An Educational Device

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The invention relates to an educational device, and in particular, an educational device for young children.

Young children, such as babies and infants, learn about their environment by absorbing rules, patterns and the organization of the world around them. This mode of learning is intrinsic to the child and is carried out without any conscious effort by the child. Children pick up the rules of language in this way when language is spoken to them and around them. Learning about the environment by absorbing information from it takes place as long as the necessary information is effectively provided for in the child's environment. From birth, a child generally receives aural language stimulation before visual language stimulation. Hence, the child recognizes spoken words before recognizing written words.

Therefore, it is desirable with young children to introduce the concepts of language and social communication skills as early as possible and to enable them to receive simultaneous aural and visual language stimulation, in order to develop the child's vocabulary as early as possible.

Conventional educational devices generally rely on the user having sufficient knowledge and aptitude to be able to operate the devices in order to learn the language that the device teaches. Therefore, these conventional devices are

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not suitable for very young children as they do not have sufficient knowledge or aptitude to be able to operate the devices to use them effectively.

In accordance with a first aspect of the invention, there is provided an educational device comprising an output device and a remote input device coupled to the output device, the input device comprising a character input device and the output device comprising a character output device, the character output device comprising a sound generation device and a display device, whereby a character entered at the input device is output by the sound generation device and simultaneously displayed on the display device, and wherein the output device is in the form of a toy. In one embodiment, the sound generation device comprises a loudspeaker.

Preferably, when the character is output by the sound generation device, that character is also highlighted on the display device.

The display device may be adapted to display graphics in addition to characters. For example, the graphic displayed may be a graphic corresponding to a character or series of characters forming a word. Typically, the graphic may be retrieved from a memory device in either the input device or the output device, or which may be coupled to the input or output device.

Preferably, the character input device may comprise an alphanumeric, or other character, keyboard. However, it is possible that the language input device could comprise any other suitable means, such as a touch sensitive screen

which permits an alphanumeric or other character to be written on the screen for entry into the input device. For example, the other characters may be characters from a language not based on the latin alphabet, such as Russian, Arabic, Chinese or Japanese.

Typically, the input device may be coupled to the output device by a wire coupling, or alternatively, by any suitable wireless communication link.

Preferably, the output device is in the form of a child's toy. Typically, the toy may be in the stylised form of a robot and may include sections which may be moved, for example, in response to commands entered on the input device.

Typically, the input device may comprise a microphone to permit characters to be entered verbally.

In accordance with a second aspect of the invention, there is provided a method of educating a student using an educational device provided in accordance with the first aspect of the invention, the method comprising positioning the output device adjacent to the student, entering characters on the character input device and causing them to be output by the character output device so as to be received by the student.

An example of an educational device in accordance with the invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is a schematic view of an input device;

Figure 2 is a front view of an educational toy which is coupled to the input device of Figure 1;

Figure 3 is a block diagram of the input device shown in Figure 1;

Figure 4 is a block diagram of the educational toy shown in Figure 2; and

Figure 5 is a flow diagram showing the language operation of the input device shown in Figures 1 and 3 when coupled to the educational toy shown in Figures 2 and 4.

Figure 1 shows an input device 1 which is in the form of a handheld or laptop device which includes a conventional keyboard 2 with alphabet keys, numeric keys, punctuation keys (such as comma, full stop, semicolon) and editing keys. The device 1 also includes a fifty character backlit LCD display 3 which displays characters entered using the keyboard 2. Also provided are a set of control buttons 4, an on/off switch 5, an on/off button 6 for the back light of the display 3 and a corresponding display on an educational toy 10 (see Figure 2), a toggle switch 7 for toggling between an automatic mode and a voice over mode, and a microphone 8. The input device 1 is coupled to the educational toy 10 by wires 9. Alternatively, the input device may be coupled to the toy 10 by any conventional form of wireless link.

The educational toy 10 is in the form a stylised robot that includes a main body 11 and two arms 12 which are independently movably coupled to the body 11 so that the arms 12 may be moved up and down. The body 11 includes a backlit LCD display 13, two speakers 14, a volume control 15 and two eyes in the form of light emitting diodes (LEDs) 16. In addition, the body 11 includes a battery compartment (not shown) which contains batteries to power the educational toy 10. The batteries may be any suitable form of battery and may be rechargeable. As an alternative, or in addition, to a battery power supply,

the educational toy 10 could be coupled to an external power supply, such as an electrical mains voltage power supply.

Figure 3 shows a block diagram of the input device 1 as well as the components shown in Figure 1, the input device 1 also includes a microprocessor 20, an LCD driver 21, a read only memory (ROM) 22 and a random access memory (RAM) 23. All the keys and buttons 2, 4, 5, 6, 7 shown in Figure 1 are represented schematically in Figure 3 by the reference numeral 24. Stored in the ROM 22 is a dictionary for spell checking. When a character is entered using the keyboard 2, the processor instructs the LCD driver 21 to display that character on the display 3. In addition, the processor 20 checks each word entered using the keyboard 2 with the dictionary stored in the ROM 22. This spell check is performed before the user "enters" the character string to send it to the toy microprocessor 30.

A schematic block diagram of the educational toy 10 is shown in Figure 4. The toy 10 includes a microprocessor 30 that receives commands on the wire 9 from the input device 1. The microprocessor 30 is also coupled to an LCD driver 31 which drives the LCD display 13, a sound driver 32 which drives the speakers 14, a random access memory (RAM) 33 and a read only memory (ROM) 34. The ROM 34 includes text to speech conversion software which permits the text input at the input device 1 to be converted to sound signals when the toggle switch 7 is switched to automatic mode. The sound signals are the enunciation of the character string input and are emitted by the speakers 14 simultaneously with the display of the character string on the LCD display 13. The ROM 34

also contains software which highlights the character string displayed on the display 13 as it is enunciated.

The microphone 8 is coupled directly to the speakers 14 via the wire 9 and is activated when the switch 7 is switched to voice over mode. In this mode, the text-to-speech conversion software and the highlighting software are disabled .

In addition, the microprocessor 30 receives signals from the control buttons 4 and in response to signals from these buttons, controls motors (not shown) that move the toy 10 in different directions and move the arms 12.

In use, an operator, such as a teacher, or other adult wishing to teach a child using the educational toy 1, switches on 39 the on/off button on the input device 1 which activates the educational toy 2. When the input device 1 and toy 2 are switched on, the microprocessor 20 in the input device 1 prompts a user, via the display device 3 to enter data 40. The user then enters characters 41 which can be input using the keyboard 2. As the user enters the characters 41 using the keyboard 2, the characters entered are displayed on the LCD display 3. This enables the user to check the characters entered to ensure that they are correct and permits any amendments. In addition, the microprocessor 20 checks the spelling of all the words against a reference dictionary stored in the ROM 22.

After a user checks that the characters have been entered correctly, the user presses the enter button which causes the processor to transmit the character

string to the educational toy 10 via the wire 9. The processor 30 receives the character string from the input device 1 and displays the characters via the LCD driver 31 on the LCD display 13. In addition, the processor 30, using the speech text to speech software in the ROM 34, converts the characters received from the input device 1 to audio commands which are sent to the sound driver 32 to drive the speakers 14 so that the speakers 14 pronounce the characters which appear on the display 13, as they are being displayed.

When in automatic mode, if the characters form words, the sounds emitted by the speakers 14 are the pronunciation of the words. Otherwise, the sounds emitted are the corresponding phonetic pronunciations. In addition, as the characters are being output on the speakers 14, the processor 30, using the highlighting software stored in the ROM 34, highlights the corresponding characters on the display 13 as they are being enunciated.

As an alternative to the automatic mode, a user can use the switch 7 to select voice over mode. This disables the text-to-speech conversion software, thereby permitting the user to speak the character string displayed on the display 13 into the microphone 8. The sound signals are then transmitted directly to the speakers 14 by the wire 9 for output by the speakers 14. In addition, the highlighting software in the ROM 34 is disabled.

In addition, using the control buttons 4, the user can control movement of the educational toy 10, for example, to make the arms 12 move up and down, to operate the LED 16 to blink and if the educational toy 10 is fitted with a

movement device, such as wheels, to cause the educational toy 10 to move backwards and forwards or to the left or to the right or to rotate either clockwise or anticlockwise.

It is possible that the display device 13 may be adapted to display graphics as well as, or in addition to, characters. Typically, the ROM 34 would also comprise a graphics library and the processor 30 would retrieve a graphic from the ROM 34, corresponding to a word transmitted to the processor by the input device, and then display the graphic on the display device 13.

An advantage of the invention is that it permits a user to interact with a student, such as a young child, using the educational toy 10 and to cause the educational toy 10 to make appropriate responses to the reactions of the student. In addition, by displaying words on the display 13 as they are spoken, helps with the student's reading and language skills by helping the student to associate particular sounds with a particular written word.

In addition, the student is not required to operate the device, and so it is suitable for students such as young children or other students without fully developed manual dexterity, or who may have difficulty operating the device.

The invention also permits communication between the toy 10, animated remotely by the user, and the student in a number of real-life contextual situations. There is also the advantage that the context is determined in real

time between the toy and the learner and is not dictated by pre-programming of the device.

Such a device may also function as a fictitious playmate and/or animated puppet allowing for the dynamic development of a relationship between the device and the student and the development of the personality of the robot toy. Therefore, it can also help nurture the imagination of the student.

CLAIMS

1. An educational device comprises an output device and a remote input device coupled to the output device, the input device comprising a character input device and the output device comprising a character output device, the character output device comprising a sound generation device and a display device, whereby a character entered at the input device is output by the sound generation device and simultaneously displayed on the display device, and wherein the output device is in the form of a toy.

2. A device according to claim 1, wherein when the character is output by the sound generation device, that character is also highlighted on the display device.

3. A device according to claim 1 or claim 2, wherein the display device is adapted to display a graphic image.

4. A device according to any of the preceding claims, wherein the character input device comprises a keyboard.

5. A device according to any of the preceding claims, wherein the character input device comprises a touch sensitive screen.

6. A device according to any of the preceding claims, wherein the toy is in the stylised form of a robot.

7. A device according to any of the preceding claims, wherein the input device comprises a microphone.

8. A method of educating a student using an educational device in accordance with any of claims 1 to 7, the method comprising positioning the output device adjacent to the student, entering characters on the character input device and causing them to be output by the character output device so as to be received by the student.