

Internet Education by Central Banks

Rudolf L. van Renesse, VanRenesse Consulting,
Willem de Zwijgerlaan 5, 2582 ED The Hague, The Netherlands

A picture is worth a thousand words

The Internet is the most powerful information providing medium today and it has great potential in conveying pictorial information in the form of still images, video clips and virtual tours. Obviously, central banks can make use of the Internet to efficiently provide information for the public on the anti-counterfeiting features of their currency.

An investigation was carried out in November 2006 of the information provided by 133 Central Banks on the public security features of their currency. Many central banks appear to provide no information at all, many only provide written information and many indeed provide illustrations. An overview is presented of the various errors that central banks make when presenting illustrated information. It appears that even illustrated information often lacks the most elementary requirements: obviousness, clarity and adequate visual representation of the relevant optical effects. As a result, the information made available on the internet by many banknote issuing authorities remains largely ineffective and – on occasion – even assumes silly proportions.

From a human factors point of view, the most efficient way to educate the public on banknote authentication is to have the security features speak for themselves without the need for explicit explanations and illustrations. It is in the interest of the issuing authorities as well as the public that a clear and truthful mental image of the available public security features can be acquired. If this image cannot be adequately created by the information radiated by the banknotes as such, the issuing authorities can revert to distribute brochures, broadcast TV-spots and even provide the necessary information on the Internet. Meanwhile, many central banks have started providing information on the Internet of the security features of their currency. This information can be purely in writing and it can be additionally illustrated. As the proverb says “A picture is worth a thousand words”, and written information therefore is not as educational and efficient as illustrated information can be. But, nobility obliges; central banks have an obligation to use the medium efficiently. This investigation shows that many central banks provide illustrated information on security features that can hardly, if at all, be expected to attribute significantly to the clear understanding of the public. Additionally, the accessibility of the information often appears to be inadequate.

Central Bank Internet Education

A list of 159 central bank internet sites can be found on the website of the Bank for International Settlements: <http://www.bis.org/cbanks.htm>, comprising a total of 133 websites involving different currencies. Because internet information tends to be somewhat volatile, it must be borne in mind that these results are valid per November 2005. The general results of the investigation are summarized in Figure 1.

It is striking that the majority (90) of central banks (67.7%) does not provide any illustrated internet information on the authentication features of their currency. On the other hand 89 central banks (66.9%) do indeed provide written or illustrated information.

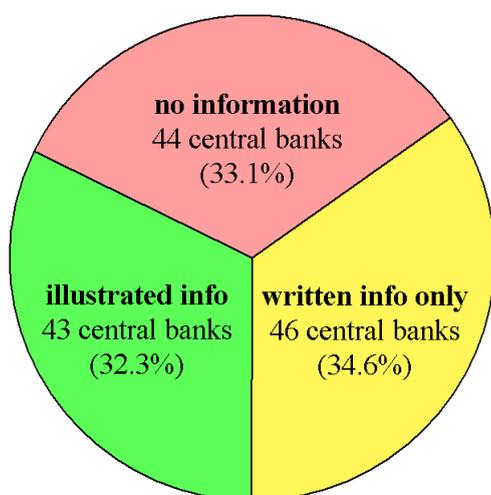


Figure 1 – Overview of information on banknote security features provided by 133 central banks.

Accessibility of central bank websites and security information

For a visitor of a central bank home page it appears sometimes obscure where to look for information on the authentication of banknotes, if available at all. In other cases information is only available on the website in the local language, which is

not always understandable for foreigners: 19 central banks provide no information on banknote security in English. In some cases the information on websites is difficult to find because it is introduced in odd places. Examples of websites with such “hidden information” are those of Bank Al-Maghrib, which gives banknote images under “banknotes and coins”, and written security information under “printing plant”, and of the Bank of Papua New Guinea which gives banknote images under “currency/notes” and written security information under “currency history”, without any cross references. The Central Bank of Kuwait unexpectedly provides illustrated information under “CBK Gallery/Issues” and the Saudi Arabian Monetary Agency under “Currency Museum”. On various occasions during this investigation the conclusion was initially drawn that a central bank did not provide information on security features, until an extended investigation was carried out on pages that were considered unlikely to provide such information.

Another accessibility problem encountered is that the information is located in too deep a level of the site. Furthermore, finding and browsing through the relevant information sometimes requires an inordinate amount of mouse clicks and waiting for illustrations to load.

Access to information sometimes is also made difficult because the relevant web pages load extremely slowly. In other cases security information is only made available as downloadable pdf files, in which the informational power of the Internet is lost.

In several cases the relevant page “e.g. banknotes and coins” consistently cannot be opened (Barbados, Samoa), or the page appears to be under construction forever (Guatemala) and the request “please come back soon” after a while makes an odd impression. In one case the complete central bank website is protected by a password (the South Pacific island nation of Vanuatu).

These experiences show that designing and maintaining websites knows many pitfalls, which appear not always avoided by even professional website designers for central banks.

In all these cases, even if the information provided were of high quality, it will not likely reach many members of the target group. Efforts invested in setting up a website will remain largely fruitless if the accessibility of the information provided, however instructive, remains inadequate.

No information on security features

In 33.1% of the cases (44 central banks) no information on the security features is provided at all (see Figure 1). In quite a few cases (16 central banks), images of the currency in circulation are shown indeed, but security information remains absent. Images of banknotes vary widely in quality between central banks. For instance the Bank Al-Maghrib (Morocco) provides very low quality banknote images having a size of only 120 x 59 pixels (Figure 2). The Bank of Sierra Leone, possibly for even greater security, illustrates low resolution images of banknotes photographed under an angle (Figure 3).

Central Banks like those of Nicaragua and the United Arab Emirates present reasonably good quality images of their currency (note width 452 and 480 pixels respectively). Otherwise, the images of the latter bank are denied copying via right mouse clicking, a futile security measure because no defense exists against simply copying such images from the screen with widely available and cheap software. Apparently, central banks thus try to prevent abuse of their images by would-be counterfeiters, a peculiar measure because the original notes are widely available for copying.



Figure 2 – Internet illustration of Moroccan 10 Dirham note (note width 120 pixels).



Figure 3 – Internet illustration of Sierra Leone 500 Leones note (note width 296 pixels).

Only written information on security features

In 47 cases (35.3%) central banks give only written Internet information on the security features of their currency (see Figure 1). Images of the currency in circulation are made available in almost all cases –sometimes with annoyingly low resolution– but information on security features remains limited to written descriptions. In 11 cases banknote images are

provided with arrows pointing at the location of the security features, like is often done in brochures. An example is given in Figure 4. This does not illustrate the security features as such, it provides essentially written information only.

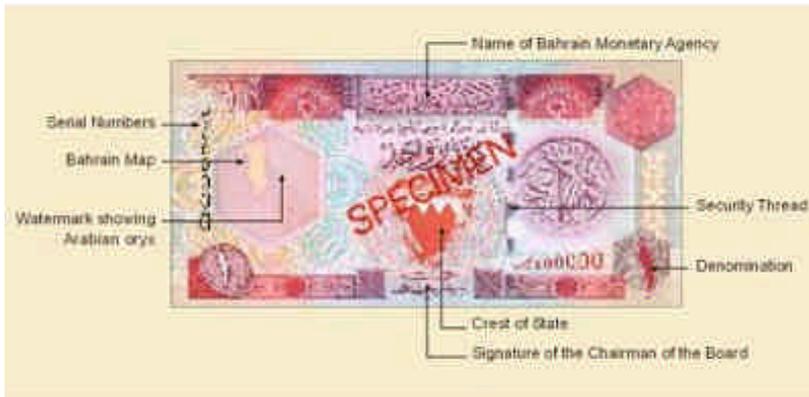


Figure 4 – Low resolution Internet illustration of Bahrain 1 Dinar note (note width 257 pixels) with arrows pointing at the locations of security features as well as non-security design elements. The image is apparently copied from a brochure.

Illustrated information on security features

In 43 cases (32.3%; see Figure 1) central bank websites provide separate images of security features of their currency. Again, the quality of the illustrations provided differs greatly between central banks and is generally inferior. In many cases the illustrations do not contribute at all to a better understanding because they are essentially void of relevant information (Figure 5). A frequent problem also is the only minute size of illustrations (see Figure 6).



Figure 5 – Bank of Korea 10,000 Won note: Internet illustration of 99 x 101 pixel details of windowed thread, without showing the windowed thread.



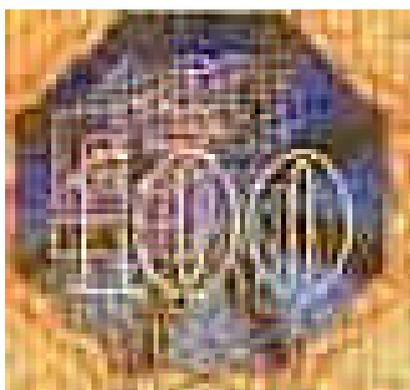
Figure 6 – Central Bank of the Republic of Argentina 20 Pesos note (width 285 pixels): Incomprehensible and illegible Internet illustrations of 65 x 65 pixel details of latent image (top right) and security thread (bottom right).

The Bank of the Netherlands Antilles on their website provide images of front and back of a 100 guilder note (note width 221 pixels) and arrows pointing at eight 48 x 48 pixel pictures, without any additional explanation (Figure 7). The image looks like being copied from a brochure and it is left to the visitor of the site to deduce what the pictures mean.



Figure 7 – Bank of the Netherlands Antilles 100 guilder note: 48 x 48 pixel Internet illustrations of security features without additional explanation.

The Singapore \$10 note serves as the only Internet example for the security features incorporated in the currency of the Monetary Authority of Singapore. Two of the minuscule images provided of the various security features are shown enlarged in Figure 8, exemplifying the ineptness of the information presented. Apart from the fact that the images are virtually void of information, it is interesting to note that the Kinegram image is accompanied with a 91 word intricate description, the larger part of which will probably remain obscure to the reader (Figure 8). One wonders what happened to the proverbial “A picture is worth a thousand words”?



91 word Kinegram description on the website:

The Kinegram appears as an **octagonal** foil on the front of the notes. It contains an image of the **denomination numeral** which shifts as the note is tilted. On varying the viewing angle, one can also see the logo of BCCS transforming into the letters "BCCS". The background of the Kinegram is composed of shapes representing **electron orbitals** which change from bright to dark as the notes are rotated. This background shimmers in an array of colors when rotated. These features are unique properties to the Kinegram and cannot be replicated.

(Note the use of words like “octagonal”, “denomination numeral” and “electron orbitals”)



Figure 8 – Internet illustrations of details of the Singapore \$10 note: kinegram top left (80 x 77 pixels), its description in writing top right and the (150 x 19 pixels) image provided of micro printing (bottom).

Only few central banks make use of animations and video clips. However, even central banks that seem to recognize these Internet benefits, sometimes present animations of inadequate resolution and lack of clarity. The clips of the Kinegram stripe and the OVI on the website of the European Central Bank are examples. The prominent characteristic of the Kinegram stripe is that –on tilting about a horizontal axis– it alternately shows the value numeral and the euro symbol. Figure 9 shows the consecutive frames of a 4-frame animation, which obviously fails to clearly demonstrate this effect. Two EU central banks (National Bank of Belgium and the Bank of Spain) present 2-frame animations that are virtually devoid of information (Figure 10).

For further instruction the ECB gives a comparison between a genuine and a counterfeit Alphagram patch on a euro 50 note. As Figure 11 shows, these still images are largely useless as educational material; the difference will likely remain obscure to the public.

The OVI on the higher euro denominations shifts from magenta over gold to green in glossy reflection. OVI is designed to be observed in glossy reflection, but the ECB presents a movie of this phenomenon showing the feature to shift from magenta to dark brown (Figure 12). This misrepresentation is due to the fact that the feature is tilted from glossy reflection to diffuse reflection. Reference is made to the excellent website of the Central Bank of Russia, which presents a high resolution video clip of the OVI on the 1000 ruble note (2004 modification) which correctly displays a magenta to green shift.



Figure 9 – ECB: 4-frame animation (82 x 141 pixels) of a Kinegram stripe on a euro 10 note.



Figure 10 – Two frame animation (150 x 113 pixels) of Kinegram stripes presented by several European Union Central Banks.



Figure 11 – European Central Bank: comparison between a genuine and a counterfeit Alphagram (72 x 72 pixels) on euro 50 notes.



Figure 12 – ECB: 4 frames (107 x 152 pixels) of a tilted OVI feature on a euro 100 note: the OVI print in the movie shifts from magenta to dark brown.

Other examples of mostly inadequate illustrations are found on the website of the National Bank of Serbia. Images are presented (as small as 48 x 48 pixels) to which pop-up descriptions are attached of only one or a few words; no further description is provided on the website (see Figure 13).



Figure 13 – National Bank of Serbia: security features of a 500 dinar note: from left to right 48 x 48 pixel details, with pop-up descriptions: “see-through picture” (animated), “security fibers”, “micro lettering”, “micro lettering”, “serial number”, “security thread”, “watermark”, “optically variable feature” (animated), and “raised intaglio print” (animated).

Of the 43 central banks that provide images of security features, 25 banks (58%) can be considered to provide illustrated information on security features that ranges from inferior to below average, while 18 banks (42%) provide illustrated information quality that ranges from average to excellent; the latter group comprises only a disappointing 14% of all 133 central banks investigated.

Central Banks that provide excellent still and animated information on the security features of their currencies are Chile (only in Spanish), Denmark, Russia, the United Kingdom, and the United States. Central banks that offer good to excellent still images of their security features are those of Belarus, Colombia (only in Spanish), Czech Republic, Peru, and Slovakia. However, the accessibility of the information on these websites is not always optimal.

DISCUSSION

The problems encountered with many websites of central banks are twofold: poor accessibility and poor quality of the information. Only very few of the central banks investigated appear to adequately deal with both these problems. Although finding the causes of these shortcomings is largely a matter of conjecture, the following discussion tries to identify a few. It goes without saying that many other websites also suffer these shortcomings, but considering the resources of central banks one would expect more advanced results. After all, central banks tend to invest significantly in issuing banknotes with high counterfeit resistance and stimulating optimal use of the security features by adequately educating the public seems a logical follow-up.

Human factors of websites

The ease of handling a website is also a matter of human factors design. This requires professional web designers that have acquired adequate insight in the structure of the information that a central bank desires to make available. In many cases this requirement is not met. Can it be concluded that public education is not generally a priority of central banks? An astonishing large percentage (33%) of central banks publish no Internet information on the security features of their currency at all. However, the remaining 67% of the central banks do provide either written or illustrated information, which indicates that the majority of central banks indeed desires to educate the public, although this may not be their first priority. The often poor accessibility of the security information must probably be attributed to unawareness of the human factors involved in designing a user friendly website. This is suggestive of both the lack of professional skill of the web designers involved and the limited interest of central banks in the functionality of their websites.

Comprehensibility of information

The clarity and comprehensibility of the pictorial (and written) information are a separate issue. On numerous occasions images on central bank websites are made available that simply do not convey adequate information. In particular where the representation of the optical effects to be observed is poor, it can be suspected that the reasons for these inadequate results are a lack of the photographer's insight in the intended function of the security feature, which may originate in a lack of clear instructions, or a lack of professional photographic skill. Images of OVI that do not display the intended shift of colors (Figure 5, Figure 12) or diffractive elements that do not display the intended image animations (Figure 9, Figure 10) are examples. In other cases the images are of poor quality but do not seem to be a sign of lack of insight or poor photographic skills, but rather seem the result of limited awareness of, or limited concern for human factors requirements; probable examples of which are shown in Figure 6 - Figure 8.

Conclusion

The often poor image resolution and the abundant occurrence of the overprinting ‘specimen’ demonstrates the wish to make digital images useless for would-be counterfeiters. However, original banknote images are widely available for reproduction: the currency in circulation itself. Moreover, as banknote designs can be protected by the Counterfeit Deterrence System (CDS) (see <http://www.rulesforuse.org/>), so can their images on the Internet be CDS-protected. For these reasons no rationale appears to exist why central banks should not provide unrestricted educational Internet imagery of adequate resolution. Furthermore, video clips of parts of banknotes constitute no security threat because these cannot reasonably be composed to form a complete high resolution image of a banknote.

It goes without saying that many other websites also suffer these shortcomings. But considering the resources of central banks, one would expect more advanced results. After all, central banks tend to invest significantly in issuing banknotes with high counterfeit resistance and stimulating optimal use of the security features by adequately educating the public seems a logical follow-up, especially because the means are so easily accessible and highly appropriate to reach the end. And indeed, *noblesse oblige*.