hand, and said palm portion of said left hand towards the person wearing the gloves;

- orienting said back portion of said right hand, and said palm portion of said left hand towards the person wearing the gloves, said names of said people, pets, and familiar objects defined by said indicia on said back portion of said fingers of the right hand being written as indicia on said palm portion of said corresponding fingers of said left hand;

said indicia include a mnemonic means enabling the person who is wearing the gloves to express his/her own mental associations with the people, pets, or familiar objects depicted on the gloves;

said method provides the person wearing the gloves with tactile and
visual aids for facilitating the establishment of mental associations with the people, pets, or familiar objects depicted on the gloves.

26. The educational method recited in claim 25 wherein mnemonic means of for facilitating the self-expression of the person wearing the gloves comprise:

story-telling dealing with the indicia by the person wearing the gloves under the supervision of a psycho-therapist;

27. An educational device for learning a standardized keyboard, comprising a pair of gloves having fingers adapted to fit the hands of the learner, said gloves providing a representation of a standardized keyboard, said gloves providing mnemonic means for memorizing the locations of the keyboard, said gloves providing mnemonic means for remembering the key-finger assignment of a standardized keyboard by color-coding the keys of the keyboard and matching the corresponding color-coded fingers of the gloves.

28. An educational device as claimed in claim 27 wherein said mnemonic means includes visual aids and auditory aids, said visual aids comprising shapes mounted on said fingers of said gloves, said shapes defining objects which object names begin with a letter corresponding to the key of the keyboard to be struck by said finger of said hand of the learner, and said auditory aids comprising stories dealing with said object names corresponding to the same finger for remembering the location of the keys of the keyboard to be struck by said finger of said hand.

29. An educational device for learning a standardized keyboard comprising a first set of four rings and a second set of four rings, said first set of four rings are adapted to fit the four fingers of the left-hand of a learner, said second set of four rings are adapted to fit the four fingers of the right-hand of a learner, said first set of rings having a first set of indicia mounted thereon as mnemonic means, said second set of rings having a second set of indicia mounted thereon as mnemonic means, said first set of indicia on said rings of said fingers of said left hand having first shapes defining objects which object names begin with a letter corresponding to the key of the keyboard to be struck by said finger of said left hand, said second set of indicia on said rings of said fingers of said right hand having second shapes defining objects
which object names begin with a letter corresponding to the key of the keyboard to be
struck by said finger of said right hand.

30. An educational device for learning a standardized keyboard as claimed
in claim 29 wherein said shapes of said indicia of said rings comprise raised or flat
surfaces mounted as mnemonic means on said rings of said fingers of said hands.

31. An educational device for learning a standardized keyboard as claimed
in claim 29 wherein said shapes of said indicia of said rings comprise
three-dimensional forms mounted as mnemonic means on said rings of said fingers of
said hands.

32. An educational device for learning a standardized keyboard comprising a
first set of four rings and a second set of four rings, said first set of four rings are
adapted to fit the four fingers of the left-hand of a visually-impaired learner, said
second set of four rings are adapted to fit the four fingers of the right-hand of a
visually-impaired learner, said first set of rings having a first set of indicia mounted
thereon, said second set of rings having a second set of indicia mounted thereon, said
first set of indicia on said rings of said fingers of said left hand having first shapes,
said first shapes comprising raised surfaces indicating the precise Braille representation
of the keys of the keyboard to be struck by said fingers of said left hand of a
visually-impaired learner, said second set of indicia on said rings of said fingers of said
right hand having second shapes, said second shapes comprising raised surfaces
indicating the precise Braille representation of the keys of the keyboard to be struck by
said fingers of said right hand of a visually-impaired learner.

33. An educational device for learning a standardized keyboard comprising a
first set of four rings and a second set of four rings, said first set of four rings are
adapted to fit the four fingers of the left-hand of a hearing-impaired learner, said
second set of four rings are adapted to fit the four fingers of the right-hand of a
hearing-impaired learner, said first set of rings having a first set of indicia mounted
thereon, said second set of rings having a second set of indicia mounted thereon, said
first set of indicia on said rings of said fingers of said left hand having first shapes,
said first shapes comprising raised or flat surfaces indicating the precise sign-language
representation of the keys of the keyboard to be struck by said fingers of said left hand of a hearing-impaired learner, said second set of indicia on said rings of said fingers of said right hand having second shapes, said second shapes comprising raised or flat surfaces indicating the precise sign-language representation of the keys of the keyboard to be struck by said fingers of said right hand of a hearing-impaired learner.
FIG. 1. The key-finger assignment of the standardized keyboard.
a. Back portion of left glove.

FIG. 2a Picture gloves with color-coded fingers.
b. Back portion of right glove.

FIG. 2b Picture gloves with color-coded fingers.
a. Back portion of left glove.

FIG. 3a Gloves with color-coded picture-indicia on their back portions and alphanumeric-indicia on their palm portions.
b. Palm portion of right glove.

FIG. 3b Gloves with color-coded picture-indicia on their back portions and alphanumeric-indicia on their palm portions.
c. Back portion of right glove.

FIG. 3c Gloves with color-coded picture-indicia on their back portions and alphanumeric-indicia on their palm portions.
d. Palm portion of left glove.

FIG. 3d Gloves with color-coded picture-indicia on their back portions and alphanumeric-indicia on their palm portions.
a. Back portion of left glove.

FIG. 4a Gloves with object indicia on their back portions and raised Braille-indicia on their palm portions for a visually-impaired person.
b. Palm portion of right glove.

FIG. 4b Gloves with object indicia on their back portions and raised Braille-indicia on their palm portions for a visually-impaired person.
c. Back portion of right glove.

FIG. 4c Gloves with object indicia on their back portions and raised Braille-indicia on their palm portions for a visually-impaired person.

SUBSTITUTE SHEET
d. Palm portion of left glove.

FIG. 4d Gloves with object indicia on their back portions and raised Braille-indicia on their palm portions for a visually-impaired person.
a. Back portion of left glove.

FIG. 5a Gloves with color-coded picture-indicia on their back portions and sign-language-indicia on their palm portions for a hearing-impaired person.
b. Palm portion of right glove.

FIG. 5b Gloves with color-coded picture-indicia on their back portions and sign-language-indicia on their palm portions for a hearing-impaired person.
c. Back portion of right glove.

FIG. 5c Gloves with color-coded picture-indicia on their back portions and sign-language-indicia on their palm portions for a hearing-impaired person.
d. Palm portion of left glove.

FIG. 5d Gloves with color-coded picture-indicia on their back portions and sign-language-indicia on their palm portions for a hearing-impaired person.
a. Left glove.

FIG. 6a Alphanumeric gloves with color-coded fingers.
b. Right glove.

FIG. 6b Alphanumeric gloves with color-coded fingers.
FIG. 7 Gloves with picture-indicia on their back portions and alphanumeric-indicia on their palm portions, in relation to the standardized keyboard.
a. Back portion of left glove.

FIG. 8a Gloves with inserted color-coded picture-indicia on their back portions and inserted picture-name-indicia on their palm portions for learning writing, spelling, and language vocabulary (English).
b. Palm portion of right glove.

FIG. 8b Gloves with inserted color-coded picture-indicia on their back portions and inserted picture-name-indicia on their palm portions for learning writing, spelling, and language vocabulary (English).
c. Back portion of right glove.

FIG. 8c Gloves with inserted color-coded picture-indicia on their back portions and inserted picture-name-indicia on their palm portions for learning writing, spelling, and language vocabulary (English).
d. Palm portion of left glove.

FIG. 8d Gloves with inserted color-coded picture-indicia on their back portions and inserted picture-name-indicia on their palm portions for learning writing, spelling, and language vocabulary (English).
a. Back portion of left glove.

FIG. 9a Gloves with inserted color-coded picture-indicia on their back portions and inserted picture-name-indicia on their palm portions for learning writing, spelling, and language vocabulary (French).
b. Palm portion of right glove.

FIG. 9b Gloves with inserted color-coded picture-indicia on their back portions and inserted picture-name-indicia on their palm portions for learning writing, spelling, and language vocabulary (French).
c. Back portion of right glove.

FIG. 9c Gloves with inserted color-coded picture-indicia on their back portions and inserted picture-name-indicia on their palm portions for learning writing, spelling, and language vocabulary (French).

SUBSTITUTE SHEET
d. Palm portion of left glove.

FIG. 9d Gloves with inserted color-coded picture-indicia on their back portions and inserted picture-name-indicia on their palm portions for learning writing, spelling, and language vocabulary (French).
a. Back portion of left glove.

FIG. 10a Gloves with inserted color-coded photo/object-indicia on their back portions and inserted photo/object-name-indicia on their palm portions for facilitating self-expression.
b. Palm portion of right glove.

FIG. 10b Gloves with inserted color-coded photo/object-indicia on their back portions and inserted photo/object-name-indicia on their palm portions for facilitating self-expression.

SUBSTITUTE SHEET
c. Back portion of right glove.

FIG. 10c Gloves with inserted color-coded photo/object-indicia on their back portions and inserted photo/object-name-indicia on their palm portions for facilitating self-expression.
d. Palm portion of left glove.

FIG. 10d Gloves with inserted color-coded photo/object-indicia on their back portions and inserted photo/object-name-indicia on their palm portions for facilitating self-expression.
a. Back portion of left glove.

FIG. 11a Set of picture-rings to help teenagers memorize the key-finger assignment of the keyboard.
b. Back portion of right glove.

FIG. 11b  Set of picture-rings to help teenagers memorize the key-finger assignment of the keyboard.
A. CLASSIFICATION OF SUBJECT MATTER

<table>
<thead>
<tr>
<th>IPC(5)</th>
<th>US CL.</th>
</tr>
</thead>
<tbody>
<tr>
<td>409B 13/00</td>
<td>434/233</td>
</tr>
</tbody>
</table>

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)


Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

- APS search terms: 434/clas, glove

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US, A, 2,570,908 (Behr) 09 October 1951, see entire document.</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-6, 8-9, 27-28</td>
</tr>
<tr>
<td>Y</td>
<td>US, A, 4,902,231 (Freer) 20 February 1990, see figures</td>
<td>1-6, 28-31</td>
</tr>
<tr>
<td>Y</td>
<td>US, A, 4,909,739 (Ladner et al) 20 March 1990, see Col. 3, lines 5-68.</td>
<td>3, 27-28</td>
</tr>
<tr>
<td>Y</td>
<td>GB, A, 1,581,453 (Matthew) 17 December 1980, see Figure</td>
<td>6, 8, 32</td>
</tr>
<tr>
<td>Y</td>
<td>US, A, 4,846,687 (White et al) 11 July 1989, See Figure 1.</td>
<td>9, 33</td>
</tr>
</tbody>
</table>

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

- "A" Special categories of cited documents:
  "A" document defining the general state of the art which is not considered to be part of particular relevance
  "E" earlier document published on or after the international filing date
  "L" document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  "O" document referring to an oral disclosure, use, exhibition or other means
  "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "G" document member of the same patent family

Date of the actual completion of the international search:

15 October 1993

Date of mailing of the international search report:

[Signature]

Name and mailing address of the ISA/US Commissioner of Patents and Trademarks:

Box PCT
Washington, D.C. 20231

Facsimile No. NOT APPLICABLE

Authorized officer:

KAREN JALBERT

Telephone No. (703) 308-0858

Form PCT/ISA/210 (second sheet)(July 1992)*
<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>US, A, 0,623,966 (Barkley) 02 May 1899, see Figures.</td>
<td>29-33</td>
</tr>
</tbody>
</table>