



Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura



Objetivos de Desarrollo Sostenible

POLICY BRIEFS UNESCO

How data and ICT can be effective allies to prevent youth violence in the Northern Central American countries



Published in 2018 by the United Nations Education, Science and Culture Organization, 7, place de Fontenoy, 75352 Paris 07 SP, France and the UNESCO Regional Office for Sciences in Latin America and the Caribbean, UNESCO Montevideo, Luis Piera 1992, piso 2, 11200 Montevideo, Uruguay..

© UNESCO 2018



This publication is available in Open Access under the Attribution-ShareAlike 3.0 IGO (CC-BY-SA 3.0 IGO) license (<http://creativecommons.org/licenses/by-sa/3.0/igo/>). By using the content of this publication, the users accept to be bound by the terms of use of the UNESCO Open Access Repository (<http://en.unesco.org/open-access/terms-use-ccbysa-en>).

Original title: “Cómo los datos y las TIC pueden ser eficaces aliados para prevenir la violencia juvenil en los países del norte de Centroamérica”. Published in 2018 by the by the United Nations Education, Science and Culture Organization, and the UNESCO Regional Office for Sciences in Latin America and the Caribbean, UNESCO Montevideo.

This document is part of the project on Preventing Youth violence through ICT in El Salvador, Honduras and Guatemala, funded by the Spanish International Development Cooperation Agency – AECID. The project is coordinated by the Social and Human Sciences sector and the Communication and Information sector of the UNESCO Regional Office for Science for Latin America and the Caribbean, UNESCO Office in Montevideo; with the ongoing collaboration of the UNESCO Office in San José and the UNESCO Office in Guatemala.

The terms employed in this publication and the presentation of data appearing herein do not imply any position taken by UNESCO regarding the legal status of countries, territories, cities or regions or regarding authorities, borders or such limits.

The ideas and opinions expressed in this publication are the authors' own and do not necessarily reflect the viewpoint of UNESCO or commit the Organization.

Participation in preparing this document:

Research and drafting: Aldo Magoga

Reviewed: Guilherme Canela, María Florencia Straumann, Pablo Ramírez-Miranda, Andrés Morales y Marlon Hernández-Anzora.

Cover photograph: UNESCO 2018

Graphic Design: María Noel Pereyra (UNESCO Montevideo)

PUBLIC POLICIES, DATA ANALYSIS AND ICT: HOW CAN NUMBERS HELP COMBAT VIOLENCE?

“Data, data, data. I can’t make bricks without clay”.

*Sherlock Holmes, a fictitious character created in 1887
by Scottish physician and writer Sir Arthur Conan Doyle (1859-1930)*

Among the many puzzle pieces of the so-called 4th Industrial Revolution, the exponential growth of humankind’s capacity to store and analyze data, is particularly revolutionary.

The information one can now carry around, literally, in one’s shirt pocket, would have required a server as big as a house, 30 years ago. We have shrunken the space needed to store exabytes of information, while also accelerating dizzyingly the speed to process that information.

However, this process offers us only the “potential” to improve design, implementation, monitoring and evaluation of the most diverse range of public policies, including those on security. Storing and processing may generate information, but generating better policies will require us to go further: we need to produce knowledge.

This is the Gordian knot of evidence-based policies. What questions can we ask these data we have generated? Or, first of all, what data must we produce to facilitate our policies’ design, implementation, and evaluation? “How can we guide the data – information – knowledge sequence?” is the key question for decision-makers and public policy-makers.

The fourth industrial revolution has also drastically transformed youth and the experience of being young. Changing cultural schemes and the role of young people in present-day societies has given the role of protagonists, but has also evinced their broad-ranging needs and their lack of opportunities, facing situations of vulnerability and violence. This is intensified in the Latin American scenario, a disproportionately violent context.

The following text, from the Italian expert on data and policies to combat violence, Aldo Magoga, offers a critical view of this issue. Magoga combines public policies on security and preventing violence, with the opportunities offered by ICT and by data analysis science. With illustrative examples, he underscores how public policies attempting to more effectively prevent violence can add quality by using available computing tools more intensely and strategically.

Additionally, the text calls a major warning about the care we must take, when elaborating a coherent policy on the use of data mining. Relevant ethical and human rights issues such as privacy, freedom of expression and transparency of algorithms, are today’s challenged, intensified by brand-new debates about such issues as Artificial Intelligence and the Internet of Things.

The key is therefore to acknowledge the pressing need to turn information into knowledge; assuming that there are opportunities and risks. The task to make public policies more efficient, is to boost opportunities (in this case, by using computing science and data analysis for security policies) and mitigate risks (particularly to protect and promote human rights for all).

In this context, UNESCO has contributed to changing the paradigm for working with young people, not considering them as beneficiaries, but as active partners and potential change agents in their societies. Better coordination between violence-prevention policies and the use of data, can undoubtedly contribute to greater opportunities and lower risks for youth, as a foundation for more peaceful, more sustainable present and future societies.

We expect this text to encourage us to continue incorporating these issues strategically and sustainably in the Center for Public Policies on Preventing Violence.

Enjoy reading this book!

The Publishers

**PROJECT: PREVENTION OF YOUTH VIOLENCE THROUGH COMMUNICATION
AND INFORMATION TECHNOLOGIES (ICT) IN EL SALVADOR,
GUATEMALA AND HONDURAS**

How data and ICT can be effective allies to prevent youth violence in the Northern Central American countries

Aldo Magoga

CONTENTS

| | |
|---|----|
| Prologue..... | 1 |
| Acronyms | 4 |
| Definitions | 4 |
| Introduction | 5 |
| 1. ICT and preventing youth violence in the countries of the Northern Triangle | 7 |
| 2. ICT and preventing youth violence | 9 |
| 3. Using data in the National Strategy to Prevent Violence and Crime (ENP) of Guatemala 2017-2027 | 14 |
| 3.1. The National Strategy to Prevent Violence and Crime of Guatemala 2017-2027..... | 14 |
| 3.2. Data use in the ENP | 16 |
| 3.3. Major elements of the ENP in information use | 18 |
| 4. Using data and big data to effectively draft and implement policies to prevent youth violence | 19 |
| 5. Recommendations..... | 22 |

ACRONYMS

| | |
|---------------|---|
| AI | Artificial intelligence |
| IDB | Inter-American Development Bank |
| CCFC | Campaign to keep Children Free of Commercials |
| COPPA | United States Child On-line Privacy Protection Act |
| ENPEVI | Survey on Perception of Public Security and Victimization |
| ENP | The National Strategy to Prevent Violence and Crime |
| GIS | Geographical Information Systems |
| ICCS | International Classification of Crimes for Statistical Purposes |
| IIN | Inter-American Institute of El Niño |
| MINGOB | Ministry of Governance of Guatemala |
| MP | Public Ministry of Guatemala |
| MTI | Inter-institutional Technical Working Group |
| OAS | Organization of American States |
| OJ | Judicial Agency of Guatemala |
| CSOs | Civil-society organizations |
| UNDP | United Nations Development Programme |
| SICA | Central American Integration System |
| ICT | Information and Communication Technologies |
| UNESCO | United Nations Education, Science and Culture Organization |
| UNODC | United Nations Office on Drugs and Crime |
| US-AID | United States Agency for International Development |

DEFINICIONES

| | |
|-------------------------|--|
| Bullying | Repetitive use of force, aggression, and intimidation among adolescents as a form of domination and imbalanced power relationship: “A person is harassed when exposed, repeatedly and over time, to negative actions by one or more other persons, and has difficulty defending himself or herself” ¹ |
| Cyberbullying | Harassment by electronic media. |
| Data mining | Discovering patterns in large volumes of data using statistical methods, data bases, and automatic learning systems. |
| Data Science | The science of using Data. |
| Grooming | Strategies an adult uses to gain the trust of children to abuse them sexually. |
| Target group | The group of persons and stakeholders who are beneficiaries of a project or program. |
| Hackathon | A rapid design event where programmers and software developers collaborate intensely on specific projects. |
| Baseline | The initial values of an array of quantitative and qualitative indicators adequately describing the situation to be changed by a program or policy, measured at the beginning or prior to implementation. |
| Machine Learning | Software for automatic learning. |
| Sexting | “Texting” with sexual contents. |
| Stakeholder | Parties who are involved in the situation. |

1 Definition of bullying adopted by UNESCO. Source: “Bullying at School: What We Know and What We Can Do”, Dan Olweus, 1993. At: <https://bit.ly/2SrNvOF>

INTRODUCTION

According to the UNESCO definition, “The term ‘information and communication technologies’ (ICT) refers to those forms of technology that are used to transmit, process, store, create, show, share or exchange information via electronic media. This broad definition of ICT include such technologies as radio, television, video, DVD, telephone (both land-line and mobile), satellite systems and computer hardware and software and networks, as well as equipment and services associated with these technologies, such as video-conferencing, email and blogs”².

In the last few years, these technologies have grown exponentially. The Domo³ company has estimated that, by 2020, 1.7 MB of data will be generated per second: the amount of information produced in a few hours (measured in terms of bytes, kilobytes, megabytes, gigabytes, terabytes, petabytes, exabytes, zettabytes, and yottabytes), will equal all the information that humankind has produced over centuries of history.

ICT, Internet, and social networks in particular are often associated with new forms of violence, and the most vulnerable categories are children, adolescents, women and LGTBI persons. Sexting, grooming, cyberbullying, and on-line sexual blackmail are some of the most common forms of on-line violence. Typing the words “violence and ICT” into Google will show most search results are links to articles and pages on technology as a tool to perpetuate violence or articles warning about the danger of Internet for children and adolescents. The recent OAS/IIN report, “Guidelines for empowering and protecting the rights of boy and girl children and adolescents on Internet in Central America and the Dominican Republic”⁴ provides such proof, as do recent denouncements by the Campaign for Children Free of Commercials (CCFC) accusing Google Inc. of illegally compiling data from child users of YouTube for commercial purposes, thereby violating the Child

Online Privacy Protection Act (COPPA) of the United States.

Problems associated with using social networks for violence become more serious as the population with Internet access grows, particularly as social networks spread (Facebook, YouTube, Instagram, Tumblr, Ozone, Sina Weibo, Twitter, Baidu Tieba, LinkedIn, Reddit, Pinterest, Kakaotalk) and access to Internet by smartphone. In January 2018, Facebook had 2.055 thousand million active users who accessed the platform from a smartphone or tablet, versus 687 million users with computer access⁵. The Demo company reported that Facebook users have increased from 2.5 thousand million in 2012 to 3.8 in 2017. A recent study by the Pew Research Center showed that only 51% of US adolescents from 13 to 17 use Facebook, preferring other platforms such as YouTube (81%), Instagram (72%) or Snapchat (69%)⁶. The above OAS/IIN report states:

“According to the latest data from the International Telecommunications Union, nearly 70% of youth worldwide are on-line, meaning one fourth of the total number of individuals using Internet. In the Americas, 65.9% use Internet, 88.4% of them youth from 15 to 24. These figures show that more and more girls, boys and adolescents depend on Internet to connect with resources, services, tools and digital platforms; in order to learn, participate, relate with others, be entertained, do their homework and socialize. They also show that the digital divide remains for access to Information and Communication Technologies (ICTs) in these groups”⁷, especially in rural areas.

Increasing Internet access is undoubtedly a very positive element, and offers many opportunities para for adolescents and youth. In addition to accessing information, which has grown exponentially in the last five years, adolescents and youth have countless opportunities to communicate, socialize, make cultural productions or simply share their ex-

2 Definition of ICT in “The Unesco ICT in Education Programme”, 2007, page 1. At: <https://bit.ly/2CMelWs>

3 “Data never sleeps 2016”, Demo. At: <https://www.domo.com/learn/data-never-sleeps-6>

4 “Guidelines for empowering and protecting the rights of boy and girl children and adolescents in Internet in Central America and the Dominican Republic”, IIN. At: <https://bit.ly/2EQCFP4>

5 <https://bit.ly/2DdJ6dr>

6 The 3 favorite social networks of adolescents in the United States (and none is Facebook), BBC World News. At: <https://bbc.in/2KH0WtW>

7 “Guidelines for empowerment and protecting the rights of boys, girls and adolescents on Internet in Central America and Dominican Republic”, IIN, Page 15. At: <https://bit.ly/2EQCFP4>

periences. Young people can use Internet for education, by accessing on-line courses (YouTube, podcasts, audiobooks, or e-learning platforms, such as Coursera⁸ or from major universities), to organize into groups: thematic, cultures, school or religious groups; among other possibilities. They can also use ICT to participate in social programs and for preventing violence.

Alongside concerns about young people's Internet access, since the 1990s we have recognized the potential of ICT for combating and preventing violence. In addition to campaigns and initiatives to prevent violence against children on Internet, there are others against gender violence; virtual courses for social operators, parents and teachers about how to prevent and confront bullying at school; applications to facilitate anonymous complaints; geo-referenced maps of crime rates to warn the public; dissemination of protection technologies through algorithms that filter contents that are sensitive for children; and smartphone programs and apps (such as "safe cities").

At the same time, although there has been more progress in countries such as the United States and the countries of Europe, and to a lesser but still significant degree in Africa and Latin America, governments have fostered the use of ICT for analysis and decision-making; Chile, Brazil, Argentina and Mexico has made the most headway in e-governance. Since the first Geographical Information Systems in the 1990s, up to data mining in social networks, to systems for early identification of attacks and identifying members of terrorist groups, the use of ICT to prevent and combat violence and crime has evolved rapidly and potentially quite effectively.

The main consultancy findings indicate that, in El Salvador, Guatemala and Honduras, greater institutional competency has developed in the different organizations responsible for security and justice, to store, analyze and exchange data to design, implement and track public policies on security, including the youth sector, as the top perpetrators of violence and, at the same time, the most vulnerable and affected by it.

Further, available data features major limitations: indicators are not always aligned with international standards, information is incomplete (lacking ages,

8 Platform of virtual education by scholars of the University of Stanford, USA. At: <https://www.coursera.org>

ethnic groups, sex, geographical data, and time series) or is not homogenous among institutions. Further, there are delays in updating data and difficulties accessing information; in general, there are no inter-institutional portals or systems to facilitate data access and flow among institutions.

The main limitation is on how available information is used. Generally, indices and quantitative data are used to describe the problem that public policies attempt to address (context, problem status) and not to identify causal chains, identify and weight risk factors, measure progress in policies (decreased crime rates), which neglects the efforts and progress made in every country. A case in point is the findings from surveys on victimization being conducted in the region⁹.

However, the national context favors an increase in information quality and usage for public policies to prevent youth violence. Based on Guatemala as a case study, we will present some possible uses of information that these policies can apply more adequately, tapping into the opportunities offered by the availability of information from different sources: administrative data, surveys, social networks and big data, multivariant analysis techniques, artificial intelligence algorithms to interpret and forecast violent behaviors among youth.

In this document, "**Chapter 1. ICT and preventing youth violence in countries of the Northern Triangle**", summarizes the current situation of using ICT in Guatemala, El Salvador and Honduras.

"**Chapter 2. ICT and preventing youth violence**" presents some general guidelines about how ICT could be used effectively and the main techniques for analyzing information.

"**Chapter 3. Data use in the la National Strategy to Prevent Violence and Crime of Guatemala 2017-20127 (ENP)**", presents the National Strategy to Prevent Violence and Crime of Guatemala, data use in the ENP, and some strengths of the ENP's use of information.

"**Chapter 4. Using data and big data to effectively prepare and implement policies to prevent youth violence**" gives different tools to analyze different

9 The National Statistics and Geography Institute Center of Excellence of Mexico (INEGI) and UNODC have played a leading role, in disseminating surveys on victimization in the Latin American region.

components of prevention policies, from initial assessment to communication and sensitization.

“Chapter 5. Considerations” summarizes some considerations regarding the situation in countries of the Northern Triangle and opportunities to explore in order to reinforce data use for policies on preventing youth violence..

1. ICT AND PREVENTING YOUTH VIOLENCE IN THE COUNTRIES OF THE NORTHERN TRIANGLE

El Salvador, Guatemala and Honduras make up a region with some of the world’s highest homicide rates: the Northern Triangle. Their governments, security and justice institutions, and Civil-society organizations (CSOs), have progressively improved their competencies in using statistical information to measure, monitor, design and implement public policies on citizen security and preventing violence. We are referring to standardizations of criminological data for statistical purposes (ICCS promoted by UNODC, IDB projects and most recently USAID/UNDP projects, with technical and thematic assistance by UNODC), surveys on victimization and perception of violence / violence against women (Latinobarómetro, Barometer of the Americas, Governments, Civil society), operational rooms with geo-referenced information for early response systems to crime phenomena, institutional and inter-institutional information systems (being improved) to measure information performance, management, administration, production, exchange and dissemination.

These three countries have a specific law for access to public information, but its implementation has not yet lived up to expectations. In Guatemala, for example, the Human Rights Prosecutor / Ombudsman¹⁰ (PDH), the press¹¹ and Civil Society¹² have called for action regarding this scanty implementation, especially when the government is called upon

to transparently disclose public expenses and information that is considered sensitive or of national interest.

However, countries in the Central American region do not have complete information systems, with updated, accessible data bases meeting international standards. Despite progress achieved in standardized measurement of murder rates (which also have issues, according to various analysts), available information is fragmented, not always accurate (or even contradictory), without an adequate degree of disaggregation (by gender, ethnic group, or age), and often not updated and difficult and slow to access. Institutions in the region are also slow because of obsolete information management systems that require ad hoc information, transmitted to those requiring it by just a few competent staff, short-handed compared with the many requests they receive every day.

In those cases where the National Statistics Institute does have information on security and justice, such as in Guatemala, where the INE has a portal with access to this type of information, data base has been updated only to 2015. Regarding youth violence, there is only information on the number of murders and injured by five-year age groups, but no gender disaggregation. For other crimes, there is disaggregation by sex, but not by age groupings. The same goes for information adults arrested, as well as for most other indicators (accusations, necropsies and so on¹³), for which data are available up to 2012.

Such weaknesses in information management show the main challenges for public policies in countries of the region, also reflected in policies on citizen security and preventing violence and crime.

Decision-making on public policies is based only partially on elements of analysis and accurate information, given the lack of information and since decision-makers often need to deal with situations that are out of control, with responses that are often improvised and often unfounded – or “based” on empirical evidence. “Iron-fist” policies, and judicial systems in general, are not effective¹⁴, crime is alarming, and impunity is the norm in most cases. Only in Guatemala, which has made such headway against impunity, according to the United Nations

10 The Human Rights Ombudsman (PDH). Report on Implementing the Law on Access to Public Information. Conclusions from the 2016 Annual Report.

11 “PDH condemns secrecy on the National Security Council”, By Diario La Hora newspaper -13 June 2018. At: <https://bit.ly/2JP79Pe>

12 “A small gesture of rebellion, for the right to access public information”, by Carlos Mendoza, on the Diálogo de Guatemala platform. At: <https://bit.ly/2Q4jiTD>

13 Statistical portal of the National Statistics Institute of Guatemala, at <https://bit.ly/2pULZJy>

14 Citizen Security Report, UNDP. At: <https://bit.ly/2HLesuw>

International Commission Against Impunity, impunity has dropped from 96.4% in 2008 to 90.2% in 2015, its lowest figure to date¹⁵.

Further, institutions, despite many domestic and international community efforts, have no effective management by results. There are no systems to measure progress against adequately defined goals; institutional structures are rigid, top-down, characterized by a context of emergency (in all sectors: educational, sanitation and health, infrastructural, environmental, plus the well-known issues of citizen insecurity), which favor ad hoc, non-comprehensive solutions, oriented toward getting beyond the “critical phase” – till a new emergency focuses public opinion and decision-makers’ attention toward other emergencies.

Scarcity of public funding, due to low fiscal tax collection, because of evasion, corruption, inequities and the poverty prevailing in countries of the Northern Triangle, is a major problem facing institutions in the región¹⁶. However, the effectiveness of policies results from efficient institutional processes, and efficiency can be improved with minimal investments, but with major responsibility and political will. This is the case of Guatemala, which has falling rates of impunity thanks to strengthening the Public Ministry and Judicial Institutions, by reforming the criminal-procedural code, implementing policies of strategic prosecution, assessing performance and managing by results. Such reforms have been followed by public budget increases, but strengthening norms and institutions has been essential; allocating more funding to judicial institutions without working on their characteristic bottle-necks, without also improving their efficiency in handling cases, would not achieve the expected effects.

ICT can be a useful tool to improve such processes, and to add value to youth violence prevention policies, to disseminate a culture of legality and reduce factors causing violence, while increasing the resilience of potential victims, reinforcing State ca-

pacities to implement public policies and respond effectively, punishing violent actions in different contexts: home, schools, institutions, neighborhoods, community and cyberspace.

Data Science was developed starting in the 1990s, to turn data into information and discernment, by extracting knowledge from data by combining statistics, mathematical models, software, applying game theory, quantitative analysis techniques, and other computing and analytical tools to take a set of structured and un-structured information and clean, prepare and analyze its data differently, adding value as information and interpreting existing information. Taking merely quantitative data, e.g., the murder rate, Data Science probes deeper into knowledge about homicidal violence, studying its modalities, causal factors, enabling and preventive elements, measuring and modeling scenarios, to provide the essential knowledge base to make prevention policy effective.

With growing Internet access and use of social networks in the last ten years, much more data are available to analyze information. Examining these data is both a huge challenge and a fabulous opportunity. If the problem used to be the availability of information, the extraordinary amount of data to analyze – on the order of several terabytes (1 TB = 1,000 GB) – has led data scientists and social platforms that take the most advantage of data (e.g., Facebook), to develop a new sector of research, called big data. Big data uses complex systems technologies and artificial intelligence, such as machine learning and data mining to identify trends, correlations and patterns among the different information sources, and create mathematical models to help interpret and forecast – and test these conjectures – based on the data.

In Northern Triangle countries, a first analysis of available data and progress in using ICT¹⁷, has shown how institutions of security, justice and statistics in Guatemala, El Salvador and Honduras are in fact improving their information management systems, data bases and indicator standardization procedures. However, this shows how embryonic ICT usage still is; ICT are used partially and quite

15 “For the period 2008-2016 period, total impunity for all crimes was 92.86%, with 96.40% the annual rate in 2008 and 90.87% in 2016” and “Annual effectiveness of the judicial system has risen from 3.6% in 2008 to 9.8% in 2015 – which was also the year with the lowest impunity on record, with 90.2%”, Portal CICIG. At: <http://www.cicig.org/proyectos/sij/>

16 “Regional human development report for 2013-2014”, page 113, UNDP. At: <https://bit.ly/1e1LyA>

17 Analysis done with implementers of the INFOSEGURA Project by US-AID/UNDP. INFOSEGURA is a “Regional project specializing in evidence-based information management to strengthen public policy-making and tracking regarding citizen security in Central America and the Dominican Republic”. At: www.infosegura.org

incipiently. Fundamentally, security policies are guided by reactive approaches, more or less punitive (generally increasing the punitive approach, but introducing the first elements of restorative justice) and, generally, prevention policies do not achieve significant impacts. Despite reducing murders in the last few years, the rates of violent crimes such as abuse of women, threats and injuries, extorsions and other crimes related with organized crime show no major turnarounds.

Guatemala has made significant progress in policies to prevent violence and use evidence in decision-making, by creating the Vice-Ministry to Prevent Violence and Crime under the Ministry of Governance (MINGOB). The Vice-Ministry has a “National Policy on Preventing Violence and Crime, and fostering Citizen Security and Peaceful Coexistence 2014-2034” and, with the new government, the “National Strategy to Prevent Violence and Crime (ENP) 2017-2027”. There is also an Inter-sector Technical Working Group, comprising institutions relevant to policies on security and justice, and the National Statistics Institute, responsible for standardizing indicators, analyzing and disseminating information for decision-making. For this reason, policy on Preventing Violence in Guatemala has been analyzed in light of information use and opportunities for integration offered by ICT.

The next chapter describes the main techniques for analyzing and using ICT to prevent youth violence.

2. ICT AND PREVENTING YOUTH VIOLENCE

Using ICT to generate and analyze information is especially useful for public policies and for decision-making. ICT enable designing, implementing and monitoring of evidence-based plans and actions, as well as waging communication campaigns and sensitization actions geared toward influencing causal factors underlying violent behaviors, with the techniques outlined below.

Analysis tools range from quantifying a phenomenon (e.g., graphs to describe inter-annual variation in homicides) to information analysis using techniques of different complexity, such as Artificial Intelligence applied to big data. Such tools make it possible to identify areas with the highest rates, population groups and persons at risk – of being vic-

tims or perpetrators, make analyses and forecasts of crime trends or the emergence of new violent phenomena, and create crime forecast systems or early warning systems.

Among existing tools, we may mention:

- Using data to design, implement, track, evaluate and measure the impact of initiatives and policies to prevent, focusing on youth.
- Using information to design life plans based on young people’s individual characteristics and socio-economic context (psychological profiles, availability of labor, etc.).
- Virtual employment bureaus, virtual courses, distance education programs, peer groups on social networks for professional / economic insertion and reinsertion.
- Communication for sensitization and change, by producing and broadcasting television programs, soap operas, films, documentaries and information and sensitization campaigns (Blogs, YouTubers and Influencer), groups on social networks (Facebook, Instagram, Twitter, WhatsApp...)
- Smartphone apps, hackathon
- Communication for Change programs with youth groups (schools, churches, hip-hop groups), YouTubers and Influencer.

Beyond these tools, ICT can be used for security and access to justice policies:

- Combating crime through technology and applications for security, e-bracelets, and video surveillance systems.
- Protecting vulnerable groups with early warning and complaint systems in such institutions as schools, households, prisons and jails, religious centers, and sports associations.
- Apps to help reporting and complaints by citizens, surveys on social networks, situational risk dashboards / rooms, Safe Cities programs.

- Using ICT for criminal investigations, criminal laboratories, cybercrime, cyber-bullying.

Measuring administrative indicators and data enables analysis of different expressions of youth violence: perception of insecurity, collected by surveys on victimization, focus groups in schools and communities, data on incidence, through administrative records on complaints and cases taken to court, etc.

With such information, historical series of indicators can be analyzed, measuring inter-annual variation in violence and crime rates, defining vulnerable groups on the basis of age, gender, ethnic groups, geo-referencing and mapping information, including geographical details and layers of data to complement information on crime rates with variables from other fields, bridging from simply analyzing indicators to more advanced analyses.

Some data useful for these purposes may be: Administrative data on crime rates (homicides, sexual violence, school harassment, cyberbullying), the number of adolescents and youth in conflict with criminal law or deprived of freedom, rates of crime and recidivism in youth and adolescents, population victimized by age, sex and ethnic group, percentages of the population who have changed their behaviors due to violence.

Further, analysis tools and Data Science can reveal and quantify the weight and inter-relationships among phenomena associated with violence and thereby identify causal chains to construct evidence-based prevention policies. Beyond simply analyzing indicators, there are techniques to extra

knowledge from data that will be useful to understand patterns, correlations and causal chains, so prevention policies can influence reduction of the phenomena underlying violence. Causal factors, trigger factors, and preventive factors can be identified and their role quantified, so policies can focus resources and actions to maximize their potential impact.

Business Intelligence (BI) applies mathematics and statistics to interpret data, transforming information into knowledge, by using analytical and statistical mathematical modelling: mathematical analysis, correlation analysis, multivariate analysis, techniques of linear and non-linear interpolation, cluster analysis, predictive models, and interpretative models, among others.

These techniques are quite useful to complement simply quantitative information on violent phenomena, evidencing and identifying possible causes for correlations between two or more variables, i.e., a pattern relating them. For example, when some forms of violence are related with specific socio-economic situations, such as dropping out of school, family abandonment, or the presence of organized youth structures, such as maras or gangs. They can also reveal correlations with other variables, such as school inclusion, the presence of youth programs (sports, music, art, culture, vocational training) or other forms of youth aggregation (volunteering groups, hip-hop groups, associations or informal sports groups) or simply State presence (social programs, social assistance) or non-governmental organizations, such as churches or community groups. When there is positive correlation, phenomena are

Illustration 1. Examples of using ICT for policies on preventing youth violence



Illustration 2. Examples of using ICT for Citizen Security and Access to Justice Policies



proportional. For example, the number of murders and ease of accessing firearms, or the number of burglaries and robberies, and the rate of economic inequality. When the correlation is negative, phenomena are inversely proportional, as between victimization of women and dissemination of non-machista patterns of masculinity, or between the murder rate and the percentage of indigenous population.

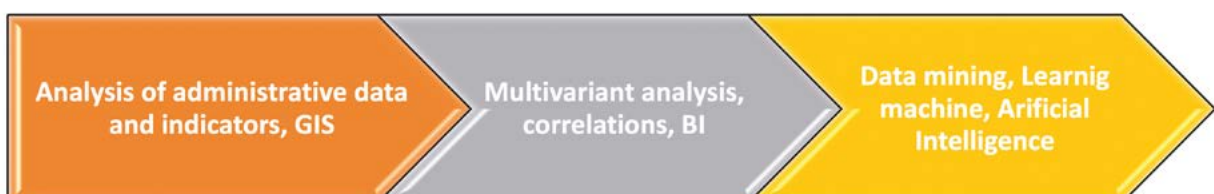
More complex techniques include factorial analysis, cluster analysis, interpolations and others, called overall multivariate analysis techniques. Such techniques – described below – are useful to build interpretative, descriptive and predictive models and make it possible to identify, measure and understand trends, causal factors, areas of marginalization and vulnerability, and groups at risk, as well as studying how they work and how specific expressions of youth violence, such as *maras* and gangs or groups for collective violence, can be disarticulated.

Factorial analysis, for example, can evidence and measure how variables from different fields (educational, economic, ethnic, security) are inter-related. Schooling, GDP per capita, access to employment, absence of violence, rule of Law, the health system,

life expectancy, and a country's percentage of indigenous population, are all inter-related. A country with high rates of impunity can hardly have low murder rates, and a country with high economic well-being is more likely to enjoy social well-being.

Factorial analysis can extract from a set of variables, based on relative correlations, subsets of variables that represent, with some degree of approximation, a system. Such techniques can reduce the number of variables to be used, without forfeiting percentages of relevant information, thereby reducing the system's complexity and helping understand what factors are most significant regarding a problem situation. These factors, according to their positive or negative correlation with the phenomenon under analysis, may be causal elements or factors aiding protection and prevention. Correlations may also be the effects of phenomena that are independent of each other but generated by the same causes. Correlation does not, in fact, mean causality: if two or more variables are correlated, they may indeed be consequences of the other(s), but they may also be the consequence of some other variable not included in the system.

Illustration 3. Techniques to analyze Data and Big Data for policies to prevent youth violence



Cluster analysis is another multivariate analysis technique. It makes it possible to create similar sets of objects (clusters) representing municipalities, persons, institutions, or population groups, with similar characteristics on the basis of the variables they share (attributes). So, for example, it is possible to construct clusters of municipalities, or neighborhoods with similar socio-economic characteristics, by crime rates, dropout rates, inequities, or any other variable included in the system analyzed. This way, policies on prevention can design models for different implementation, constructed expressly for each type of cluster. Prevention programs in urban municipalities with high rates of homicide, economic inequity, and social exclusion, cannot be the same as policies implemented in a rural zone with indigenous population. Each cluster must have its own policy.

Interpolation techniques, based on a data set and the mutual correlations among the data, make it possible to design mathematical functions with which to construct predictive models (straight or curved lines, more or less complicated, in two or more dimensions, depending on the number of variables). This makes it possible to assess which variables most influence a phenomenon and target investments in public policies toward those variables, to impact the problem's causal factors (such as youth violence), thereby increasing interventions' effectiveness.

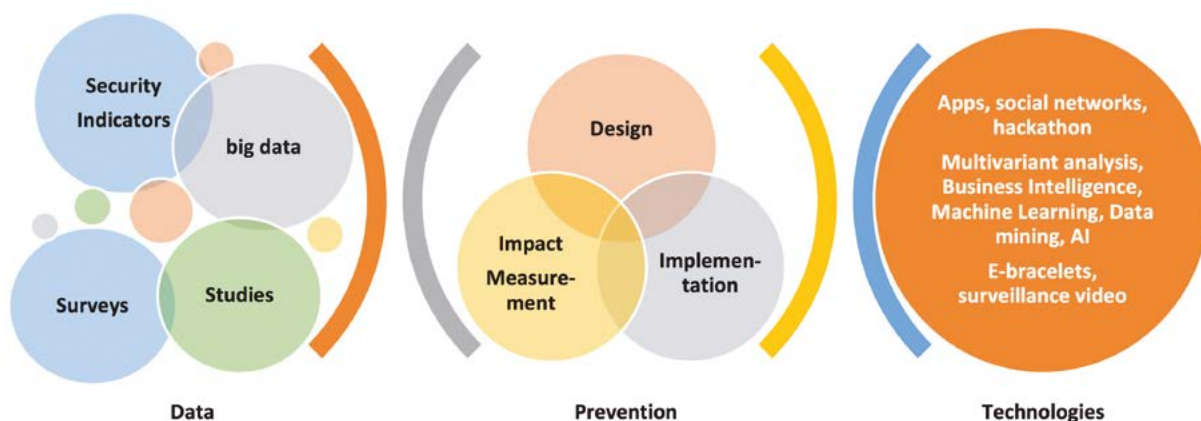
As social networks spread and information available on their users soars, for initially commercial purposes, the mathematical statistical tool to analyze information from the Web has acquired new techniques to extract qualitatively relevant information from interactions on social networks from millions of users and from available information about

any type of public behavior, and other contextual information (climatic, political, economic, social, or institutional). This refers to the varied information that users share on the Web, from credit-card use, to electrical energy consumption, books read, places and persons frequented and, most recently, geo-referencing and health conditions that the public constantly shares via GPS systems and apps that smartphones and smart watches constantly monitor. Further, artificial intelligence algorithms, such as those using neural networks, can foresee future behaviors on the basis of similar behaviors in the past. The magnitude of this information is huge. Big data is an extremely large data set that can be analyzed by computers to reveal patterns, trends and associations, especially regarding human behavior.

Neural networks are a computing model based on a set of neurons, represented by parameters, which are defined according to the situation, the value of which is defined progressively according to the network's own experiences (training the neural network). Much software for facial recognition, understanding verbal language and machine translations is based on neural networks, trained with images of faces, repetition of known words, and comparison with pre-existing texts. The same applies to the preferences of a consumer who buys products on Amazon, watches television series on Netflix or searches on Google.

Such interactions, without having to understand the causal factors determining them, with the tool of Artificial Intelligence, can be used to describe and create models predicting individual and collective behaviors of persons and population groups, by age, gender, culture, socio-educational level, geographical area, political preferences, etc. These models

Illustration 4. Using Data / Big Data to prevent youth violence



facilitate creation of targeted, personalized communication campaigns according to users' preferences and characteristics, to advertise a product or influence their preferences.

The case of Cambridge Analytica has shown recently how using Artificial Intelligence and big data analysis to learn and forecast about individual and collective behaviors, can include new tools to influence people's preferences. A significant percentage of posts on Facebook and Twitter are generated by persons and software that create, amplify and spread news that is not necessarily true, influencing the perception of reality and, consequently, people's social, economic, political, and religious behavior.

For policies to prevent violence, this type of analysis makes it possible to identify and gauge the weight of cultural patterns (machismo, sexism, racism) in violent behaviors, as well as the relevance and the linkages with individual and family contextual variables, reflected in violent behaviors (abuse, bullying, etc.). This include exclusive, aggressive practices that adolescents and youth experience and suffer from at home, in schools, institutions, community settings and social networks (Facebook, Instagram, Snapchat, WhatsApp groups, Twitter, etc.), from their peers or the authorities (parents, teachers, other educators, social service staff, etc.).

Studying how target groups use social networks and analyses using big data techniques of profiles of audiences can rapidly enhance the effectiveness of prevention policies and programs. These may include positive actions geared to impact social networks, such as preventing cyberbullying, sexting or grooming, or may be implemented using social networks to communicate, sensitize, create or strengthen population groups (youth or Civil Society) who are active in preventing violence. This way, campaigns, messages and social networks themselves can be used quite effectively.

Big data is also applicable to assessing and identifying risk factors that policies to prevent youth violence intend to change. In fact, all information (data, big data) and the knowledge extracted from it (maps, infographs, behavior models, statistics, trends, clusters, correlations, causal factors, studies on vulnerabilities, etc.) should be the foundation of all decision-making. Unfortunately, analyses that go beyond a few rates (crime, poverty, violence, persons at risk), are generally the exception in public policies and in policies to prevent youth violence in particu-

lar. Evidence-based decision-making, targeting, and prioritizing policies and resources according to reality, designing criminal policy and strategic prosecution of violent crimes based on victims' priorities, using quality indicators for design, implementation and tracking of prevention policies are rarely seen in the region.

There are fortunate exceptions, such as in Guatemala. The National Prevention Strategy (presented in greater detail below) requires expressly for the National Information System on Violence and Crime of Guatemala, a dependency of the National Council to Prevent Violence and Crime, to promote "research into the causes and factors conditioning violence and risky behaviors, linking social variables and information about violence and crime".

3. DATA USE IN THE NATIONAL STRATEGY TO PREVENT VIOLENCE AND CRIME (ENP) OF GUATEMALA 2017-2027

In Northern Triangle countries, national institutions' capacities to register and process information on crime and crimes are constantly increasing. Fundamentally, they use information to analyze criminal prevalence, complemented by surveys and studies about maras and gangs, violence against women, trafficking in persons – emphasizing children – and specific studies to orient policies or engage in sensitization and policy advocacy by CSOs.

Depending on the data bases and the countries, there is fairly reliable information on denounced cases, sex and age of victims and defendants, but little information about ethnic groups.

Beyond crime indicators, there are other socio-economic indicators, such as poverty rates, dropout and unemployment rates, or situational assessments are made through assessments / surveys in specific settings – neighborhood, community, school. However, in general, these are territorial indicators and not linked to victims or perpetrators.

In recent years, information has been enriched by major findings from victimization surveys. The survey in Guatemala was conducted the first half of 2018 and its findings are being analyzed for publication and use soon. In Honduras a survey was done in

2016 on perception of insecurity and victimization¹⁸. El Salvador has a consultation on public opinion regarding victimization and perception of insecurity from 2009¹⁹ and in May 2016; the National Survey on violence against women²⁰; but El Salvador does not have a recent survey on victimization.

In addition to that information, and despite the headway made by the region in recent years to manage and analyze information, the ICT are still being used only partially, both in policies on security and for preventing violence.

In Guatemala, the National Strategy to Prevent Violence and Crime (ENP) offers quite a valuable opportunity to see how data, and particularly big data, is being used and can be used to prepare, implement, and measure the effects and impacts of policies to prevent youth violence.

3.1. Guatemala's National Strategy to Prevent Violence and Crime 2017-2027

To analyze the potential of ICT for preventing youth violence, we present below Guatemala's National Strategy to Prevent Violence and Crime (ENP) 2017-2027 by the Ministry of Governance of Guatemala, how it uses the available data and institutional tools and, on that basis, the possible use of data and big data for policies to prevent youth violence in the region.

The ENP does not target youth violence, but children and youth are the main population group that the prevention policy aims to protect. The overall framework, the guiding principles, the strategy, the conceptual model, the stakeholders, the management model and the proposals for measures to implement the ENP, can show how ICT could facilitate the effectiveness of policies to prevent youth violence.

Guatemala's prevention policy offers an outstanding opportunity for ICT, since it has had, since the

18 Citizen perception of insecurity and victimization in Honduras. Executive Report 2016, University Institute of Democracy, Peace and Security. At: <https://bit.ly/2DbnKx7>

19 "Victimization and perception of insecurity in El Salvador". *PUBLIC OPINION CONSULTATION, JULY - AUGUST 2009*. University Institute of Public Opinion. "José Simeón Cañas" Central American University, San Salvador, El Salvador. October 2009. Report series 123. At: <https://bit.ly/2Rqkp0u>

20 Report on the State and Situation of Violence against Women, 2017 At: <https://bit.ly/2yF1VEC>

outset, the managing by results and evidence-based decision-making approach. For this reason, the National Prevention Strategy is presented regarding preventing youth violence and how it uses ICT, offering suggestions about how it might include multivariate analysis techniques and big data more comprehensively.

The ENP is a

*"tool for State executive decision-making to ensure that policies, strategies, plans, programs, available resources, and especially human will all coincide, to generate an integrated impact. In the field of prevention is where two fundamental mandates of the State inter-connect: providing well-being and protecting the public"*²¹.

The main goal of the ENP is to decrease risk factors, such as drinking alcohol and dropping out of school, and increase prevention factors, such as schooling, parental care, and availability of services. ENP interventions fall under three main areas, where violence and crime most often arise: home, school and the community, attempting to change them into safe places for the different vulnerable groups who are there: children, adolescents, youth and women.

The five (potentially) high-impact programs of the ENP began implementation between July and September 2018. Planned activities are education, sensitization, counseling services, networks of collaboration to prevent violence and find jobs. The goal: for boy and girl children from territorial zones at risk to grow up and develop with autonomy and relational congruence with an enabling social-community environment to live and live together free of violence. Collaboration networks include territorial coordination to increase institutional effectiveness (protecting children's and adolescents' rights, satisfactory rehabilitation and reinsertion into social life) and policy dialogue between the State and Civil Society to prevent and manage social conflict.

The Conceptual Model leads to the definition of a Logical Model for Preventing Violence and Crime in Guatemala: a "planning tool expressing how to achieve the expected results. This establishes the cause-effect relationship between chosen interven-

21 "The National Strategy to Prevent Violence and Crime. 2017-2027", MINGOB Guatemala, 2017, Page 15

tions and expected results, considering evidence of their effectiveness contributed by the conceptual and explanatory models, to make it clear how changes will be produced²².

The theoretical framework of the ENP Conceptual Model is systems theory, which has led to identifying 4 networks of causality, mutually interacting and entwined, “comprising the set of causal factors and their connections with each other that structurally determine the problem’s existence in the prioritized population” : “the networks interact and reinforce each other to conserve the development condition expressed by the problem” : 1. Children’s development with individuals causing violence and the crime related to their psycho-affective development, above all within the family home. 2. The social community environment favoring violence and crime. 3. Weak State capacity to prevent violence. 4. Inadequate historical model to manage social and cultural diversity.

Based on the four causal networks, the ENP has identified 4 strategic sectoral results to achieve through ten outputs / interventions (see Table 1).

Seven out of the ENP’s ten strategic outcomes are directly linked to issues of children, adolescents and youth. For children, the ENP plans specific actions to facilitate children’s holistic development, ranging from education and sensitization to counseling services, from public spaces for using free time to the territorial employment working groups, with emphasis on the institutions’ achieving effectiveness in protecting children’s, adolescents’ and young people’s rights, particularly for rehabilitation and social reinsertion, including psycho-affective care in State establishments.

The three remaining outcomes are to strengthen capacities coordinating, collaborating and dialogue among State institutions and Society, including CSOs and the Private Sector.

3.2. Data use in the ENP

For each of the ENP’s strategic outcomes, ICT can play a transcendental role: information analysis and case studies to identify and measure the weight of factors associated with violence; sensitization programs focusing on influencing factors causing vi-

olence or reducing risky behaviors; information technology adapted to using adolescent and youth social networks; software apps to facilitate networking collaboration, for job searches and to warn the risk-vulnerable population in their community.

However, data use has been limited to measuring the crime rate to define the ENP baseline, target and tracking.

According to information provided by the Vice-Ministry to Prevent Violence and Crime, on the basis of the logical model to prevent violence and crime described above, the ENP will use the following data sources and tools:

- Crime rate indicators, fundamentally from the PNC and complemented by data from other institutions such as the MP.
- The Survey on Perception of Public Security and Victimization (ENPEVI), the findings of which became available in July 2018. The survey includes fourteen crimes: Vehicle theft, auto part theft, objects stolen from inside vehicles, motorcycle theft, home burglary, robbery with violence, robbery without violence (pilferage), bank fraud, swindling, aggression and injury, threats, extortion, kidnapping, and corruption. Crimes against property have a number of characterizations of the perpetrator, but this depends on the crime, since the victim has to have seen the thief to be able to give information about him/her, whereas in general the survey gives information about where the crime occurred.
- The upcoming findings from the Survey on Well-being of Children, Adolescents and Youth in Guatemala (EBNAJ), with emphasis on migratory and development issues²³.
- The tool to target and prioritize crime, developed under the INFOSEGURA project, based on municipal crime rates (always with PNC data).
- The Inter-institutional Technical Working Group (MTI),²⁴ -MTI-comprising the dif-

23 In the cartographic survey phase. Ready by late 2018 with the final report.

24 “Work reactivated by Inter-institutional Technical Working Group to unify indicators on violence”, post by MINGOB, 30

22 “Logical model to prevent violence and crime in Guatemala”, page 74, MINGOB, Guatemala, 2017/2018



ferent institutions responsible for security and justice policies in Guatemala, to analyze criminal phenomena. The MTI aims to standardize indicators according to the international standards promoted by UN-ODC (ICCS), disseminate, exchange and use information for analyses to understand criminal phenomena in order to guide evidence-based public policies.

- A tool for information and qualitative analysis, through Commissions to Prevent Violence of the National System of the Development Council²⁵: each level of the Council (community – COCODE, municipal – COMUDE, and departmental –CODEDE) has its own Prevention Commission: CO-COPRE, COMUPRE and CODEPRE. The approach model used by the Community Violence Prevention Unit of the Vice-Min-

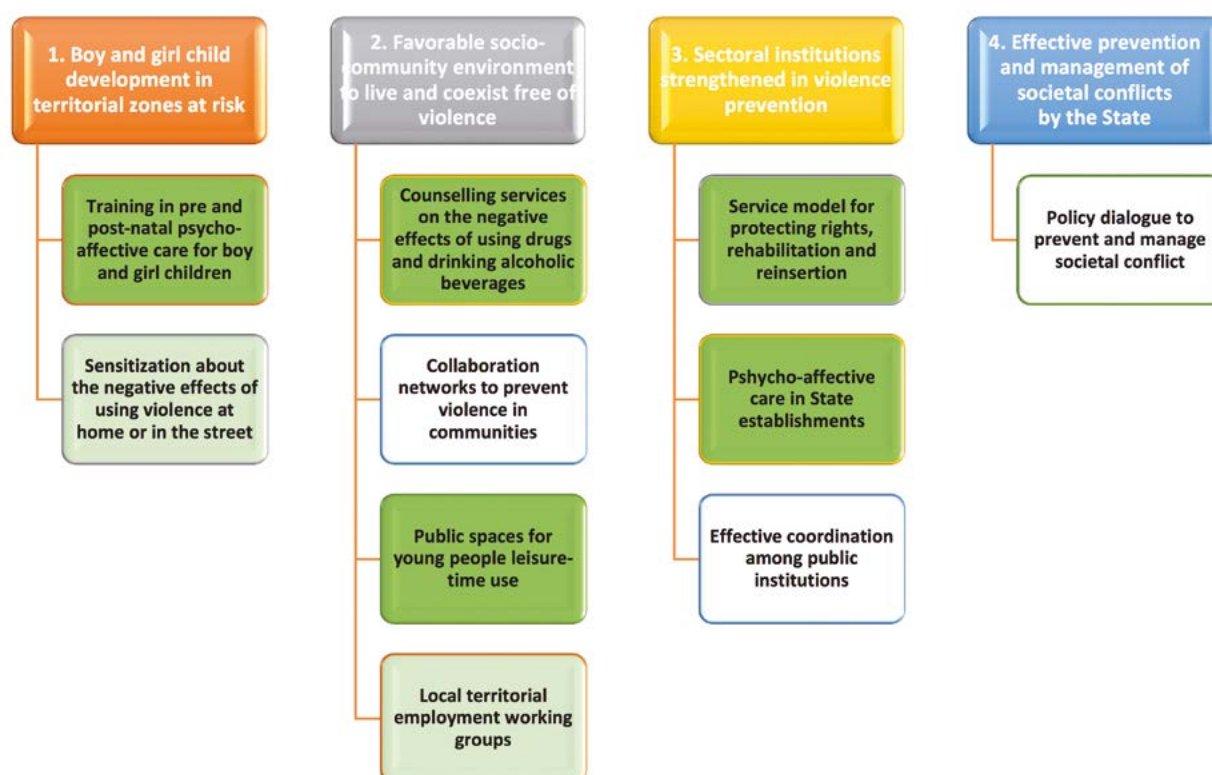
istry for Prevention of MINGOB is based on the Prevention Commissions trained and technically backstopped by MINGOB, and their actions and results are included in the ENP M&E system.

- The Policy’s approach model also provides for Citizen Discussion Workshops (for State-Society dialogue) to complement local quantitative information (crime rates, socio-economic information, etc.) with qualitative information, thereby incorporating specific elements affecting communities, such as heavy alcohol drinking or the rate of domestic violence that is not denounced. Cross-comparing qualitative with quantitative information will make it possible to better understand the phenomenon of violence at the local level and its trends, to guide local preventive actions.
- Further, there are Observatories to Prevent Violence that the Vice-Ministry for Prevention of MINGOB is creating nationwide, to manage and analyze information

September 2016. At: <https://bit.ly/2Pxm0Ed>

25 Law on Urban and Rural Development Councils, Decree 11-2002, Congress of Guatemala. At: <https://bit.ly/2P4X-7zp>

Table 1. ENP strategic sectoral results



and generate departmental reports for decision-makers on prevention and citizen security. The first Observatory was inaugurated on 30 October 2018 in Chimaltenango.

This shows how the ENP utilizes available quantitative data (institutional administrative information), complemented by qualitative information, compiled locally and nationally, from discussion workshops, surveys and studies. This information is analyzed by Observatories and Prevention Councils, by MTI and by the Vice-Ministry for Violence of MINGOB, to design, implement, and monitor ENP actions.

With the exception of an initiative in the design phase to conduct multivariate analysis in transborder municipalities, with indicators on health, development and education, so far the ENP has no multivariate analyses of information or use of big data, to complement administrative information and local Councils' and Observatories' information with data extracted from social networks.

3.3. Major elements of the ENP in information use

The ENP was designed by efforts that began over five years ago, and its strong point has been the Inter-institutional Technical Working Group (MTI) coordinated by the Ministry of Governance. However, the MTI is the result of a high-level policy decision that enabled their creation and the work of the staff from different institutions involved: Ministry of Governance (which leads the MTI), the National Statistics Institute, the Public Ministry, the Judicial Agency, the National Legal Science Institute, and other dependencies and institutions involved as needed. The MTI has made possible, in addition to significant progress in standardizing crime and justice indicators (where UNODC has played and continues to play a determining role, in addition to IDB and more recently the above-mentioned IN-FOSEGURA Project), creation of constant inter-institutional dialogue resulting from collaboration by staff, consultants, and technical staff who are participating.

MTI is joined and complemented by MINGOB experience in local programs to prevent violence by the Colom government (2008-2012), with social policies that had been prioritized by the Administration. The Pérez-Molina government (2012-2016) then created the Vice-Ministry to Prevent Violence, which has designed the National Prevention Policy for 2017-2027²⁶. That Policy outlined the use of criminological indicators to identify areas to implement the different planned strategies: citizen security for zones with higher crime rates and community prevention in areas lower crime rates. The Morales government (2016-2020) has given the violence prevention policy a more systemic vision than prior policies, geared toward reducing causal factors, through the National Prevention Strategy.

Therefore, MINGOB has worked to institutionalize the prevention policy, creating organizational and operational structures, which started information gathering and evidence-based decision-making. Such continuity in the strategic vision of prevention policy is a first key element.

Additionally, there is prioritization of prevention in security policies and the political will to focus on evidence, institutionalizing the MTI, and inter-sector work that the working group has facilitated, strengthening information systems. In particular, the Survey on Perception of Public Security and Victimization (ENPEVI), conducted in 2018, studies and analyses done by experts from various disciplines, and including their results and recommendations in preparation for the ENP.

The data and information used in the ENP have made it possible to:

- Have a Conceptual Model to guide actions systematically and not case-by-case.
- More accurately measure the crime rate, with details on ages and geographical data.
- Identify priorities and areas to implement the policy according to the crime rate, the social / territorial characteristics, and identifying target groups, fundamentally youth, with preventive interventions starting in childhood.

- Have a baseline and a corresponding system of tracking and monitoring for implementation.

4. USING DATA AND BIG DATA TO EFFECTIVELY DRAFT AND IMPLEMENT POLICIES TO PREVENT YOUTH VIOLENCE

Information analysis using multivariate analysis techniques and big data is highly relevant to determining the causal chains leading to youth violence, to identify priorities for such programs (thematic, geographical, ages, ethnicity and others), to define target groups and implementation territories, to design strategies and activities to influence causal networks and manage and track the Program: monitoring and evaluation system, indicators, baseline and targets. In summary, to design and implement policies to prevent youth violence.

Table 2 shows possible uses for ICT in policies to prevent youth violence, divided into components, and outlined below: Assessment (baseline), Identifying vulnerability / risk factors, Identifying resilience factors, Designing policies and actions, Implementing and decision-making, Communicating with and Sensitizing the target group.

Assessment (baseline)

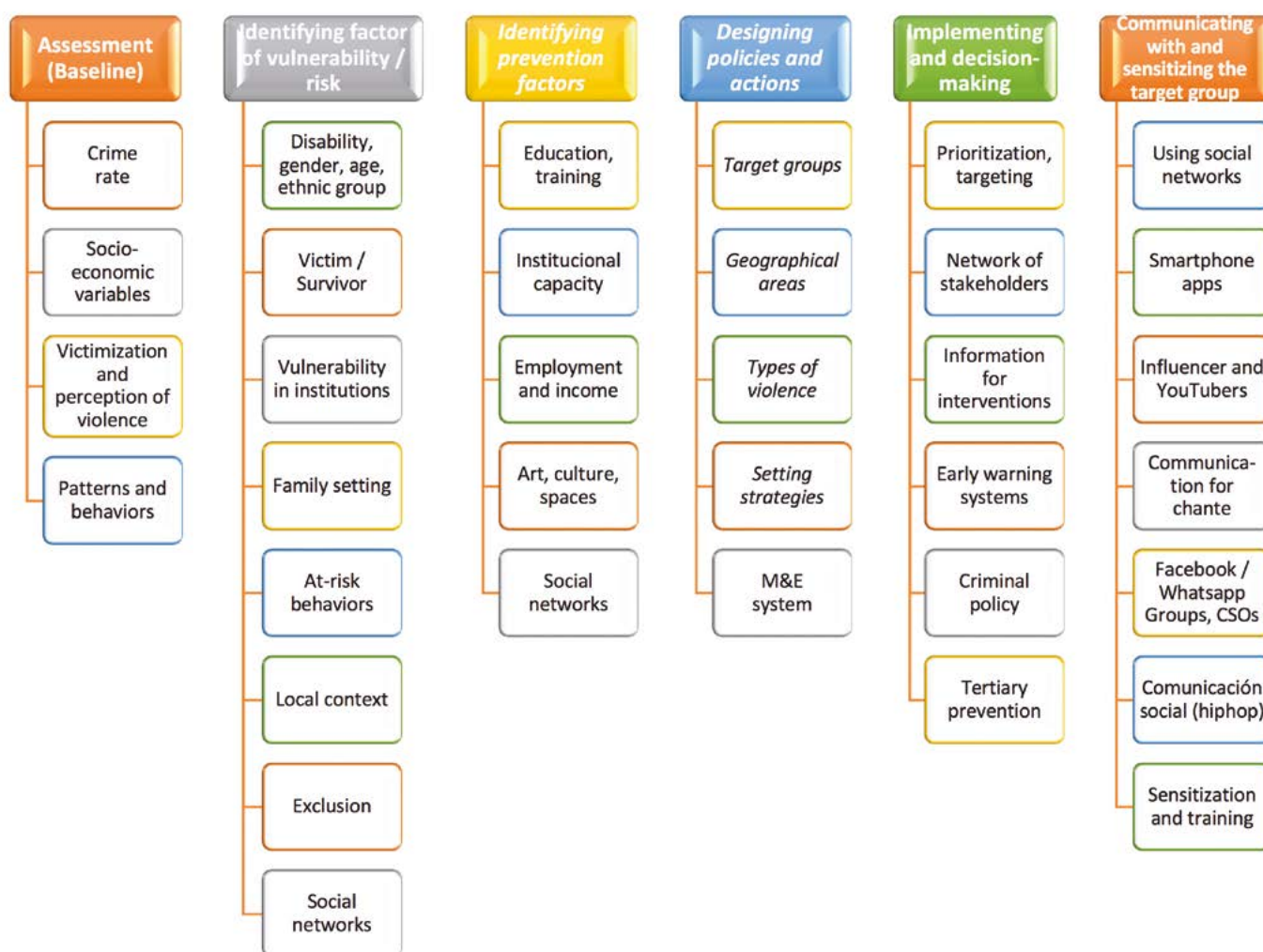
For a prevention program to be effective, the situational analysis, identifying factors associated with violence, their relevance and interaction, defining causal chains, defining overall goals, baselines and targets, are all elements of transcendental importance that are often not given the necessary attention and resources.

A lack of complete, quality information is the greatest obstacle to adequately designing prevention programs and aiming their actions scientifically to reduce the causes of violence.

Measurement and analysis of the facts associated with youth violence must have information and knowledge about phenomena associated with violence, including historical series, as disaggregated as possible: information disaggregated by sex, age, ethnic group, place, detailed information on violent acts (murders, bullying, harassment, rape, threats, injuries, psychological violence, VAW) by places (schools, homes, State institutions, cyberspace), population groups, aggressor's characteristics, etc.

26 "National Strategy to Prevent Violence 2017-2027", post del MINGOB, 14 julio, 2017. En: <https://bit.ly/2qjmclU>

Table 2. Using ICT in policies to prevent youth violence, by components



An analysis of the context of youth at risk of committing violence, i.e., potential perpetrators, is also required: poverty rate, inequity, drop-out rate, family abandonment, school, use of alcohol and drugs, family abandonment and migration, workplace exploitation, gang violence, family violence, absence of the State, presence of organized crime, marginalization, access to income. Among these, studies and research on social networks can identify subjective factors, cultural patterns (machismo, sexism, racism), reference models involving violence and its forms of expression.

The surveys on victimization and perception of violence – recently implemented in the region – offer a very valuable tool for prevention policies. Such surveys reveal the degree of victimization by different crimes (excluding violence against women, in-

tra-family, gender-based violence) and characteristics of victims’ economic partners. They also reveal how much the public trusts institutions, probing details about the modalities in which criminal phenomena occur, revealing the perception of risks, and the effects of violence on the citizenry, such as migration and abandoning their studies.

Identifying vulnerability / risk factors and preventive factors

Speaking of youth violence, especially when the violence is perpetrated by children or adolescents, the border between victims and perpetrators vanishes. The violent context in which children and adolescents live that generates the violent behavior and the vicious circle of violence reproduces itself; victims of violence become perpetrators. Child gang mem-

bers who were captured using violent methods and threats, sexual abusers who are victims of in-home sexual violence, bullies who have been victims of abuse and harassment.

Therefore, multivariate analysis and big data make it possible to identify the main population groups (at risk of committing violence and the vulnerable population), factors associated with production and reproduction of violence and preventive factors. Identifying and measuring the weight of such factors is essential to guide policies on prevention. Factors may be geographical, economic, cultural (culture of legality), political, institutional, ethnic or gender-related. And more importantly yet, the places (homes, schools, prisons, jails and penitentiaries, churches, communications media and social networks) may be places that either favor violence, or that prevent it or protect from it.

Identifying places and their characteristics, multi-factor analysis of complex systems yield valuable inputs to understand and measure causal (or systemic) relationships between risk factors and violence. This is essential for the prevention policy to be effective, identifying and intervening to lessen the factors determining violence: protecting children, to prevent the violence resulting from victimization; discourage use / abuse of alcohol and drugs, which facilitate violent actions; care for children and policies to support unwed mothers, to keep children from joining gangs in search of affective support and identity that they don't have at home; community programs to prevent capture of children and adolescents by organized crime groups.

Designing policies to prevent youth violence

Once young people have been identified by risk factors, the geographical areas where they live and act (family, school, neighborhood, institutions, Internet), the assessment findings and results of analyzing causal factors associated with violence make it possible to define target groups, places for intervention, types and modalities of the expressions of violence to prevent (sexual, cyberbullying, maras and gangs, family violence, gender-based violence, violence against women), as well as the strategy, activities and means to influence causal factors.

To maximize the strategy's effectiveness, the policy must have indicators to enable effective measure-

ment of performance and of activities' results, monitoring their results / outcomes in order to update these indicators to constantly adjust the program's strategy to maximize outcomes.

Implementing the policy and decision-making process

During policy implementation, there is additional information that can, by using multivariate analysis, correlations, and big data, improve understanding of causal factors associated with youth violence, identified in the design phase. Better understanding of the dynamics among target groups, obtained by measuring and analyzing short-term changes fostered by the policy, will gradually improve the action and adjust it to the actual situation, from a standpoint of managing by results. From this approach, maximizing the effects of programs should be reflected in more or less significant changes in the initially planned activities.

Beyond facilitating management by results, during program implementation ICT can be used to:

- Identify, using market studies, job opportunities for young people and youth employment expectations, by surveys, discussion workshops and focus groups so vocational training can be based on labor-market demand, making it easier for youth and companies to get together, by applications and portals for companies, and employment bureaus.
- Analyze social networks for psychological profiles of target groups, life plans, local territorial mental health systems.
- Guide local prevention actions and early warning of conflict and violence, using artificial intelligence software applied to analyzing social networks.
- Facilitate complaints, warn about risk zones, anonymously denounce abuses and violence in institutions, using smartphone apps.
- Guide crime policies based on strategic prosecuting the most significant crimes linked with violence, using territorial information systems, measuring State weakness, and technological crime investigation.

- Early detection of crimes by gangs using crime-rate mapping, risk analysis, cost-benefit models, and crime trends.
- Programs to reinsert young offenders and adolescents in conflict with criminal law using ICT for distance education and tutoring, access to the job market, remote tracking, and communication.

Communicating with and Sensitizing the target group

Of course, ICT and social networks play a central role in everything concerning communicating with and sensitizing target groups.

Communication and sensitization activities must be grounded in context analyses (assessments), causal chains and social networks so they can be effective in modifying cultural patterns associated with violent behaviors.

This can facilitate:

- Interaction and exchanges between adolescents and youth at risk with peer groups on social networks, blogs, YouTube channels, Instagram, etc.
- Making campaigns and violence prevention programs more dynamic according to target groups, with Influencer and YouTubers.
- Generating smartphone apps to favor communication and access to information for vulnerable youth.
- Using apps as a vehicle for communication to prevent youth violence.

However, using social networks, smartphone apps, collaboration with Influencer and YouTubers, creating or strengthening Facebook and WhatsApp Groups of CSOs and youth organizations and waging communication campaigns for change, have high potential to influence cultural patterns (culture of legality and citizen co-existence) for youth and adolescents at risk. Such technologies can complement and make more effective the sensitization and education activities of prevention programs at home, in schools, churches, detention centers, institutes and communities.

RECOMMENDATIONS²⁷

On the basis of information about the ENP and the multivariate analysis and big data techniques presented in the previous chapters, some recommendations are offered below, based on the ENP for aspects that should be developed to incorporate ICT and big data into policies to prevent youth violence in Northern Triangle countries:

- From a theory of change perspective, each program to prevent youth violence needs to identify and impact the causal chains determining or fostering the fact that a young man or woman carries out violent behaviors: dropping out of school, lack of parental care or public services (child-care centers, social interaction facilities, neighborhood social programs) or private activities (parishes, churches, associationism, or other groups), or individual actions (victims of family abuse and violence, deviant behavioral models, use of drugs and alcohol) or the presence in territory of maras and gangs, etc
- It is necessary to complement information that can be compiled and analyzed in assessments, with quantitative and qualitative information to identify vulnerability and risk factors that lead a young person to behave violently. These include studies on gender, on persons with disabilities, on vulnerabilities by age, sex and ethnic group. Plus studies on dynamics between victims and perpetrators and collective and individual factors associated with violent behaviors: parenting models, roles of institutions (schools, churches, companies, centers of social reinsertion / detention), protective environments, behaviors at risk (alcohol, drugs), local conflict (presence of maras, gangs, organized crime), exclusion (social, economic, workplace, etc.), lack of access and opportunities, use and behavior of youth on social networks.
- Along with identifying vulnerability factors associated causally with youth violence, the assessment must be complemented by

27 ICT use policies in these contexts must especially stress rights to freedom of expression and privacy of youth themselves in their digital citizenship.

studying and measuring the factors that play a positive role in reducing violence: access to quality education, presence of social assistance programs and protective environments, job and income generation opportunities for parents and youth (and young parents), vocational training, art, culture, existence of accessible public spaces, the urban environment, presence of State institutions or Civil-Society Organizations. However, it must also incorporate elements of individual resilience, information on youth behavior in families, schools, churches, communities, social networks, community programs, territorial mental health programs and psychological care.

- Analyses that can be made to clarify the weight and causal and preventive factors associated with youth violence, may include quantitative analysis techniques, especially those using qualitative information on social network use, cultural bubbles, circles of interest and techniques that can deeply probe complex relationships between the individual / subjective and collective dimensions with such causal factors, using a causal model that identifies as clearly as possible importance and relationship of each factor with the different expressions of youth violence.



Aldo Magoga has a B.Sc. in Physics, graduated from the University of Turin, Italy, writing his thesis on *Cosmological Models*. At Landívar University in Guatemala, where he has worked as a Social Researcher on violence, he has obtained a M.A. in Human Rights, with a thesis on *Citizen Security* with a Human Rights approach.

In Italy, he has worked as a Researcher in Applied Mathematics, educator with children and youth, and coordinator of projects to computerize the Public Sector. Since 2000 he has lived in Latin America, performing as a coordinator, evaluator of projects for children, youth, security and justice by the European Union and the United Nations (UNICEF, UN Women, UNDP, UNODC, UNFPA, and UNESCO). He is also a data scientist, expert in econometric models and statistical multivariant analysis.



Oficina Regional de Ciencias de la UNESCO
para América Latina y el Caribe
UNESCO MONTEVIDEO
Luis Piera 1992, piso 2 (Edificio MERCOSUR)
Montevideo 11200
Tel. (598) 2413 2075
Uruguay

montevideo@unesco.org
www.unesco.org/montevideo