I C T

ICT in Aruba 2010

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INTRODUCTION

Currently the question is rather 'who does not have a computer or laptop in the home' or 'who does not own a mobile phone', than 'who owns one'. The same applies to the question 'who does not have internet connection in the home'. In the last decade, developments in the world of computer technology and telecommunication have taken enormous strides which makes it almost unthinkable that there are still households that do not own a computer or a mobile phone. These items are nowadays regarded as being 'indispensable gadgets'. In 2011, according to the International Telecommunications Union (ITU), an estimated 0.7 billion households worldwide (38.9% of all households) disposed of one or more computers, and 0.6 billion households (33.3% of all households) were connected to the internet[1]. Given important developments in computer technology and telecommunication, and following recommendations of the United Nations as described in the "Principles and recommendations for Population and Housing Census", the Central Bureau of Statistics Aruba added a number of questions to the 2010 Census questionnaire on the presence of computers, mobile phones and internet connections in households in Aruba. In this paper, the data obtained will be presented and the presence of computers, mobile phones, and internet connections will be discussed in relation to relevant variables such as, the average age of household members, the average number of household members, the geographical location of households, type of household and household income. In addition, special attention will be dedicated to the school attending population with or without computers, mobile phones and/or internet connections at home.

COMPUTERS

During the 2010 Aruba Census, information on the ownership of computers was obtained from 34,499 non-collective households, of which 21,801 (62.6%) reported that they disposed of one or more computers/laptops. This is a significant growth in contrast to the 2000 Census when only 32% of all non-collective households in Aruba had at least one computer. Thus, in a decade, the number of non-collective households with one or more computers nearly doubled (see Figure 1).

In 2010, the majority of households in Aruba (40.7%) had one computer, followed by 14.7% with 2 computers. Only a relatively small group reported having more than two computers in the home (7.8%). In comparison, in 2000, only 27% of all households disposed of 1 computer in the home and 3.7% had two computers (see Figure 2).

Figure 2: Distribution of households by number of computers in households, 2000-2010

Number of computers
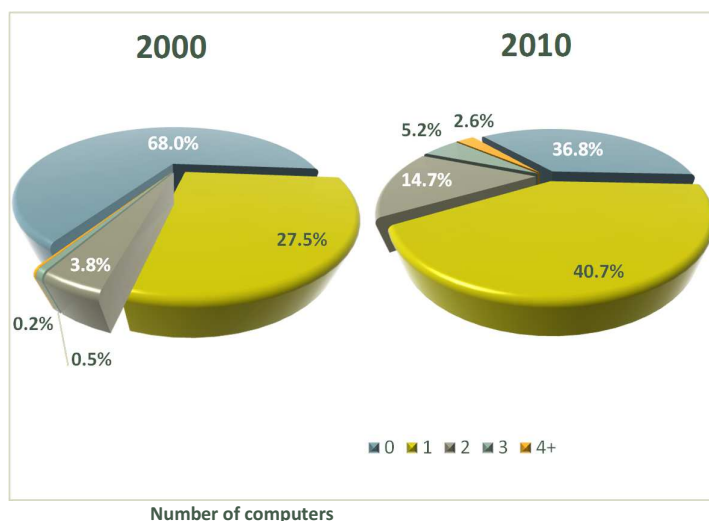
REGION

In Figure 3 the number of non-collective households in Aruba in 2000 and 2010 is presented by region as well as the number of households per region that owned at least one computer. In both 2000 and 2010, Noord/Tanki Leendert was the most populated region and had the highest number of households with at least one computer. The lowest number of households with at least one computer was found in San Nicolas South.

Figure 1: Number and percentage of non-collective households with at least one computer, 2000-2010

**Figure 3: Total number of households and number of households with at least one computer by region, 2000-2010**

Legend:
- 2000 Total number of households
- 2010 Total number of households
- 2000 Households with 1 or more computers
- 2010 Households with 1 or more computers
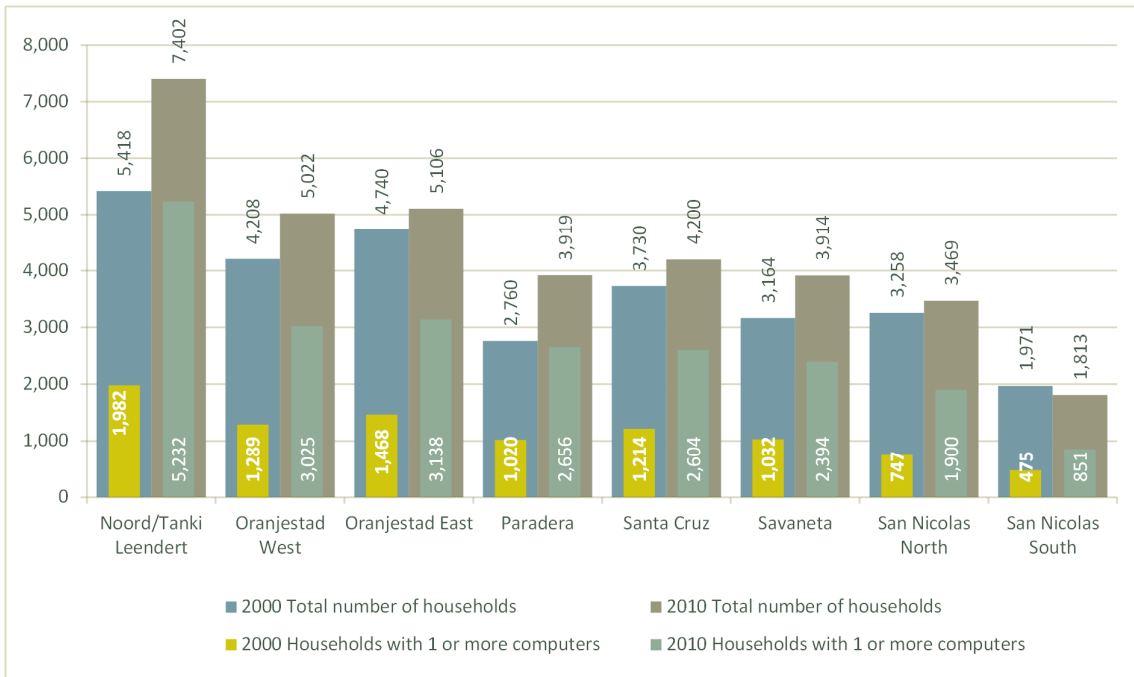
In Figure 4 the penetration rate of computers in different regions in Aruba is presented according to data from the 2000 Census and the 2010 Census. In the year 2000, Noord/Tanki Leendert and Paradera were the regions with the largest percentage of households with at least one computer. In 2010, Paradera ended in second place, superceded by Noord/Tanki Leendert. On the other hand, in 2000 and in 2010, San Nicolas North and San Nicolas South \were the regions with the lowest penetration rates of computers in households. However, between 2000 and 2010, the largest growth in the number of households with at least one computer was observed in San Nicolas North, where the number of households with at least one computer more than doubled.

Figure 4: The penetration rate of computers in households (depicted as a percentage of total number of households with at least one computer), 2000-2010

Legend:
- 2000
- 2010
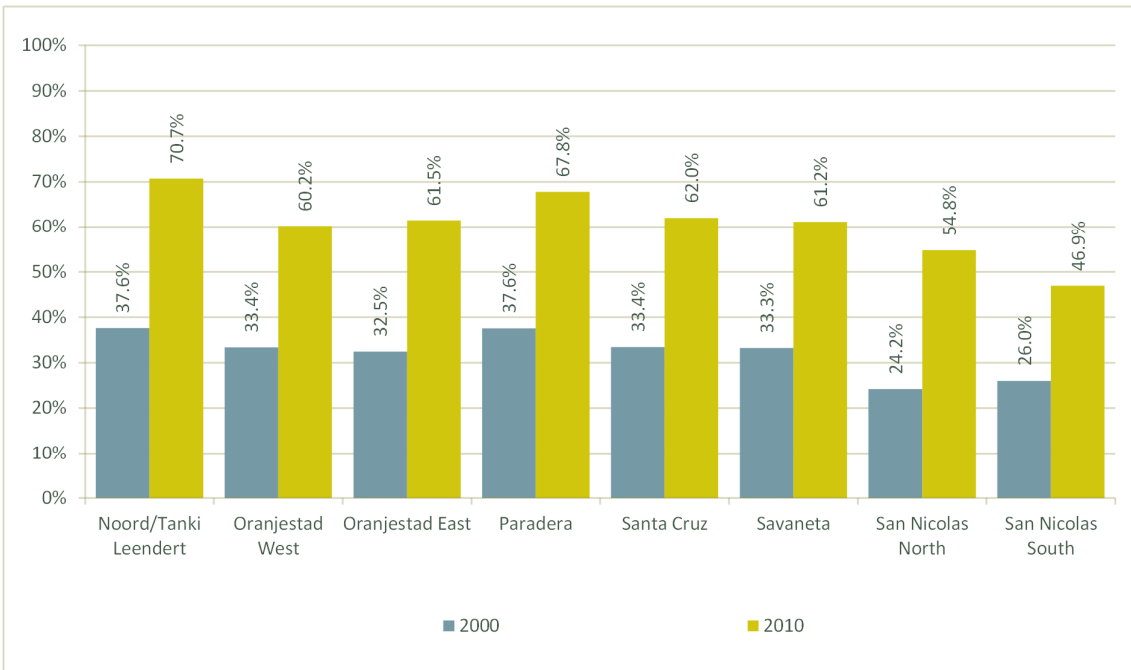
TYPE OF HOUSEHOLD

According to the 2010 Census, nuclear households, consisting of a single conjugal family nucleus, were the largest group of households with one or more computers in the home (52%, see Figure 5). In itself this result is not very uncommon, because the nuclear households also represented the largest group of household type in Aruba. Of all nuclear households 72% had at least one computer in the home, a considerable increase relative to the year 2000 where less than half of all nuclear households owned at least one computer(see Figure 6).

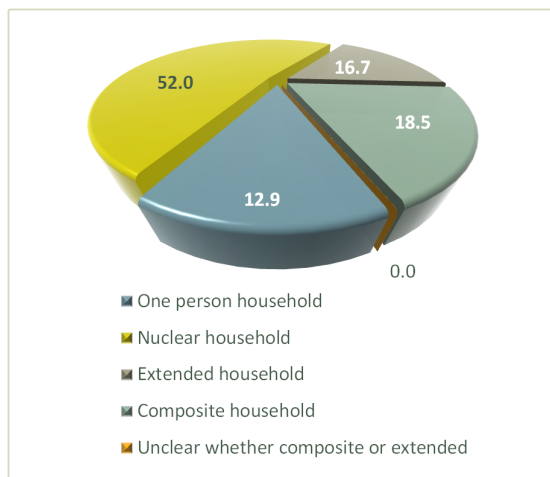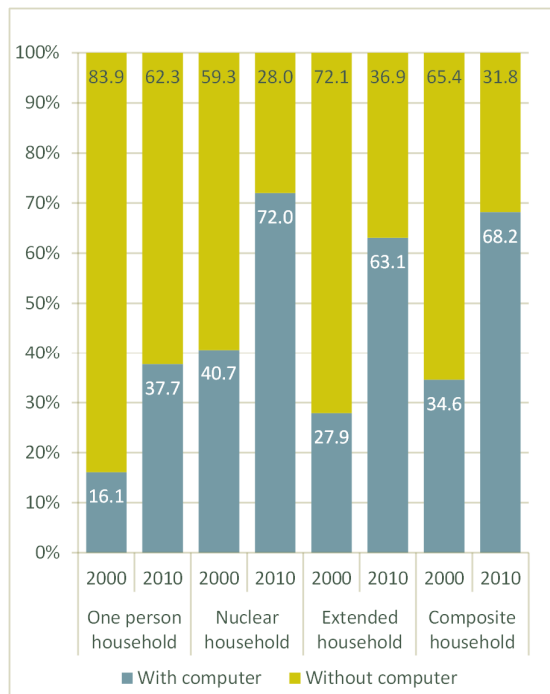**Figure 5: Percentage of households with at least one computer by type of household**

This significant increase in the ownership of computers was observed in all types of households, being particularly noticeable in one person households and in extended households where the percentage owning at least one computer more than doubled (increase of 134%, and of 126%, respectively). However, despite the substantial increase in the ownership of computers by one person households, the percentage of one person households owning at least one computer (in 2010) is still relatively low.

HOUSEHOLD SIZE AND AVERAGE AGE OF HOUSEHOLD MEMBERS

The average size of households and the average age of household members are important factors influencing the ownership of computers in the home. Analysis of the relationship between household size and the ownership of computers showed that, according to 2010 Census data, the ownership of computers was significantly positively related to household size (r^2=.32, p<.001; see Table 1). The larger the household, the more computers were present in the household (see Figure 7).

Table 1: The average household size and the average age of household members by number of computers in the household

Number of computers	Average household size	Average age of household members
0	2.3	43.4
1	3.0	35.3
2	3.5	33.5
3	3.8	33.2
4	4.2	33.9
5 or more	4.5	32.6

Figure 6: Proportion of households with one or more computers by type of household, 2000-2010

Figure 7: Number of computers in the household by number of persons in the household
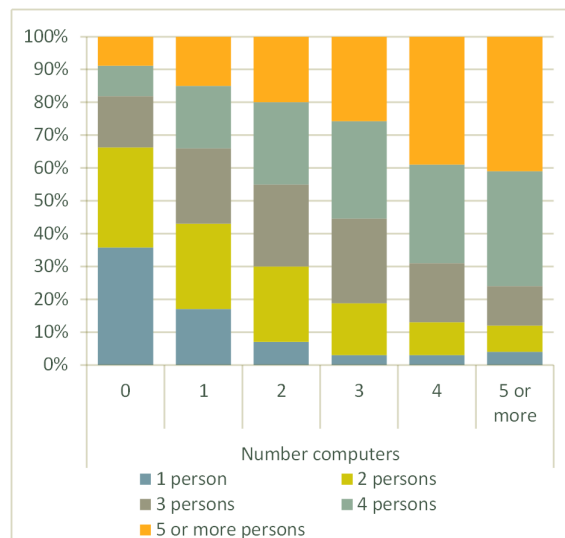
In addition, households with at least one computer were composed of considerably younger individuals (mean age=34.5 years) than households without computers (mean age=43.4 years). The age difference amounted to almost ten years (see Table 1). Furthermore, households without computers were composed by almost a quarter of persons 65 years or older. On the other hand, persons 65 years or older represented only 8% of household members of households with at least one computer (see Figure 8).

Figure 8: Age composition of households with and without at least one computer
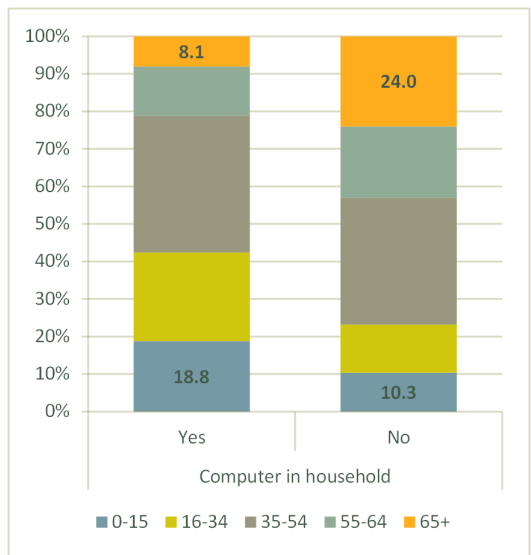
HOUSEHOLD INCOME

Household income is also an important variable influencing the ownership of computers. Although computers and laptops are nowadays more readily available and affordable than in the past, the purchase of a computer or laptop is still for some, beyond reach. Analysis of data obtained from the 2010 Census showed that the median monthly household income of households with at least one computer was almost double that of households who did not own a computer (Afl. 6300, and Afl. 3622, respectively), although, for comparison purposes, the number of contributors to the household income was kept in both cases to at least two persons. In addition, the analyses conducted revealed that the number of computers in a household was related to the median monthly household income of households with at least two contributors to the household income. The higher the median monthly household income, the more computers were present in the household (see Table 2).

**Table 2: Median household income (in Afl.) by number of computers in the household**

Number of computers	Median monthly household income (in Afl.)	Median number of contributors
0	3622.00	2
1	5350.00	2
2	7325.00	2
3	9062.00	2
4	10728.00	2
5 or more	11569.50	2

LEVEL OF EDUCATION COMPLETED

Level of education and the ownership of computers is a relationship worthy of investigation. Therefore, by means of data gathered during the 2010 Census, the ownership of computers was analyzed according to the highest level of education attained of persons 14 years and older, who were not attending school. The results of these analyses indicated that the majority (61.9%) of persons without computers in their household had only primary (special) education or less as their highest level of education attained. On the other hand, the majority (65.1%) of persons who had access to at least one computer in their household had attained at least a diploma at a lower vocational level of education (see Figure 9).

Figure 9: The distribution of the highest level of education attained of persons with and persons without at least a computer in their household
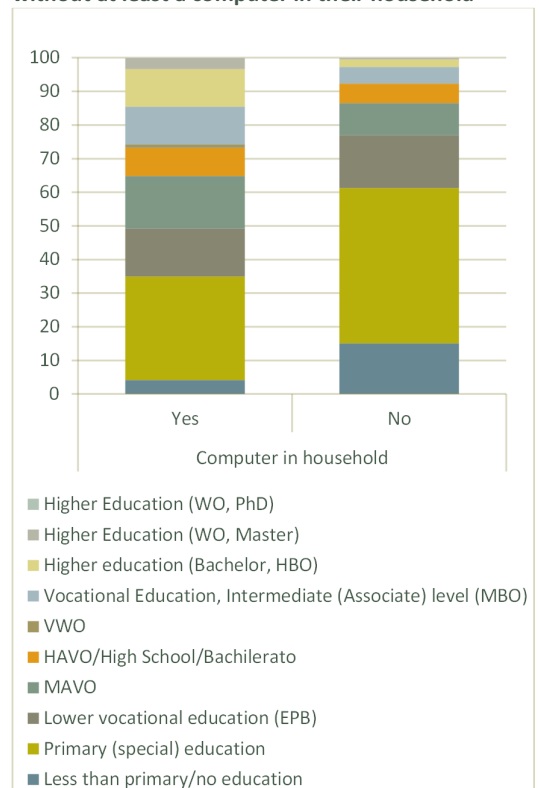
SCHOOL ATTENDING POPULATION

The results of the 2010 Census indicated that 79% of all school attendees (total of 26,615 school attendees) had at least 1 computer in the household, contrary to the year 2000 when only 47.9% of all school attendees (total of 23,387 school attendees) had at least 1 computer in the home. In Figure 10 the percentage of school attendees with at least one computer in the household is illustrated by type of education attended. Of all school attendees, those attending special education had the least access to computers in their household, given that only 52.5% of reported having one or more computers in their household. On the other hand, students that attended VWO (academically oriented preparatory education to higher education, university) registered with the highest percentage (95.9%) having at least one computer in their household, followed by the HAVO students (academically oriented 5 years preparatory education to higher professional education, non-university) with 91.2%. Please note that the question regarding the presence of computers in the home was completed for households, meaning more than one student living in the same household could have access to the same computer.

Figure 10: Percentage of school attendees with at least one computer in the household by type of education attended
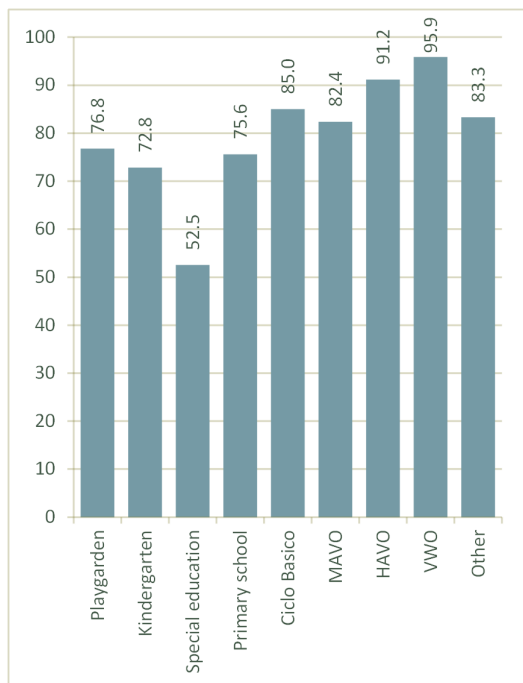

THE MOBILE PHONE

The most popular gadget among the youth and the most indispensable device for business people in the twenty-first century is undoubtedly the mobile phone. Owning a mobile phone has become nothing short of an absolute necessity worldwide. According to the International Telecommunication Union (ITU), in 2011, an estimated 6 billion mobile phone users worldwide and 90% of the world population had access to mobile networks[1].

Results from the 2010 Census indicated that 95.2% of all non-collective households in Aruba had one or more mobile phones at their disposal. A third all non-collective households had two mobile phones (33.5%), followed by 27.2% that had one mobile phone (see Figure 11). Unfortunately comparison with the 2000 Census was not possible given that the question regarding availability of mobile phones in households was not incorporated in the questionnaire of the 2000 Census.

Figure 11: The distribution of mobile phones in households, 2010
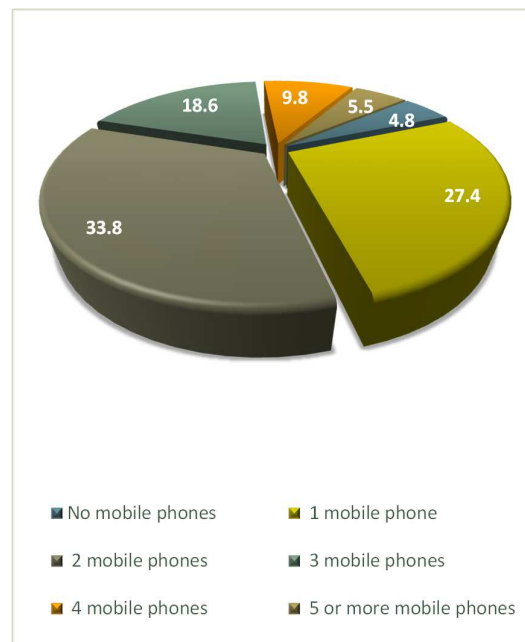
However, it is important to mention that between the 2000 and the 2010 Census the percentage of households with a fixed telephone connection dropped substantially. While in 2000, 72.2% of households in Aruba had a fixed telephone connection, in 2010, this percentage dropped to 60.2%.

REGION

In 2010, the penetration rate of mobile phones in all regions of Aruba was very high. In all regions, between 89% and 95% of all non-collective households had at least one mobile phone (see Figure 12). The region Savaneta registered with the highest percentage of households with mobile phones (95.3%) and San Nicolas South with the lowest percentage (89%). According to the 2010 Census, the total number of mobile phones in Aruba amounted to 75,130 devices or 746 devices for every 1000 persons.

On the other hand, the presence of a fixed telephone connection in households in Aruba dropped substantially in every region. The highest drop was observed in Oranjestad West, where the percentage of households with a fixed telephone connection dropped with 20.5%. Consequently, in 2010, barely half of all households in Oranjestad West reported having a fixed telephone connection.

TYPE OF HOUSEHOLD

Of all the households that owned at least one mobile phone, nuclear households registered with the highest percentage with at least one mobile phone in the household (see Figure 13). Of all nuclear households, 96.2% had at least one mobile phone. The lowest percentage of households with at least one mobile phone was found in one person households (see Figure 14).

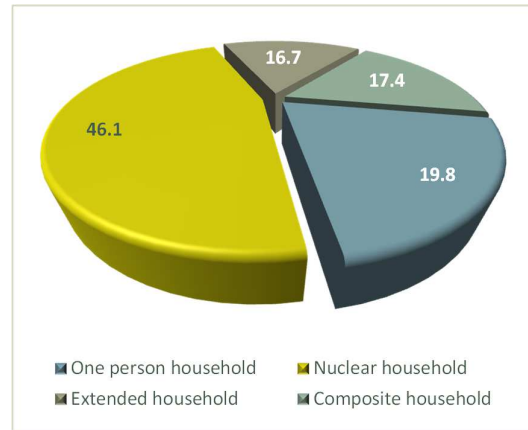**Figure 13: Distribution of mobile phones by type of household**

Legend:
- One person household
- Nuclear household
- Extended household
- Composite household

Values: 46.1, 16.7, 17.4, 19.8

Figure 14: Percentage of households with at least one mobile phone by type of household

	One person household	Nuclear household	Extended household	Composite household
	87.4	96.2	95.1	96.7
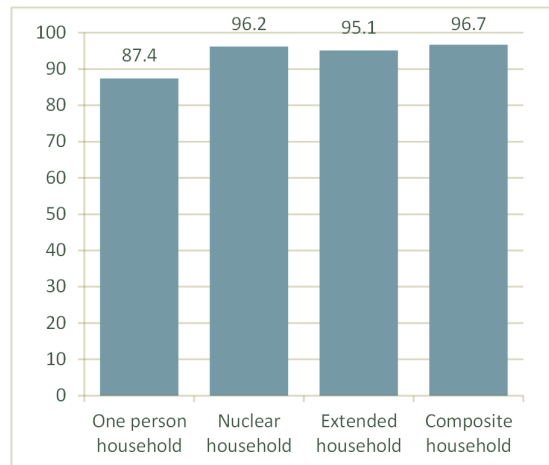
Figure 12: Percentage of non-collective households with one or more mobile phones, compared to the percentage of non-collective households with a fixed telephone connection (2000-2010) by region

Region	2010: Households with at least one mobile phone	2000: Households with a fixed telephone connection	2010: Households with a fixed telephone connection
Noord/Tanki Leendert	94.9	70.2	61.1
Oranjestad West	95.3	66.7	53.0
Oranjestad East	94.4	71.5	58.0
Paradera	94.9	77.8	66.0
Santa Cruz	93.4	75.3	62.6
Savaneta	95.3	76.0	62.0
San Nicolas North	92.9	72.9	60.6
San Nicolas South	89.0	70.5	59.6
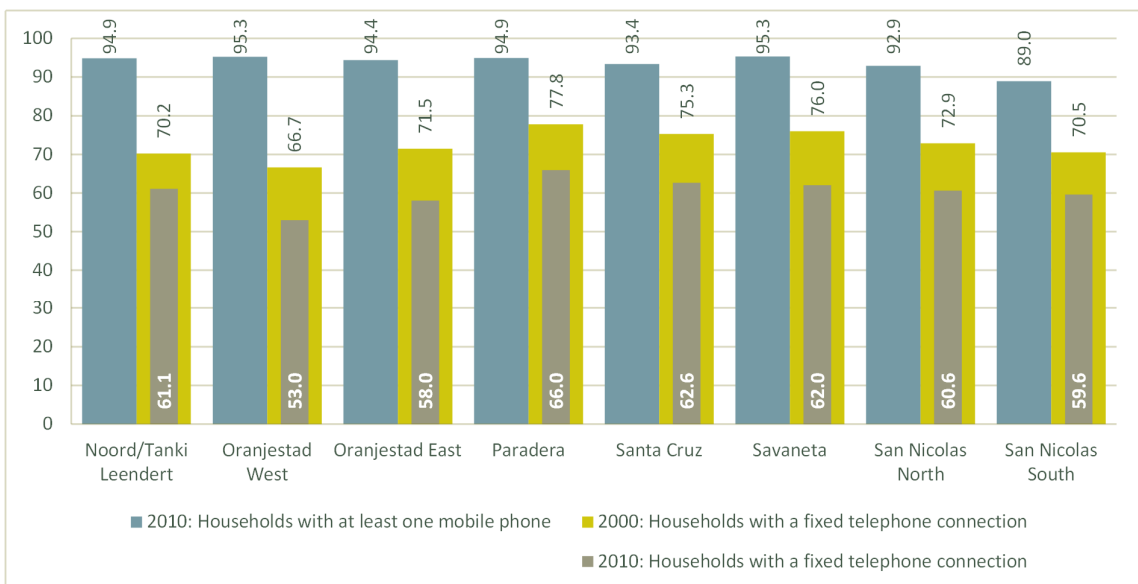
HOUSEHOLD SIZE AND AVERAGE AGE OF HOUSEHOLD MEMBERS

Analyses of 2010 Census data revealed a one on one relationship between the number of persons in a household and the number of mobile phones in a household (see Table 3 and Figure 15). Of the 30,335 households with at least one mobile phone, more than half (53.6%) had as many mobile phones as persons in the household. For example, 78.2% of households with 5 or more mobile phones had 5 or more persons living in the household. However, it should be noted that households with 5 or more mobile phones constituted only 5.5% of all households in Aruba.

Table 3: The average household size and the average age of household members by number of mobile phones in the household

Number of mobile phones	Average household size	Average age of household members
0	1.8	55.6
1	1.7	45.9
2	2.7	36.6
3	3.6	34.4
4	4.4	33.0
5 or more	5.7	32.7

When analyzing the relationship between the average age of household members and the presence of mobile phones in the households, the results indicated that members of households without mobile phones were on average almost 20 years older (mean age=55.6 years) when compared to household members of households with mobile phones (mean age=36.6; see Table 3). As can be seen in Figure 15, persons 65 year and older are overrepresented in households without mobile phones.

Figure 15: Age composition of households with and without at least one mobile phone
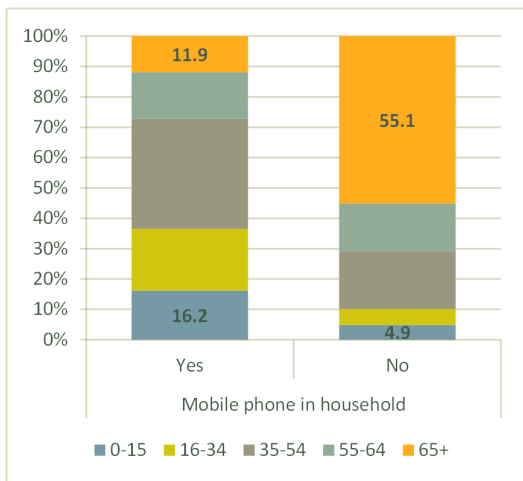
HOUSEHOLD INCOME

According to data collected during the 2010 Census, the majority of the households (95.2%) disposed of one or more mobile phones. The remaining 1544 households that did not dispose of a mobile phone could have been without a mobile phone for economic reasons. Analyses conducted on the relationship between household income and the presence of mobile phones in households revealed that households with a mobile phone received a monthly income of nearly twice that of households without a phone (Afl. 5450, and Afl. 2900, respectively), although (for reasons of comparison) the number of contributors to the household income was kept to two or more persons for both households with and households without a mobile phone. In addition, the results of the analyses revealed that the higher the median monthly household income, the more mobile phones were present in the household (see Table 4).

Table 4: Median household income (in Afl.) by number of mobile phones in the household

Number of computers	Median monthly household income (in Afl.)	Median number of contributors
0	2900.00	2
1	3575.00	2
2	4800.00	2
3	5800.00	2
4	6900.00	3
5 or more	8071.50	3

LEVEL OF EDUCATION COMPLETED

When comparing the population with at least one mobile phone in the home to the group without a mobile phone by their highest level of education attained, the results showed that 69.5 percent of persons without a mobile phone in the home had primary education or less, compared to 42.2% of persons with at least one mobile phone (see Figure 16). However, it should be kept in mind that only 6% of all households in Aruba indicated that they did not have at least one mobile phone.

Figure 16: The distribution of the highest level of education attained of persons with and persons without at least one mobile phone in their household
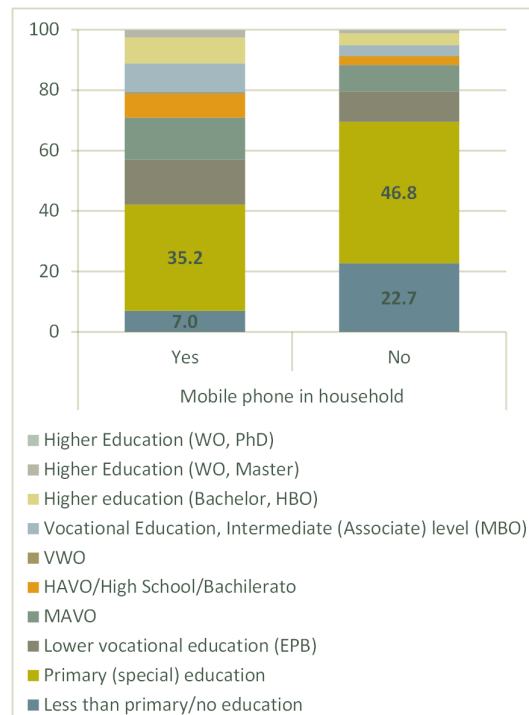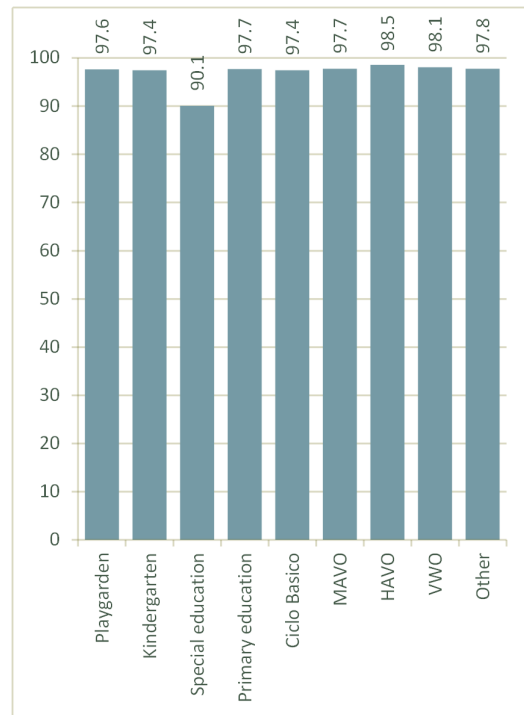

- Higher Education (WO, PhD)
- Higher Education (WO, Master)
- Higher education (Bachelor, HBO)
- Vocational Education, Intermediate (Associate) level (MBO)
- VWO
- HAVO/High School/Bachilerato
- MAVO
- Lower vocational education (EPB)
- Primary (special) education
- Less than primary/no education

SCHOOL ATTENDING POPULATION

According to the 2010 Census, the percentage of school attendees with at least one mobile phone in the home exceeded 97% for all types of education they attended except for one. The lowest percentage of 90.1% was registered for those attending special education (see Figure 17). The HAVO and VWO students registered with the highest percentages with mobile phones in the household. Please keep in mind that more than one student from the same household could have reported the same mobile phone given that the question on the ownership of mobile phones was completed for households and not for individual persons within households.

Figure 17: Percentage of school attendees with at least one mobile phone in the household by type of education attended

INTERNET CONNECTION

According to the ITU the number of internet users has more than doubled between 2006 and 2011 worldwide[1]. As illustrated in Figure 18, in 2006, the number of internet users was reported at a little over 1 billion persons or 18% of the world population, while in 2011 this percentage increased to almost 2.5 billion persons or 35% of the world population. According to the ITU, 45% of the internet users are persons younger than 25 years. As was reported earlier, in 2011, according to the ITU, an estimated 0.5 billion households had an internet connection.

Figure 18: ICT world population 2006, and 2011
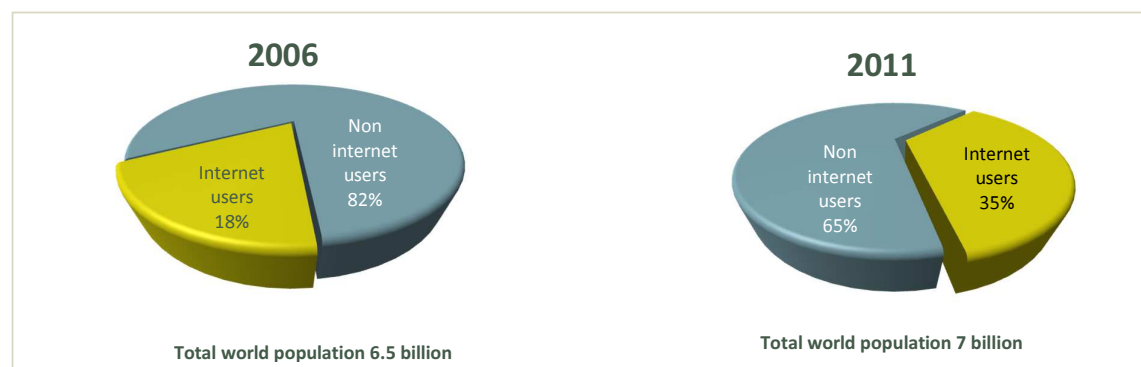
The 2000 Census revealed that in Aruba a total of 4,398 non-collective households (15.2%) had an internet connection. This number increased substantially according to the 2010 Census, when 17,619 households (55.0%) reported having internet connection at home via a computer (see Figure 19). In addition, 40.9% of all households reported that they accessed the internet through their mobile phone. In total, 64.9% of all households had either an internet connection via a mobile phone or a computer.

Figure 19: Percentage of households with internet connection via a computer (2000-2010) and/or via a mobile phone (2010)

- 2000: Internet connection via a computer
- 2010: Internet connection via a computer
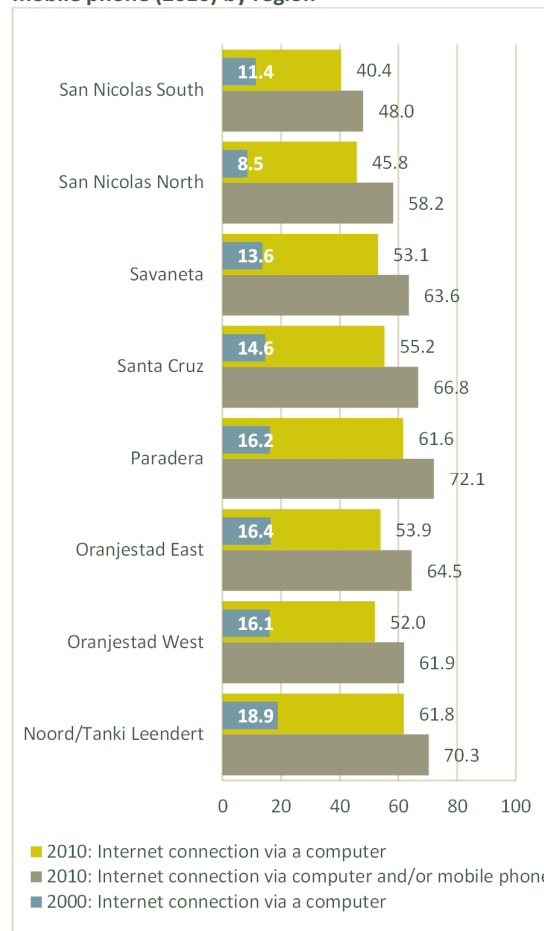- 2010: Internet connection via a computer and/or a mobile phone
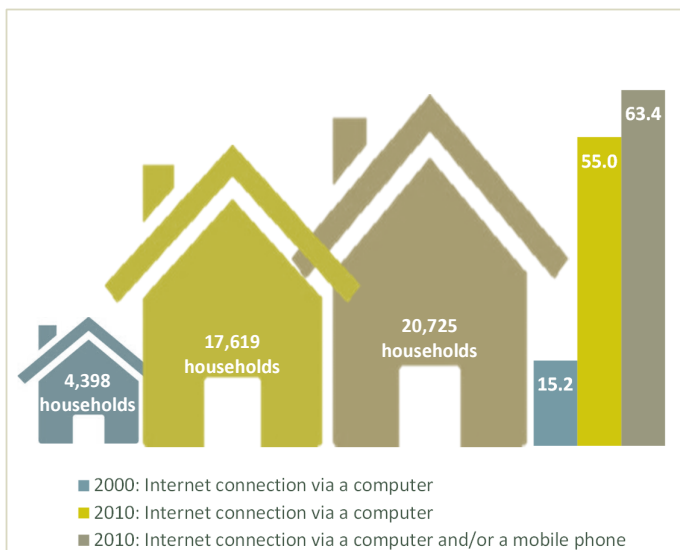
The majority of households with internet connection via a computer had a DSL/Cable net connection (90.9%), 9.7% had a mobile broadband connection, and only 1.6% connected to the internet via dial-up.

REGION

The distribution of the households with internet connection by region is illustrated in Figure 20. The region Noord/Tanki Leendert had the highest percentage with regards to households with internet connection, while the regions San Nicolas North and San Nicolas South reported the lowest percentages. Despite the lower penetration rate of internet in these two regions, between 2000 and 2010, a substantial growth was observed in both San Nicolas North and San Nicolas South, where the percentage of households with internet connection via a computer was concerned. In San Nicolas North, the percentage of households with internet connection via a computer grew with more than 400% and in San Nicolas North with 250%. San Nicolas North therefore

experienced the highest growth compared to the other regions.

Figure 20: Percentage of households with internet connection via a computer (2000-2010) and/or via a mobile phone (2010) by region

- 2010: Internet connection via a computer
- 2010: Internet connection via computer and/or mobile phone
- 2000: Internet connection via a computer

TYPE OF HOUSEHOLD

The distribution by type of households with internet connection via a computer is illustrated in Figure 21. Of all households in Aruba nuclear households reported the highest percentage with internet connection (51%). Figure 22 shows that of all nuclear households 73.1% disposed of internet connection and of the one person households only 42.2% had internet connection according to the 2010 Census. The percentage of households with internet connection via a computer more than doubled in all households between 2000 and 2010. In one person households, the percentage with an internet connection via a computer more than tripled, and in extended households, internet connections more than quadrupled.

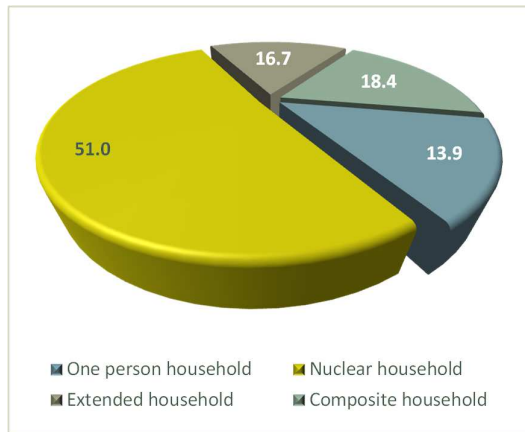**Figure 21: Distribution of internet connection via a computer and/or a mobile phone by type of household**

- One person household
- Nuclear household
- Extended household
- Composite household

Figure 22: Percentage of households with internet connection via a computer and/or a mobile phone by type of household

- 2010: Internet connection via a computer
- 2010: Internet connection via a computer and/or mobile phone
- 2000: Internet connection via a computer
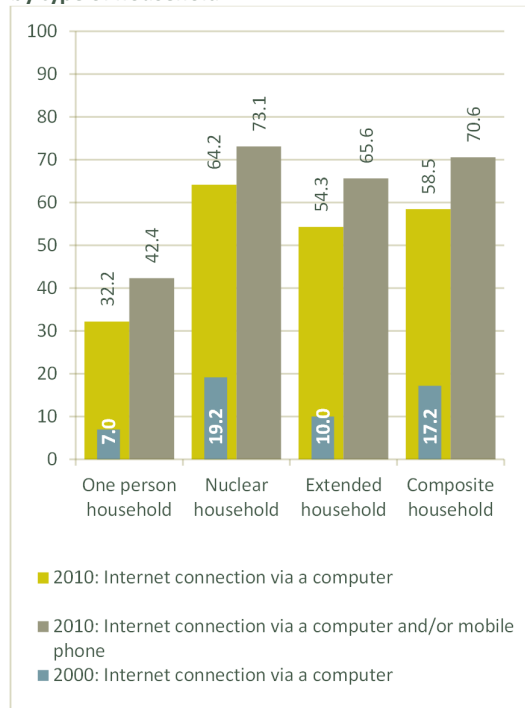
HOUSEHOLD SIZE AND AVERAGE AGE OF HOUSEHOLD MEMBERS

With respect to the average number of persons in households with internet connection it should be noted that an average of 3 persons were reported in these households, while the average number of persons in the households without internet connection was reported at 2 persons. Where the average age of persons in households with and without internet connection was concerned, it should

be noted that persons with internet connection in the home were ten years younger than persons without (mean age=38.3 years, and mean age=49.0 years, respectively). This result is in accordance with the findings reported earlier on the age difference between persons in households with a computer and/or mobile phone and persons in households without these gadgets.
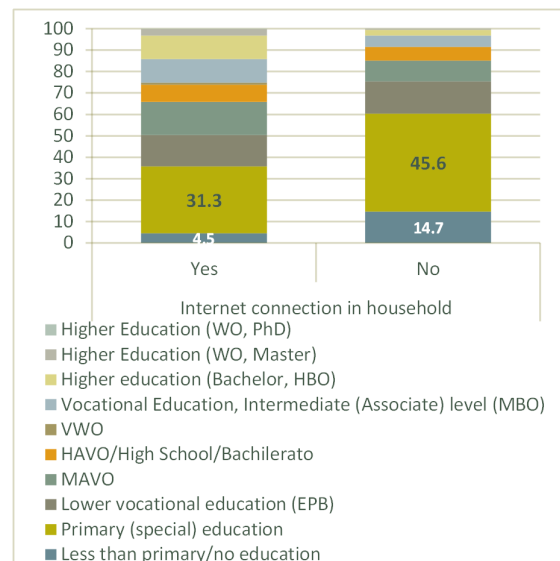
HOUSEHOLD INCOME

Household income has been found to be significantly related to the ownership of computers and mobile phones. Therefore, it should come as no surprise that household income is also related to the presence of internet connection in the household. The results of the 2010 Census revealed a substantial difference between the mean income of households with internet connection and households without, the former earning nearly twice the amount of money per month than the latter (mean monthly household income=Afl. 7422,65, and Afl. 4229,85, respectively).

LEVEL OF EDUCATION COMPLETED

With regard to population with and without internet connection in the home, Figure 23 indicates that 60.3% of the population without internet connection had primary education or less as their highest level of education. For the group with internet connection this percentage registered at 35.8%. These percentages are in line with those observed in persons without a computer and/or a mobile phone in the household.

Figure 23: The distribution of the highest level of education attained of persons with and persons without internet connection via a computer and/or a mobile phone in their household

Internet connection in household

- Higher Education (WO, PhD)
- Higher Education (WO, Master)
- Higher education (Bachelor, HBO)
- Vocational Education, Intermediate (Associate) level (MBO)
- VWO
- HAVO/High School/Bachilerato
- MAVO
- Lower vocational education (EPB)
- Primary (special) education
- Less than primary/no education

SCHOOL-ATTENDING POPULATION

According to the 2010 Census the percentage of school attendees with internet connection in the household was reported at 79.7%. The percentage of students with internet connecting was highest in students attending VWO (96.5%) and lowest in students attending special education (54.6%; see Figure 24).

Figure 24: Percentage of school attendees with internet connection via a computer and/or mobile phone by level of education attended
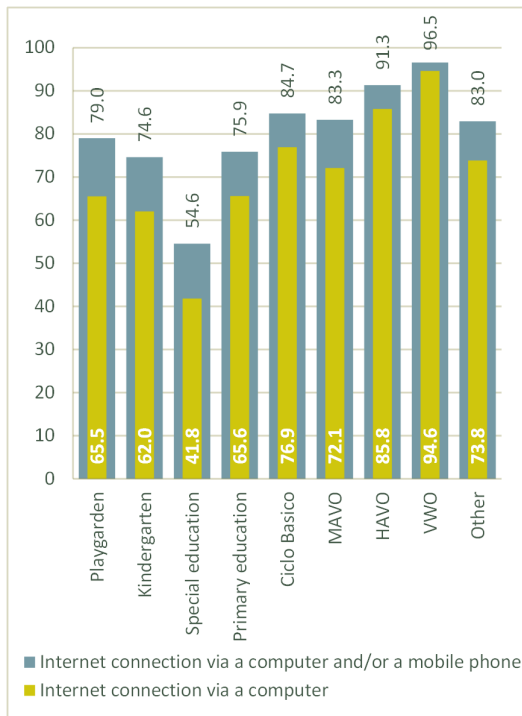
SUMMARY

According to the ITU there were an estimated 0.7 billion households in 2011 that owned one or more computers worldwide (38.9%) and 0.6 billion with internet connection (33.3%).

Upon further analyses of the trends in Aruba with regard to the number of households with computer and internet connection it is clearly shown that during the period 2000 – 2010 a substantial growth occurred. Although there is no data available for the year 2000 with regard to households with mobile phones, it is almost certain that this area also experienced an enormous growth.

The percentage of households with at least one computer in the home went from 32.9% in the year 2000 to 62.6% in 2010. According to the 2010 Census a significant portion of the households disposed of one computer in the home (40.7%), while nuclear households were the largest group with at least one computer in the home. Of the group of school attendees 79% reported that they had a computer in the home and of this same group the VWO- and HAVO students reported the highest percentages respectively 95.9% and 91.2%. At regional level Noord/Tanki Leendert was the most densely populated area, which according to the 2010 Census also had the highest percentage of households with at least one computer. Although San Nicolas North reported the lowest percentage of households with at least one computer, this region experienced the largest growth in the ownership of computers between 2000 and 2010. The average age of members of households with at least one computer was reported at 34.5 years and households without a computer at 43.4 years, households with at least one computer thus being composed of considerably younger individuals. In addition, differences were observed in the mean household income of households with and households without a computer and also between the level of education completed of persons with and persons without a computer at home, both favoring persons and households with at least one computer in the home.

With regard to the penetration of mobile phones in the population of Aruba, we seem to be following the trend of the world population, of whom 90% had access to mobile networks in 2011. According to the 2010 Aruba Census, the vast majority of all households in Aruba disposed of at least one mobile phone (95.2%), while 33.8% of households had two mobile phones in the home. After further examination of the different types of households, nuclear households reported the highest percentage with mobile phones (46.1%). With regard to school attendees, the percentages for all the different types of education hovered above 97% with the exception of students attending special education. Of these students, 90.1% had at least one mobile phone in the home. Furthermore, results of the 2010 Census showed that households with at least one mobile phone were composed of younger individuals than households without a mobile phone, the age difference being almost 20 years. The ownership of mobile phones was also positively related to household income and level of education completed.

According to the 2010 Census 63.4% of all households in Aruba disposed of internet connection. Of all household types, nuclear households were better connected to the internet. In total, 73.1% of nuclear households reported having internet connection via a computer and/or mobile phone.

Where the school attending population was concerned, 79.7% of all school attendees disposed of internet connection, the percentage with internet connection being highest in HAVO and VWO students and lowest in students attending special education. Furthermore, households with internet connection had on average a higher monthly household income and consisted of younger individuals than households without internet connection. In addition, individuals in households with internet connection had on average a higher level of education.

From the results obtained during the 2010 Census it can be concluded that Aruba follows the international trend in the ownership of computers and mobile phones and the connection to the worldwide web.

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