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IMPROVING STUDY HABITS USING A BEHAVIOUR CHANGE FRAMEWORK INCORPORATING SOCIAL MOTIVATION AND GAMIFICATION

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Abstract

Students entering into their first year of university studies are subject to a jarring difference between the learning experiences of high school and university. High schools typically take a very structured approach to teaching whereas university expects students to take ownership of their learning. This dramatic shift often means students are not adequately prepared to form positive study habits on their own, or existing habits are likely to break down. Further complicating this issue is the rising popularity of video games and social networking amongst students. These two areas provide fun and engaging experiences for their users where traditional learning environments struggle to do so. In this research-in-progress paper, we propose a framework that can be used by instructors to improve learning environments so that their students are better engaged and encouraged to form positive study habits. The framework utilises a hybrid of the Transtheoretical model of behaviour change (TTM) and the SNAP model of motivation. Social networking and gamification are used as triggers that enable the process to occur. It is envisaged that this research will lead to instructors creating more effective learning environments with less effort, and making academic learning a more enjoyable pursuit for students.

Keywords: behaviour change, education, gamification, social networking

1 INTRODUCTION

Many first year students entering university typically come from having a very structured learning environment in high school. Students are carefully monitored in high school to ensure they are managing their study efforts. When beginning university though, students are free to manage their time as they see fit. This jarring difference in learning environments presents an issue, as students tend to struggle with adapting to the newfound freedom of study. As well as this, the relatively recent rise of online social networking and the prevalence of video gaming amongst a diverse range of university-aged students is influencing students' expectations of their learning experiences. That is, students are expecting that their experiences at university align with those that they receive in their personal life. Not being able to engage students then makes it difficult to encourage students to form positive study habits. Forming a good study habit is an integral part of being a high performing student (Credé & Kuncel, 2008) and so it is important that universities become more effective at encouraging this. Instructors play a crucial role in creating engaging learning environments, however there are many aspects to consider which presents a considerable challenge for them. Therefore, this research-in-progress paper proposes a technology-based study habit framework that will allow instructors to implement a system that can be engaging and promote good study habits more effectively and efficiently. To achieve this, two research questions are postulated. The first question aims to find an approach that will encourage positive study habits in students and the second question aims to answer the problem of engaging students. These questions will be considered when constructing the framework.

- How can behaviour change models be used to guide changes in motivation towards studying?
- What techniques can be used to engage students in learning activities?

2 LITERATURE REVIEW

The following section outlines relevant prior work and key literature that informs the theoretical construction of the framework to help answer the questions set out by this research. Behaviour change theories are analysed, followed by motivation theories, and finally the relevant techniques that can be used to enhance engagement.

2.1 Behaviour Change Management

The core foundation of this research is the concept of changing students' behaviour, particularly towards study habits. Human behaviour is quite complex and there are many factors that contribute to an individual behaving in a particular manner (Ajzen, 1991). Attempting to alter or persuade certain behaviours can therefore be challenging given the complexities involved. To improve the likelihood that a behavioural intervention will be effective, it is crucial to consider behavioural theories from which this research can form its foundation. Thus, as this research is primarily focused on improving students' study habits (one aspect of behaviour) it is important that models for behaviour change be

investigated and incorporated where appropriate. Two such models are the Transtheoretical Model of Change (TTM) and the SNAP (Smoking, Not smoking, Attempting to stop, Planning to stop) model.

Firstly, the TTM model (alternatively referred to as the ‘Stages of Change’ model) outlines the distinct phases individuals progress through when attempting to alter their behaviour. These stages include: *pre-contemplation*, *contemplation*, *preparation*, *action*, *maintenance* and *termination* (Prochaska & Velicer, 1997). Figure 1 outlines the overall progression in change of behaviour as described by the Transtheoretical model.

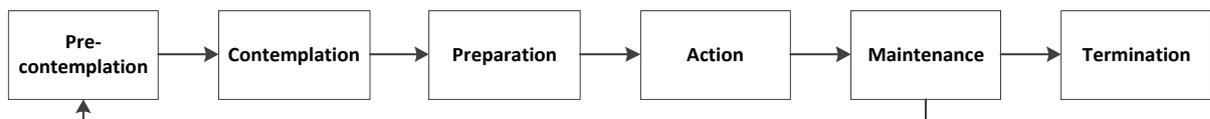


Figure 1 Transtheoretical Model (Stages of Change)

During the *pre-contemplation* stage, an individual is unaware that there is a need for change and has no intention to make alterations to their behaviour. The point at which the individual becomes aware and is considering altering their behaviour happens during the *contemplation* stage. A plan to change behaviour is formulated during the *preparation* stage. A change in behaviour that has been initiated signals the *action* phase being entered. After initiating the change, the individual typically attempts to prevent a relapse in behaviour and so it can be said they are in the *maintenance* stage. Finally, when an individual has reached the *termination* stage they will no longer continue the prior undesirable behaviour. The typical timeframe for each phase is six months for the stages between *pre-contemplation* and *action* and between six months and five years for the *maintenance* stage (Prochaska & Velicer, 1997). The implication of timeframes being the driver of progression however, has been highlighted as not reflecting what happens in reality (Littell & Girvin, 2002). Rather, individuals may change their behaviour for unpredictable reasons and may progress backwards and forwards through certain stages of change at any point. Furthermore, some of the stages in the model have been criticised as being arbitrarily defined and therefore not useful (West, 2005). Considering these deficiencies, one alternative to the Stages of Change model could be the SNAP model of motivation.

Secondly, the SNAP model aims to outline changes in motivation as a continuous process (West, 2009a). The basic premise of the model is that individuals set themselves a rule that is their desirable behaviour. For instance, “I will quit smoking”. The individual then fluctuates between four different states. As the model was originally created as a smoking cessation model, these states are written for that context. However, the model can also be adapted to apply to non-smoking related scenarios (West, 2009b). Table 1 outlines the two versions of the acronym definition.

	Original Model	General-Purpose Model
S	Smoking	Staying with the old behaviour
N	Not smoking	New behaviour engagement
A	Attempting to stop	Attempting to change
P	Planning to stop	Planning to change

Table 1 SNAP Model Summary

The argument underpinning SNAP is that motivation is not accurately represented in linear and discrete stages. Rather, one may jump from planning, attempting, performing or not performing a change in behaviour in any direction. This is because individuals do not make choices about their behaviour rationally, but rather with instinct and habit (West, 2009a). The feeling of an individual *wanting* to do something versus the feeling that they *ought* to change their behaviour is the main catalyst. For instance, an individual may know they *ought* to stop smoking, but their feelings of *wanting* to smoke outweigh the feeling that they should stop. A range of factors can influence why the individual wants to smoke and so if something happens to reduce the feeling of wanting to smoke below the level of knowing they should, then a change is likely to occur. However, this is not permanent, and extenuating circumstances may elevate the feeling of wanting to smoke once again. Hence, this is an indefinite and continuous process that can proceed in any direction. Figure 2 diagrammatically represents the possible paths.

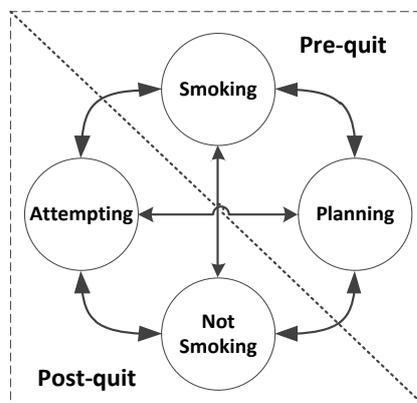


Figure 2 SNAP model of motivation (for quitting smoking)

Considering both of the presented models, the Stages of Change model alone may not be an accurate enough model for providing an effective intervention in changing an individual's behaviour. However, it does provide a useful high-level view of the process of change. The SNAP model appears to more accurately represent the manner in which motivation works in reality. These two models are often discussed in competition of each other (Prochaska, 2006; West, 2005, 2006), however, it may be more appropriate to think of each as representing different levels of abstraction. That is, the Stages of

Change model may be better suited to outlining the higher-level process whereas the SNAP model can better outline the lower-level workings of motivation.

2.2 Motivation Theory

When one exhibits certain behaviours it is partly because they are motivated to do so. However, there are three broad categories of motivation, namely: *amotivation* (having no motivation to perform an action), *extrinsic motivation* (being driven to perform an action by an external force) and *intrinsic motivation* (performing an action due to one's own will) (Ryan & Deci, 2000). There is a range of sub-types within extrinsic motivation, with those being: *External Regulation*, *Introjection*, *Identification*, and *Integration*. Table 2 summarises these sub-types.

Motivation Type	Description
<i>External Regulation</i>	An individual who is motivated because of external rewards or punishments for compliance
<i>Introjection</i>	Actions are primarily performed for approval from others.
<i>Identification</i>	An individual begins to personally value the activity and the effect of external forces is reduced.
<i>Integration</i>	An individual prioritises the goals of performing the desired action which indicates that the action is of personal significance.

Table 2 Types of External Motivation (Ryan & Deci, 2000)

One example of systems that make use of the external types of motivation is social networking sites, with Facebook and Twitter being particularly popular with university students. Although simply a communication tool that allows them to communicate and stay in contact with a large number of friends, it has altered the habits of these students to the point that it is common to witness students obsessively checking these websites for updates. This may be due to the *Fear of Missing Out* (FoMO), a phenomenon involving the feeling that other people (particularly friends) are having rewarding experiences for which one is not present (Przybylski, Murayama, DeHaan, & Gladwell, 2013). This suggests that students who experience FoMO may be quite externally motivated as the approval and acceptance of others is a pressing concern for them. The study also found that students who exhibit high levels of FoMO are more likely to use Facebook during class. This may explain part of the reason why social media is seen as a distraction in a learning environment. It suggests that students are more concerned with what their friends are doing rather than what they themselves are currently required to do. Being easily distracted in class could also suggest that students are not engaged with their learning environment. However, using a social networking site to collaborate on class work has shown that students will be more engaged with the content and use it outside of class; although long-term use of the system after the completion of the course is difficult to achieve (Ractham & Firpo, 2011). Therefore, an approach that will motivate students to use learning tools for the long term is desirable.

2.3 Gamification

To redirect motivation, one must create an engaging alternative. One such way to create engagement is through gamification. Gamification is the process of implementing game dynamics, mechanics and components into a system that would otherwise not be considered a game in order to enhance engagement and motivate individuals to perform an action (Kapp, 2012; Werbach & Hunter, 2012; Zichermann & Cunningham, 2011). Gamification is principally used for behaviour change (Werbach & Hunter, 2012) as meaningful use of various game components and mechanics can encourage certain behaviours to be exhibited. Using gamification in a learning context has successfully been used in *Quick Quiz*, a gamified multiple-choice question application (Cheong, Cheong, & Filippou, 2013). Quick Quiz allows students to test their knowledge by competing in short-timed quizzes and awarding points for correct answers and attempts at answers. It has been shown to be quite effective at engaging users through its use of gamification

Furthermore, video gaming amongst university-aged students is quite prevalent, with a recent study finding that both male and female students almost equally reported playing games (Weaver, 2013). One of the primary reasons respondents gave for playing games was that they found them to be challenging yet enjoyable, and would game in between classes as a break from their coursework. Therefore, gamifying the classroom presents an opportunity to break the division between education and personal enjoyment, and forging an environment where students may not feel the need to escape from the classes to enjoy what they are doing.

3 PROPOSED MODEL

Based on the reviewed literature concerning behavioural models, the proposed framework will use a hybrid of both the Stages of Change and the SNAP model. As was mentioned in an earlier section, the Stages of Change model is a useful way of representing the overall high-level process that an individual goes through from the state of being completely unaware of an issue in behaviour towards a new desirable behaviour. However, some modifications to the Stages of Change model are made to incorporate the continuous process of maintaining a new behaviour, as demonstrated by the SNAP model. Figure 3 outlines the framework and the integration of the two models.

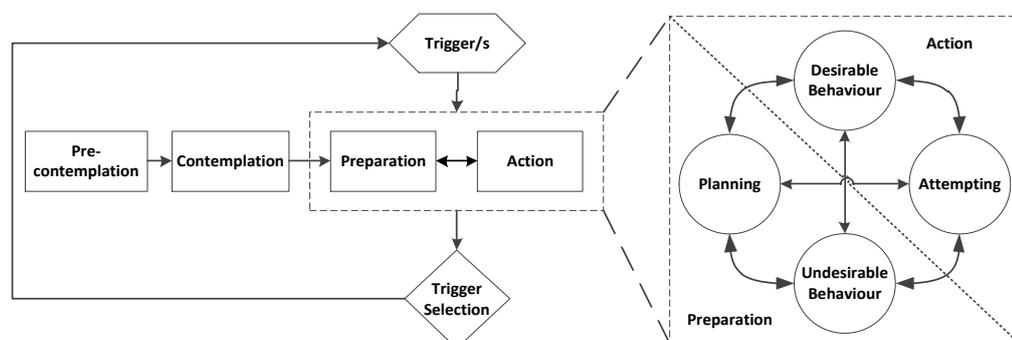


Figure 3 Proposed framework

3.1 TTM and SNAP integration

There are noticeable alterations to how the TTM is represented in the proposed model shown in Figure 3. Firstly, the ‘termination’ stage is excluded as it is difficult to justify that an individual will permanently change their behaviour without any chance of relapsing into an old behaviour (West, 2005). In the context of this research, a student is very unlikely to be motivated to improve their study habit permanently and without a single moment of lapsing to a previous study behaviour. Hence, it is unrealistic to assume that complete termination of an undesirable behaviour would be possible or appropriate to consider, and so it is excluded. Secondly, the stages of *preparation* and *action* remain as they were in the original model. *Maintenance*, however, now refers to the loop formed by the triggers and not a discrete stage. This is because an individual is continually trying to maintain a new behaviour against an undesirable one, with encouragement by the triggers. The SNAP model more clearly demonstrates the intricacies between preparing and acting on a desired behaviour, and so it is used to model the lower-level process that is occurring. Finally, the stages of *pre-contemplation* and *contemplation* will remain as per the original model, however, the impact of these two stages will not form the core focus of our study.

3.2 Operation of the model

In order to encourage students to improve their study habits, triggers (in the form of gamification techniques and social networking) are used. The goal of using these triggers is to enhance the feeling that students *want* to improve their study habits, rather than focusing on enhancing the feeling that they *ought* to study more. Online social networking will be used to encourage the Fear of Missing Out in a positive way (such as by posting updates that highlight the improvements made by friends of students) and gamification, which will be used to make the activity that students undertake more *fun*. Currently, it can be argued that the traditional learning environment strongly re-enforces the notion that students *ought* to study, however, if one considers the principles behind the SNAP model, a student will be more likely to change their behaviour if the feeling of *want* exceeds the feeling of *ought*. Specific triggers for different types of motivation will be developed in this research project. Given the continuous nature of the ‘maintenance’ stage, a cycle of triggers will be used to encourage the student to sustain their desired behaviour.

4 METHODOLOGY

There are two aspects of this research that will require testing and analysis. Firstly, we will need to determine which triggers are appropriate to encourage positive study habits. Secondly, the framework will need to be implemented as a real world system. These two aspects will be tested separately over three phases. The triggers will be implemented using a prototype system. A rapid application development cycle is planned as it allows for continuous improvement of a system based on feedback from users. Overall, there will be three phases in which the experimentation will be carried out. The first phase will involve a survey to verify the model is valid. This will also be used as a means to

assess the current state of student study habits and motivation. The second phase will involve building the prototype and having students use it over a number of weeks. The development of the prototype will follow a *design thinking* and rapid application development approach whereby an initial prototype is developed and iterated over for a number of cycles (IDEO, 2012). Students will then be surveyed about the system in order to provide feedback for further development. Finally, the third phase will have students using the prototype, however, no changes will be made during the time it is in use to allow for a formal evaluation of the framework to be carried out. Students will be asked to participate in a survey regarding their use of the prototype in the form of a retrospective pre-test. In a retrospective pre-test, participants are asked to complete a pre-test evaluation at the same time as the post-test evaluation. Retrospective pre-tests have been shown to produce more accurate assessments of program outcomes as compared to individual pre- and post-test approaches (Pratt, McGuigan, & Katzev, 2000). Formal interviews will also be conducted just prior to the completion of phase 3.

5 RESEARCH SIGNIFICANCE

As a result of the research being carried out, instructors will be able to better tailor the learning environment satisfying both student expectations and motivational theory, and develop strategies to maximise their learning potential. A more effective learning environment may lead to students becoming more effective learners by making more efficient use of their time. This would allow the possibility of students committing to endeavours away from university whilst still studying. The balance this would bring may lead to academic learning being a more enjoyable pursuit than currently considered and, in turn, could lead to increased motivation to learn.

This research is also expected to uncover triggers to encourage positive attitudes towards studying. Not only will effective triggers be discovered but also those that do not promote improvements in study habits. This will be a valuable finding to instructors in order to avoid spending resources towards triggers that are not likely to succeed. Furthering this, by identifying how to develop an environment that encourages learning, instructors may also apply similar principles when constructing teaching methods and assessment.

6 NEXT STEPS AND FUTURE WORK

The next stage of the research is to develop a system that implements the theoretical model proposed earlier in this paper. This system will then need to be trialled amongst university students to test for both the model validity as well as to evaluate the system. Future work may include trialling the framework to improve other aspects of academic performance in students. For this to occur, the framework will need to be generalised as far as possible.

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