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GREENTAP: USING NUDGES, AUTOMATIC BEHAVIOUR, AND COMMITMENT DEVICES TO RAISE SAVING RATES AMONG DLSU UNDERGRADUATES

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Abstract: Previous studies (Ayson et al, 2011) have shown evidence of a "last mile" problem in personal saving among DLSU undergraduates, whose declared intentions to save are not matched by equivalent action. The behavioural economics literature suggests that nudges, automatic behaviour, and commitment devices may help overcome this "last mile" problem. In this paper, we propose a mechanism called GreenTap that combines these three elements into a novel ID-based saving scheme. GreenTap is conceptualised as a re-purposed version of a pre-existing yet under-utilised electronic wallet (e-wallet) facility at DLSU called GreenPurse. The modified programme would split the GreenPurse e-wallet into two "compartments", a spending compartment and one for saving. It would then allow students to deposit funds into the e-wallet and, crucially, set a pre-determined amount that would shift money from the spending account to the saving account every time they scanned their ID card – as a "nudge" that takes advantage of their automatic behaviour. The saving account would be locked for a pre-determined period, leaving the saved funds temporarily inaccessible, as a commitment device.

We also present the results of a large-scale simulation administered as a month-long randomised controlled trial intended to obtain preliminary data for the effectiveness of such an intervention. We recruited 111 student volunteers, roughly half of which were assigned to a simulation of the GreenTap scheme, and the other half as control (regular saving). Both groups reported data on daily saving, spending, and ID use, which we use to perform an evidence-based evaluation of GreenTap's potential. Results indicate that the mechanism has the potential to induce savings among students only if a minimum pre-determined amount of about PhP 24.20 is enforced, and that it is possible to target the mechanism at specific demographics that experience below average savings.

Key words: Behavioural economics; automatic behaviour; nudges; personal saving; evidence-based evaluation

1. INTRODUCTION

A survey by Ayson et al (2011) of 576 DLSU undergraduates confirmed what many have suspected about the relationship between the intention to save and the actual ability to save. In it, 82.64% of respondents affirmed the importance of saving and their desire to do so, but reported being consistently unable to meet these targets[1]. In particular, any successful attempt at saving throughout the week was often negated by excessive spending on weekends.

Situations like these are often referred to in the behavioural economics literature as "last mile" problems, where despite the best declarations and opportunities, a gap between intention and action persists. In Lowenstein (1996), Michel et al (2003), and Pathak, Holmes, and Zimmerman (2011), the last mile problem in personal saving is theorised as the result of three deeply-rooted cognitive biases: *availability bias*, which makes saving harder when one's available memories are conditioned toward spending (e.g., experiences with spendthrift relatives and friends); *status quo bias*, which makes saving harder the more one's spending habits are pinned to the lifestyle one is accustomed to regardless of one's present income; and *hyperbolic discounting bias*, by which one prefers "smaller-sooner" rewards to "larger-later" ones.

To help overcome these biases, a growing body of work (Akerlof, 1991; Ariely et al, 2001; Ashraf et al, 2007; Hélie et al, 2010) has suggested the use of *nudges* to exploit *automatic behaviour*, as well as *commitment devices*. Nudges (Thaler and Sunstein, 2008; Thaler et al, 2001) are small, unobtrusive, and inexpensive changes to the choice architecture (e.g., the wording of a form, the size of a serving bowl, the colour of a sign, etc.) that have the effect of making the "right" choice also the easier one to make. Nudges can help exploit an individual's automatic behaviour so that doing the right thing does not have to exhaust, as Baumeister (1996) points out, one's limited supply of willpower, interest, or attention. Finally, commitment devices (such as those featured in Bryan et al, 2010; and Karlan et al, 2010) allow individuals to "lock in" their decisions and thus make willpower (or lack thereof) less of an issue.

In this paper, we describe a proposal that incorporates nudges, automatic behaviour, and commitment devices to help DLSU students overcome problems of willpower in saving. It is called GreenTap, and it will require the re-programming and re-purposing of a pre-existing ID-based electronic wallet facility called GreenPurse[2] that by all accounts is grossly under-utilised

[1] Similar findings are reported in Hagiwara (2009) for a larger Philippine sample.
[2] According to the DLSU Student Handbook, GreenPurse is an electronic cashless payment option used within the campus wherein the students get the enhanced benefits of paying without using cash for selected transactions (i.e. Registrars, Library, ITC, Accounting) via their I.D. cards. Students with I.D. numbers 110 and above are required to enrol in this program during which they deposit PhP 1,000 into their accounts upon their first year at DLSU and PhP 500 every term during the rest of their stay in the university. The balance in their GreenPurse accounts can only be withdrawn at the end of their stay in DLSU, upon sending a letter to the administration. Should the student fail to withdraw the balance in his/her account, the money shall be automatically donated to DLSU.

(in the Ayson et al survey, only 41% of respondents claimed to know about the facility and only 16 of them – 3% – claimed to have actually used it). The re-programming would result in an electronic wallet with a spending compartment and a saving compartment, and with the ability to transfer funds between them. Furthermore, it would allow students, upon signing up to the GreenTap savings scheme, to actively deposit more of their allowance into it and – most importantly – pre-specify an amount that would be transferred from the spending compartment to the saving compartment each time the ID card is scanned or "tapped" on campus (e.g., entering campus, using university facilities, etc.).

The design of GreenTap incorporates a "nudge" by linking the act of saving to a small, unobtrusive, daily and automatic behaviour that students are often unaware of. Furthermore, it uses two commitment devices: a pre-specified amount to be saved for every scan of the ID card, and a "freeze" on one's ability to access the saved funds.

Would such a scheme work – and could we get preliminary evidence without actually re-programming the pre-existing GreenPurse facility and tangling with the ethical and administrative issues of working with students' money? To answer this, we designed and ran a month-long non-computerised simulation involving 111 student volunteers. In the next section, we describe its features.

2. METHODOLOGY

One hundred eleven student volunteers were recruited for the GreenTap simulation in June 2012. The sample, though stratified by year level, college, and gender, was not random as it pre-selected only those who indicated a desire to increase their present level of saving and actively monitor their spending habits. However, the assignment of individuals to a treatment group (GreenTap scheme) and control group (ordinary saving habits) was done randomly. In this, the simulation takes the form of a field-based randomised controlled trial (RCT) whose objective is to measure the average treatment effect of the GreenTap scheme – that is, the average increase in saving among GreenTap participants compared to those in the control group.

At the start of the simulation, volunteers were briefed and surveyed for socio-demographic information. Those assigned to the control group (n=52) were instructed to save as they normally would, and to report at the end of one month, via text message, how much they had managed to save. Those assigned to the GreenTap group (n=59), on the other hand, were first asked to name a pre-determined amount to be saved at each "tap", and to send via text message, their daily number of ID "taps" experienced, as well as their daily expenditures.

Once the data were obtained, we had to introduce the following processing controls before measuring the average treatment effect. First, we had to screen out all observations whose data violated the fundamental constraint

$$Savings \leq Allowance - Expenditures \quad \text{(Eq. 1)}$$

where *Savings = Pre-determined amount * Number of taps*

Violations were possible as the participants were given total freedom to set the pre-determined amount to be saved per "tap", and may have overestimated their daily "tapping" activity.

We could then carry out an evidence-based impact evaluation of GreenTap's potential as a behaviourally-sensitive saving scheme. We ran hypothesis tests on the difference in saving between two groups, estimated a regression model to further understand the determinants of saving and aid in the identification of groups who would most likely benefit from the scheme. We also calculated recommended minimum and maximum "tap" amounts based on the data generated, following the formula

$$\textit{Minimum recommended "tap" amount} = \frac{ave.savings_{control}}{ave.number\ of\ taps} \quad \text{(Eq. 2)}$$

$$\textit{Maximum recommended "tap" amount} = \frac{ave.allowance_{GreenTap} - ave.expense_{GreenTap}}{ave.number\ of\ taps} \quad \text{(Eq. 3)}$$

3. RESULTS AND DISCUSSION

Would GreenTap work if actually implemented? With 12 observations violating Eq. 1 and thus being dropped from the sample, Table 1 below summarises saving performance across the two groups:

Table 1. Saving, allowance, and expenditure across groups

	CONTROL	GREENTAP
Average Amount of Savings (PHP)	1,208.48	638.84
Average Monthly Allowance (PHP)	6,174.12	6,831.25
Average Amount of Expenses (PHP)	4,965.64	3324.36
Average Pre-determined Amount (PHP)	-	13.91
Average Number of Taps	-	49.15

Source: Authors' calculations

Results indicate the average number of taps for the experimental group at around 50 taps per month, which measures the potential for exploiting automatic behavior within DLSU students. Multiplying this by the group's average pre-determined amount, which was around PhP

13.91, we can see that, on average, the GreenTap group saved around PhP 638.84 PHP during the simulation period. When compared with the average savings of the control group however, which was at around PhP 1208.48, we can see that the control group actually saved more than those assigned to the GreenTap scheme – a result verified by a t-test comparing mean savings across groups.

What this shows is that the students assigned to the GreenTap group may have either overestimated the number of taps they experienced daily, or were too cautious in setting their pre-determined amount. Following Eq. 2, we were able to compute a recommended minimum pre-determined amount based on the saving performance of the control group: PhP 24.17 PHP. This is the amount which, when multiplied by the typical number of daily taps experienced, would result in a monthly level of savings at least equal to that recorded by the control group. Note that this is well below the amount set by the GreenTap group (PhP 13.91), which suggests excessive caution in pre-committing a "tap" figure.

Based on more detailed allowance and expenditure data from the GreenTap group, we are able to use Eq. 3 to calculate a recommended maximum "tap" amount: PhP 70.14, which when multiplied by the average number of taps, would result in a much higher level of saving than control.

So while the GreenTap group actually saved less than control, the simulation has provided us with behavioural and evidence-based recommendations for minimum and maximum "tap" amounts for prospective enrollees. Furthermore, the data could be mined in several ways to allow future implementation to target certain student demographics that would stand to benefit most from the programme. Table 2, for instance, summarises the demographic characteristics of those from the GreenTap group whose saving levels exceeded control: third-year students from the colleges of Engineering and Education, whose weekly allowance was either between PhP 500 to PhP 900, or above PhP 4,000.

Table 2. Summary demographics of successful GreenTap savers

		CONTROL	GREENTAP
Year Level	**110**	745.00	1008.93
College	**COE**	1192.83	1276.67
	CED	0.00	1160.00
Weekly Allowance	**P500 - P999**	399.00	770.00
	P4000 and higher	0.00	900.00

Source: Authors' calculations

Table 4 on the other hand, summarises the demographics of those students whose daily tapping activity was highest, and would therefore represent the strongest potential beneficiaries from a GreenTap scheme: male second-year students from the College of Engineering.

Table 4. Summary of demographics for frequent "tappers"

	GREENTAP			
Variables	**Coefficient**	**Robust Std. Error**	**t**	**P>|t|**
Male	57.58			
111	57.17			
COE	75.00			
P3000 – P3499	65.33			
17 yrs. old	67.25			

Source: Authors' calculations

Finally, Table 5 reports the significant variables from a robust regression implemented to model determinants of personal saving (following Kibet et al, 2009). Allowance, saving method via bank account, father's education (dummy for secondary), and ethnicity (dummy for others), although all positively associated with saving are possibly too intuitive to be novel considerations in tweaking a future GreenTap scheme. However, the negative signs associated with fourth-year students, and those who in the survey indicated a desire to migrate in the future, suggest further potential for targeting, as these two demographics represent "vulnerable" savers.

Table 5. Determinants of personal saving

Allowance	0.48	0.12	4.02	0.00
Bank Account (Saving Method)	1927.82	934.17	2.06	0.04
Secondary (Father's Educ.)	2942.17	1218.98	2.41	0.02
Others (Ethnicity)	4647.00	1733.43	2.68	0.01
108 (I.D. Number)	-3833.81	1426.10	-2.69	0.01
Migrate (Future Plans)	-5157.98	934.52	-5.52	0.00

Source: Authors' calculations

4. CONCLUSIONS

Behavioural economics can aid in the design of programmes that help individuals overcome "last mile" problems without relying excessively on (often-limited) self-control. GreenTap, a proposed modification of a currently under-utilised electronic wallet facility, has shown the potential to increase student saving by exploiting automatic behaviour, nudges, and commitment devices – but only if minimum pre-determined amounts of roughly PhP 24.20 per tap are set.

But more than the GreenTap scheme itself, the practice of designing programmes driven by the latest findings from the behavioural and cognitive sciences, and tested using impact evaluation methods that come as close as possible to the gold standard of experimental data, is an important step forward in bringing the best traditions of science to the service of society.

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