

OUTBREAK OF DRUG USERS IN METRO MANILA

Prof. Amelita M. Sari

Eastern Visayas State University-Carigara Campus

evsu_carigara@yahoo.com

Prof. Engr. Ma. Erenita V. Bahian

Eastern Visayas State University-Ormoc Campus

ordex.evsu@gmail.com

-Abstract-

The effects of a 246-week outbreak of drug users among people in barangays of Metro Manila, Philippines were determined by simulating the minimum number of drug users; minimum number of weeks to influence at least 80 percent non-drug users; effects of the average contact of drug users with non-drug user friends, average parental guidance per contact with drug user friends, and average Police Officer visibility per round via Netlogo simulation for quick results of the study.

Findings indicated that 8 drug-user friends can influence at least 80 percent non-drug user friends in 246 weeks. It also depicted that increasing the average contact period of drug users with non-drug users, may or may not influence in using drugs, and increasing the average parental guidance per contact with drug users, slightly decreases the spread of drug usage, however, increasing the Police Officer visibility per round, decreases the spread of drug usage.

Key Words: *Drug, Netlogo, Metro Manila*

JEL Classification: K32- Environmental, Health, and Safety Law

1. INTRODUCTION

1.1. The Problem and its Background

Before President Rodrigo Duterte was elected President in our country, his most important platform is “war on drugs.” Truly enough as soon as he sat in office, he

started “Oplan Tokhang” which gave the Philippine National Police the right to arrest suspected individuals who are drug or shabu users. The war is still going on, but this time, operation is with the Philippine Drug Enforcement Agency (PDEA).

According to the PDEA, East and Southeast Asia are the biggest consumers of shabu (which is the agent of the study) worldwide; out of 19.6 million drug users, 9.1 million or 47 percent use shabu because of addiction. Globally, there are 246 million drug users, out of which 33.9 million are shabu users. In the Philippines, out of three million drug users, 1.5 million or 50 percent sniff shabu. Methamphetamine or shabu is a white, odorless, bitter-tasting crystalline powder that easily dissolves in water or alcohol. Methamphetamine hydrochloride, the crystal form inhaled by smoking is referred to as ice, crystal, glass, and tina.

Moreover, findings revealed that 59 people diagnosed with shabu users and 59 generally healthy individuals who did not use the drug, three Taiwanese researchers concluded that chronic users may develop particularly severe disruptions in the production of BDNF (declining levels of a protein). In turn, this protein disruption may lead to a decline in nerve cell protection that helps explain the brain damage associated with long-term shabu intake (Custodio,2016:2,3).

In addition, based on 2014 arrest data, 88.78 percent involved the seizure of drug or shabu in Metro Manila, Philippines, having the highest rate of drug users or other drug personality with 92.10 percent of the region’s barangays affected. (Carcamo,2015:1,2)

Metro Manila or the National Capitol Region is the capital of the Philippines and among the world’s thirty most popular metropolitan areas with a population of 9,932,560 (2000 census) in an area of only 636 square kilometers.(Metro Manila-Wikipilipinas (2012).

Due to this reality, the researchers were compelled to conduct a netlogo simulation to determine the quick results of the study.

The concept of the study relies on the assumptions that:

- not all friends are drug-users.

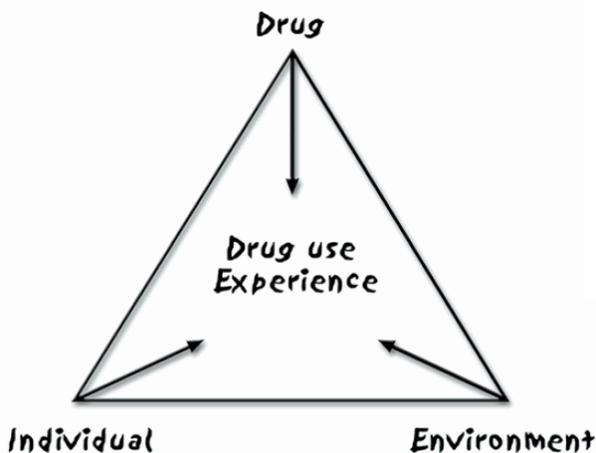
- once you have a drug addict friend, you are most likely to try drug use at least once.
- the greater the average contact-period with non-drug user friends, the lesser the chance of drug use.
- the greater the average parental guidance per contact with drug user friends, the lesser the chance of drug use.
- the greater the Police Officer visibility, the lesser the chance of drug use.

First, second, and third assumptions are based on “Psycho-dynamic model” or theory which has the basic philosophy, “we can link problems to our childhood and how we cope (or don’t cope) as adults. In other words, drug (shabu) use or misuse may be an unconscious response to some of the difficulties individuals (drug-users or non-drug users) may have experienced in childhood. In addition, it also linked to “Social learning model” which introduced the idea that dependence is not only chemical but also behavioural and social in nature. It is based more on the user’s (individual or group) thoughts about the substance (shabu), and what it is like to be ‘under the influence’ of the drug itself. Fourth and fifth assumptions are anchor on “Socio-cultural model” which focuses on society as a whole and not just on individuals. This is based on the idea that the type of society (friends, family, Police Officer) in which people (drug-users or non-drug users) live has an impact on their drug use. It suggests that people who belong to groups who are culturally and socially disadvantaged are more likely to experience drug abuse problems (DOH,2004:3).

Figure 1 shows the interaction (model) between the agent (characteristics and effects of the shabu itself), the host (characteristics of the individual or group of shabu users), and the environment (friends, parents, Police officers). It is based on the philosophy of “human minimisation“ which means “ we accept that use of drugs is a reality within our society and that trying to stamp it out is an unreachable goal.” The goal therefore is to reduce the harms (drug use experience) brought about by certain types of drugs like shabu use through: primary prevention such as community development, drug education, and media-based strategies; secondary prevention wherein the problem is identified in its early stages and intervention is applied to stop further progress of possible problematic

drug use; and tertiary prevention, that is, when the problem is considered serious and may be affecting the individual's health, finances, relationships, and/or legally. Treatment may include counselling, hospitalization, etc. (DOH,2004:4).

Figure 1: Public Health Model



Source: Department of Health: 2004

Given the Models of Drug Use, the following key questions are addressed:

- What is the minimum number of drug- user friends that can influence at least 80 percent non-user friends?
- How long will it take to influence at least 80 percent non-drug user friends with the optimum number of drug-user friends, and how is the spread
- How is the spread of drug usage affected by:
 - average contact period with non-drug user friends
 - average parental guidance per contact with user friends
 - average Police Officer visibility per round.

2. METHODOLOGY

2.1 Research Tool

Netlogo simulation in agent-based modelling or system was used as a research tool in this study. Netlogo is a multi-agent programming language and modeling environment for simulating natural and social phenomena. It is particularly well suited for modeling complex systems evolving overtime. Modelers can give instructions to hundreds or thousands of independent “agents” all operating concurrently. This makes it possible to explore connections between micro-level behaviors of individuals and macro-level patterns that emerge from their interactions.

Further, it enables users to open simulations and “play” with them, exploring their behavior under various conditions and it is also an authoring environment that is simple enough to enable students and researchers to create their own models, even they are not professional programmers.

The AIDS model (from the Models Library) was selected since it fits to the present study. This model simulates the spread of the human immunodeficiency virus (HIV) via sexual transmission, through a small isolated human population, illustrating the effects of certain sexual practices across a population. It examines the emergent effects of four aspects of sexual behavior. The user controls the population’s tendency to practice abstinence, the amount of time an average “couple” in the population will stay together, the population’s tendency to use condoms, and the population’s tendency to get tested for HIV.

In this paper, the model simulates the spread of drug usage via sniffing through a small isolated human population, illustrating the effects of the outbreak of drug users in a barangay. It examines the emergent effects of four aspects of drug usage. The drug user controls the population’s tendency to make friends with non-user friends, the amount of time an average “couple” in the population will stay together, the amount of time the non-drug users has parental guidance, and the Police Officers seen per round.

Exploration of the first and second variables may illustrate how changes of drug usage in our society have contributed to increase in the prevalence of drug usage, while exploration of the third and fourth variables may provide contemporary solutions to the problem.

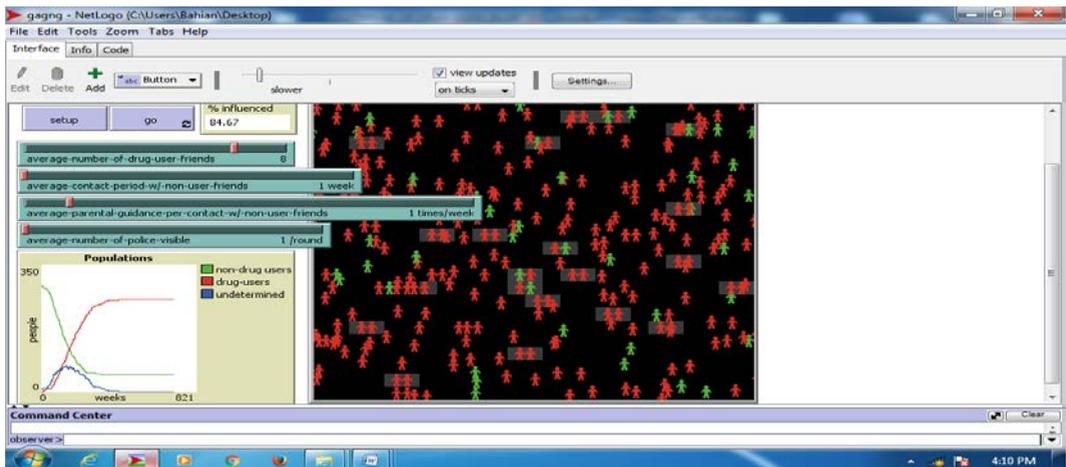
Further, the model uses “couples” to represent two people engaged in drug usage via sniffing. Individuals wander around barangays when they are not in couples. Upon influencing with a non-drug user friend, there is a chance the two individuals will “couples” together. When this happens, the two individuals no

longer move about, they stand next to each other holding hands, a representation of two drug-users into sniffing. The presence of the people in a barangay is represented by the three colors of individuals: green individuals are non-drug users; red individuals are drug users, and blue individuals are undetermined. (Wilensky,1997:1)

2.2 Scenarios from the Model

The succeeding Figures (2-6) shows Netlogo's user interface after opening and running a model from the Models Library. The parameters defined were utilized and processed using a Netlogo software (version 5.2.1) to surface the macro-behaviors driven the micro-attributes of the agents.

Figure 2: Typical output of the system for eight (8) drug users



Type of Users	Trials
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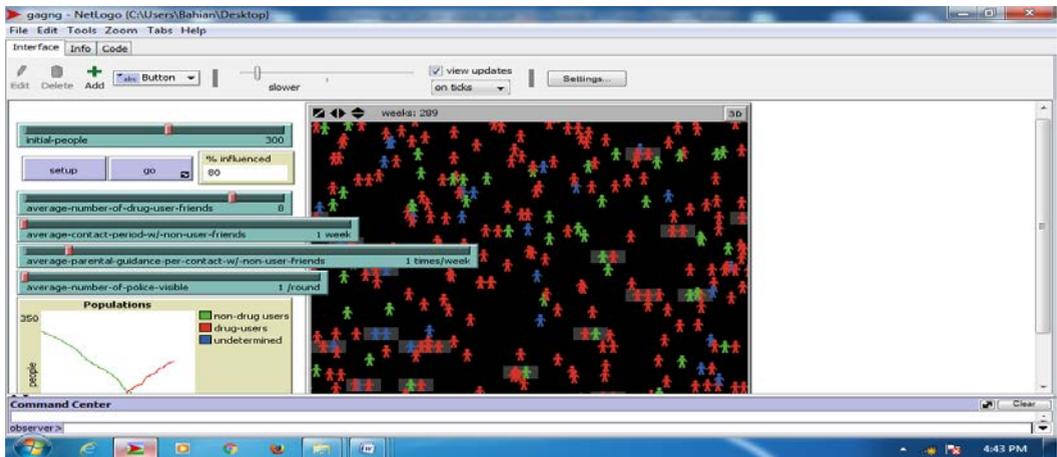
	1	2	3	4	5	6	7	8	9	10	Average
Non-drug users	15.0	15.0	10.7	10.7	9.3	17.0	15.0	15.7	12.7	10.7	13.2
Drug users	84.7	84.7	89.0	89.0	91.0	82.7	85.3	85.3	88.0	89.0	86.9
Undetermined	0.33	0.33	0.33	0.0	0.33	0.0	0.0	0.0	0	0.33	0.16

Source: Wilensky: 1997

Table 1: Simulation result of the system for (8) drug users

Table 1 shows that out of 300 people, 261 (86.9%) non-drug users were influenced by drug users. This is minimum number of drug users that can influence at least 80 percent non-drug users.

Figure 3. Average number of weeks to influence at least 80% non-drug users



Source: Wilensky: 1997

Table 2: Average number of weeks to influence at least 80 % non-drug users

	Trials										
	1	2	3	4	5	6	7	8	9	10	Average
Percent addicted	80.3	80.3	80.3	80.0	80.0	80.3	80.0	80.0	80.0	80.0	80.1
Number of Weeks	266	247	193	289	215	209	295	254	256	241	246

Table 2 presents that the simulation results for the average number of weeks to influence at least 80 % non-drug users is 246 weeks.

Figure 4: Typical output of the system on the spread of drug usage with average contact of drug users with non-drug users



Source: Wilensky:1997

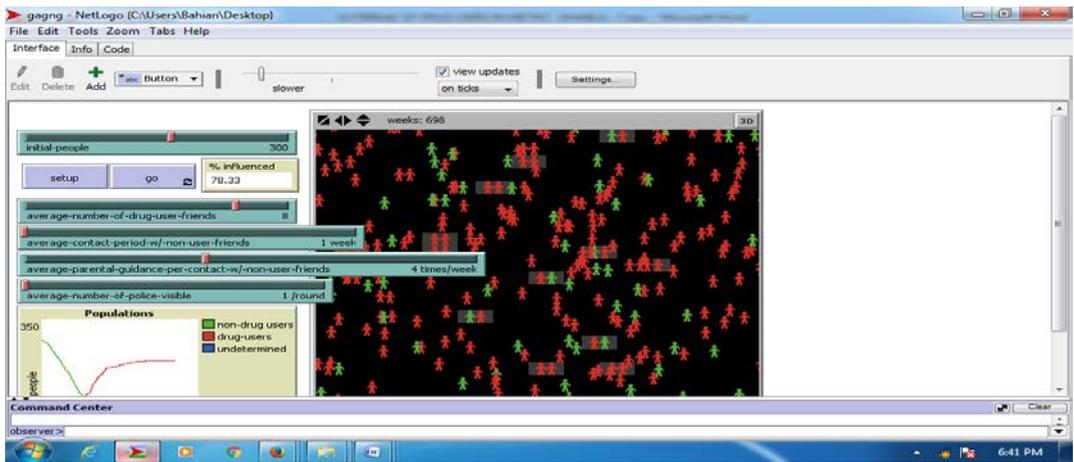
Table 3: The Spread of Drug Usage with the Average Contact of Drug users with Non-drug users

Weeks	Trials										Average	
	1	2	3	4	5	6	7	8	9	10		
1												
2	90.3	87.3	92.0	93.0	90.7	89.7	90.7	85.0	89.3	91.7	90.0	
3	92.0	95.0	89.7	92.7	94.3	90.7	87.0	84.0	93.3	94.3	91.0	
4	89.7	89.0	85.0	88.0	90.3	88.0	84.0	90.0	84.7	65.7	85.4	

5	84.7	82.7	86.0	85.0	76.0	87.0	89.3	88.0	85.7	87.7	85.2
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Table 3 presents the simulation results on the effects of the average contact of drug users with non-drug users on the spread of drug usage. The data showed a varying effect. This implies that contact time of drug users with non-drug users may or may not influence anyone to use drug.

Figure 5: Typical output of the system on the spread of drug usage with Parental guidance



Source: Wilensky: 1997

Table 4: Number of Non-drug Users Influenced by Average Parental Guidance per Contact with non-drug users

Average Parental Guidance/ Week	Trials										Average
	1	2	3	4	5	6	7	8	9	10	
1	84.7	84.7	89.0	89.7	91.0	82.7	85.3	85.3	88.0	89.0	86.9
2	85.0	87.7	84.3	85.7	82.7	89.7	93.3	90.0	79.3	87.0	86.5
3	82.3	82.3	84.7	81.7	80.7	82.3	82.3	73.0	86.7	87.0	82.3
4	86.7	78.3	84.7	77.7	81.0	82.3	79.3	75.7	82.3	81.7	81.0
5	83.7	85.0	81.7	83.0	81.3	72.3	74.0	74.7	84	85	80.5

Table 4 displays that when the average parental guidance is increased, the spread of drug usage is slightly decreased. This implies that although parental guidance is

an important factor in molding ones effective behavior toward structured, healthy activities, one still use drugs due for curiosity, peer pressure and others.

Figure 6: Typical output of the system on the spread of drug usage with Police Visibility



Source: Wilensky: 1997

Table 5: The Spread of Drug Usage with Average Police Visibility

Weeks	Trials										
	1	2	3	4	5	6	7	8	9	10	Average
1	84.7	84.7	89.0	89.7	91.0	82.7	85.3	85.3	88.0	89.0	86.9
2	40.7	57.7	12.0	24.0	33.3	6.7	26.3	32.3	7.3	37.0	27.7
3	5.67	11.0	11.7	13.0	4.0	3.0	18.3	3.7	8.7	6.0	8.5
4	4.7	4.0	3.33	4.0	5.0	8.7	8.7	7.0	7.7	6.3	5.9
5	5.7	6.3	5.0	6.0	3.3	4.0	3.3	8.0	4.3	3.3	4.9

Table 5 reveals that an increase in Police Officer visibility resulted in a decrease in drug usage. It is a common knowledge that if one sees a Police Officer, one fears of being arrested especially those doing illegal acts. This implies that the visibility of law enforcement in some way decreases or even eliminates crime.

3. CONCLUSION

Therefore, eight (8) drug- user friends can influence at least 80 percent non- drug user friends in 246 weeks in a barangay, and the outbreak of shabu or drug users is decreased through increasing the average Police Officer visibility per round, increasing the average parental guidance per contact with drug users, and increasing the average contact of drug users with non-drug users.

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