An analysis of the defective design of digital alarm clocks

The discipline to get up in time for scheduled classes, meetings, or office hours is essential to success. It is not uncommon however that biological body clocks fail to take into account such importance. This is the reason why both students and professionals resort to the use of alarm clocks. Its common place uses include telling time, recording set alarm schedules, and emitting sounds to rouse even heavy sleepers at the time set. Some alarm cocks have progressed to include buttons which serve as snooze options. These kill the alarm sounds for around ten minutes and only then resume the task of waking the consumer.

It is these alarm clocks which will be the subject of discussion in this paper. Given the function of alarm clocks, it is not surprising that emotional design is connected with its attractiveness to the consumer. For professional businessmen, alarm clocks would be more attractive if they were sleek and formal. For students and young professionals their alarm clocks are often playful and take on the form of things that the consumers are interested in, such as hobbies, favorite animals, and other such things. In this way the alarm clock utilizes reflective design to attract consumers.

The closer it is to portraying the type of person who owns it or the purpose for which the alarm is set, the more relevant the alarm clock becomes to the consumer. The alarm clock also caters to behavioral design as it offers an easy and effective means of keeping track of the time to get up off the bed. It serves as the security blanket of people who have to stay up late at night cramming for work needed the next day or for individuals who enjoy hanging out with friends up to very late hours in the night. It is thus suitable to the needs of the consumer and adequate in answering these needs.

The alarm clock is rather simple to use. Its very name is reflective of the primary purpose for which it was made. This in itself is an affordance as to the practical uses of the object. The limited buttons on the actual clock are also reflective of the range of its possible functions. There is only one button that controls the hours on the digital display on the screen and another that controls the minutes display. A separate button indicates that the time being set is an alarm time. Another button controls radio functions, if any. Another button indicates the snooze function.

Since the digital display is located at the front and occupies most of the surface area, there is no doubting as to the use of the alarm clock. In the particular alarm clocks observed (see pictures), the buttons are apparent and conspicuously placed on the top portion of the clock. This affords the consumer full view of the alarm buttons and thus conspicuous notice of the alarm functions of the clock. Digital clocks have built-in constraints working in their favor as well. When setting the time for example, the clock either gives a beep or resets back to zero when the given time format exceeds the numbers that validly express time.

An example would be an attempt to input 13: 00 am or 25: 00: 00. This practical constraint also serves to standardize the time formats for persons using clocks and watches. For clocks with indicated dates, the user is also prohibited from entering invalid date numbers, such as January 32. When setting the alarm in clocks with date indicators, there is a warning beep or outright refusal if the alarm entered has already passed. This is another constraint. Conceptual models and mental mappings may also be observed to have been employed in alarm clocks.

The shrill, loud, insistent noises employed as alarms are similar to danger signals that the individual responsively starts at when heard. The alarms therefore play on the known reflexes of individuals. The noises are often linked to high levels of arousal capable of drawing a person away from a state of rest. The repeated association of the alarm with the necessity to wake up also utilizes the mental mappings of individuals. This might prove troublesome however given that the repeated exposure to the alarm signal with no actual threat present might detract from the effectiveness of the alarm.

It is not uncommon that people have learned to sleep through their alarms while those who have not become accustomed to hearing such alarms complain of the loudness. This problem is easily solved however with the programming of multiple alarm signals. The built-in radio option has also served to answer this problem as some alarms have the option of using the radio broadcast as the actual alarm. This would ensure different sounds being given in the morning. The use of different alarm sounds would control for getting accustomed to the signals received.

This would ensure that hearing the alarm sounds would cause the sleeper to start at the threatening or shocking alarms heard. The particular alarm clocks in point also rank high in causality as their prominent display screens clearly indicate whether or not the button being pressed, as when setting the time, has an effect on the display. However, the proximity of the snooze button with the stop alarm button may result in confusion. This is particularly a concern since the individual hitting the button would not be fully aware yet of his actions as he has been so suddenly roused from sleep.

The size of the buttons would also result in problems if the snooze and stop alarm buttons were both quite small, more so if the stop alarm button were larger then the snooze button. This would prove problematic for the heavy sleeper or adamant snooze button user. Hitting the wrong button accidentally simply because one is still groggy would make the difference in waking up on time or not. A simple solution for this would be to manufacture alarm clocks with the snooze buttons bigger than the stop alarm buttons.

Alternatively, the snooze and stop alarm buttons may be placed opposite each other with the snooze button closer to the sleeper. These simple changes would aid the user as there would need to be an intentional and conscious push of the stop alarm button for the alarm to stop ringing. Considering that this change would only require the shifting around of buttons, this would not present too much of a conceptual or financial change. Conceptually, it would work since the semi-conscious user would only have access to the snooze button and would have to be partially conscious in order to completely shut off the alarm clock.

This would give time for adequate reflection whether or not to ignore the warning of the alarm by completely shutting it off. The financial expense to the manufacturer would be small as there would only be needed a change in the aesthetics of the alarm clock at the beginning. But the implemented changes in production could simply be continued limiting the expenses only to the initial change. This would be compensated by the projected increase in sales however as buyers would perceive the clock to be better behaviorally designed, this due to its easy use and strict adherence to its purpose of waking the user.

Another problem with alarm clocks is that there is hardly any feedback mechanism installed into the system. For battery-run clocks for example, there is no indicator as to the life-span left for the clock. Should the clock run out of battery in the middle of the consumer's sleep, the alarm would not go off in the morning and the consumer would have no means of rousing from sleep at the set time apart from a developed habit, if any, of waking up at the appointed time. This could easily be controlled for by creating a battery-life indicator at the side of the display.

An alarm could be given off if the battery-life nears extinction. This would not be too costly to producers as the LCD screen is already fully lit up. There would only be required a change of LCD bulb colors and an addition in the program to account for the battery. The program and materials for the same could be copied from existing objects with battery monitoring capacities – such as mp3 players. Conceptually, this would work and would be quite useful to the buyer as there would be no fear of the clock dying out.

Even the most prepared user cannot prepare for a clock running out of battery in the middle of his or her sleep. Some companies have resorted to using alarm clocks which are plugged into electrical sockets to control for this problem. However, this leads to further design problems as the energy consumption of such an alarm clock would be higher making it wasteful of user resources. Also, there would then be no feedback mechanism at all if the plug were accidentally pulled from the socket, as when a pet might run across it.

Unless there is a means for the clock to store energy in order to keep running even though it has been unplugged, no alarm signals could be given

off to warn the user of its low battery life-span. This energy storage solution would be less pragmatic than the first suggested battery indicator since an additional device would lead to more financial burdens on the manufacturer. Thus the buyer would be overburdened with the cost of such a device. The clock also does not provide any safety measures to protect against mistaken punches of its buttons.

This results in the above-mentioned problem with the snooze button. If the consumer accidentally presses the kill alarm button instead of the snooze button, the alarm would not give any feedback concerning this. This can be likened to the process of deleting documents on a computer hard drive. The computer always asks whether the user is certain that the chosen documents are to be deleted forever. This controls for any mistakes in operation of buttons. If the alarm clock were to require a confirmation from the user before truly shutting off the alarm, then this problem would be done away with.

Should the user fail to press the confirmation button, then the clock should automatically revert to snooze mode only. This would not be too difficult as the program would only need minor adjustments that would require the pressing of another button before shutting off. Conceptually, it would work since the hitting of a confirmatory button requires some semblance of awareness from the user. This would ensure that the user, upon hitting the confirmatory button, has already gotten up from his or her bed and is truly ready to go about his or her business.

The above characteristics were discussed by Norman and serve to ensure the effective and efficient use of objects from the perspective of the user.

This list of traits which an object must possess in order to be deemed user-centered and user-friendly is quite effective in deconstructing the reasonability of the construction of objects. Some objects have been taken for granted as being useful. However, usefulness is not sufficient to address the requisite needs of the consumer. There must also be a careful consideration of the possible difficulties that might arise due to the objects design.

The list is worth considering since it slows down the pace of the manufacturer and permits him or her to consider possible drawbacks as to the actual use of the object. The list permits the manufacturer to reflect upon the projected use of the object and whether or not the object has sufficient functions and tools to ensure that it fulfills its purpose to the user. Furthermore, the list is worth going through as problems that arise from faulty designs would lead to lower sales in the market.

With the example given above, negative feedback from the market regarding difficulty in using the clocks, or the confusion associated with its design, would lead to lower sales for the producer. Additional expenses would thus be incurred in order to control for the faults. But taking some time to run down the list of potential flaws that the user might encounter in everyday use would allow the producer to make the required design changes at the beginning of manufacturing. This would minimize expenses and eliminate negative user feedback.

However, the list may prove to be too time-consuming and certain elements mentioned might not be applicable for all objects. For example, in the tool studied in this paper, there was no need to analyze the conceptual model of

the alarm system. There are items therefore which are irrelevant to particular objects. The list therefore is too simplistic in assuming that the same characteristics apply to all objects. There should be some exclusionary means or principle provided that would permit the user, such as the manufacturer, to identify which traits would be relevant to the particular objects that he is producing.

This would save on the time being expended for the analysis of the design. Also, the list might prove too taxing when considering objects that do not run based on operating systems. The list is limited to the easy use of objects which require technical knowledge but have little to do with physical limitations of the user himself. The list then would be a waste of time and effort for producers engaged in the manufacture of mechanical objects, such as scissors and keyboards.

These items require analysis of design as well but few if any of the items on Norman's list would reflect the problems of these same objects – which are more focused on the characteristics and traits of the user. Physical problems encountered by users in utilizing objects would therefore go largely unnoticed as long as the associations made between the object's tools and their functions are well accounted for. Overall however, the list is useful although itself requiring some design adjustments and specifications.