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NUDGING FOR IMPROVED ACADEMIC PERFORMANCE AND MOTIVATION IN HIGHER LEARNING INSTITUTIONS

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ABSTRACT

Nudges, attempts to influence behaviour without forbidding any options or significantly changing the economic incentives of any options, have been applied to diverse issues such as sustainable consumption, e-commerce, and workplace goal-setting. Academic applications of nudges have grown, and a burgeoning attention on nudge applications in higher education is developing. In this paper, we describe our unique multidisciplinary approach, involving data analytics, qualitative research methods, and the Theory of Planned Behaviour, to developing nudges for improved academic performance and motivation at a non-residential university with a high proportion of part-time and mature students. Our paper focuses on the design and ongoing progress of nudge development. We end by exploring how our approach can serve as a template for other institutes of higher education wanting to develop and deploy nudges for better student outcomes.

KEYWORDS: ***Theory of Planned Behaviour, Nudge, Retention***

INTRODUCTION

Behavioural insights, the application of behavioural science findings from multiple fields such as economics, psychology, sociology, and neuroscience (Ruggeri et al., 2021), have been used to nudge and alter patterns of behaviour relating to diverse issues such as sustainable consumption (Loschelder et al., 2019), e-commerce (Mathur et al., 2019), and workplace goal-setting (Weintraub et al., 2021).

Nudging, first defined as "any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler & Sunstein, 2008), have increasingly been deployed in academic settings.

A 2016 study found that text message nudges delivered to lower-income university students, providing them with simplified information, encouragement, and access to learning resources, led to improvements in students' first-year academic performance (Castleman & Meyer, 2016). Similarly, by nudging students toward their teaching and learning support resources, DeVry University increased the utilisation rate of their tutoring services, helped lower-performing students attained higher assignment grades, and reduced student withdrawals (Gartner, 2022).

Yet, nudging alone may not be enough. For one, it tends to have small effect sizes. One quantitative review (Hummel & Maedche, 2019) found a median effect sizes of 21%. Evidence suggests that people cannot be nudged into doing something they do not want (de Ridder et al. , 2021) — that is, nudges cannot overcome strong preferences. Deeper, more longstanding behaviours or habits seem to also be unaffected by nudges (Oreopoulos & Petronijevic, 2019; Venema & van Gestel, 2021)

To augment the effects of nudges, behavioural change theories, such as the Theory of Planned Behaviour [TPB] (Fishbein & Ajzen, 2011), is needed. TPB, with its emphasis on attitudinal, social norm, and self-efficacy beliefs is suited to addressing the varied issues affecting university students, such as financial strain, family commitments, time management, expected study load, and work commitments factors (Dewberry & Jackson, 2018).

TPB has been found to strongly predict students' intention to quit university (Dewberry & Jackson, 2018). A sizable 61% of variance in intention to quit university has been found to be accounted for by personal attitudes, subjective norms, and perceived behavioural control.

MULTIDISCIPLINARY APPROACH

Background

A multidisciplinary, mixed-method approach, involving data analytics, qualitative research methods, nudge theory and TPB, was chosen to develop nudges to pursue our two goals of 1) improving academic performance, and 2) reducing withdrawal rate among students at a university in Singapore.

The university is non-residential and caters to a high proportion of part-time and mature students who have to juggle family and work commitments alongside their education, and/or may have not been in formal education for prolonged periods. Naturally then, many students need help and support to perform better academically and persevere in their educational journey.

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In this paper, we describe the problem discovery stage of our approach where we select, survey, and study students to define the problem and develop interventions and nudges. We employ a funnel approach, starting with larger samples before zeroing in on smaller groups with the more in-depth methods of focus group discussions, interviews, and case studies *(Figure 1).*

Data analytics

To select students to conduct research for problem discovery, a data analytics approach was used to analyse various student attributes, such as academic performance, and other relevant data attributes, such as years lapsed since prior education.

Decision tree algorithm – CHAID (Chi-square Automatic Interaction Detection) was used to construct decision trees to help with the selection of candidate student-clusters. CHAID is appropriate for the discovery of student-clusters as it considers the significant association between student attributes – recursively splits the tree into two or more branches – and eventually ending up with child branches that represent student-clusters that shares distinct characteristics.

Two decision trees were constructed. Decision Tree 1 deals with academic performance. Decision Tree 2 deals with student active/withdrawal status. *Figure 2* illustrates a decision tree being deployed – each child branch or node represents a student-cluster.

In one of the clusters for Decision Tree 2, the ratio of course taken to course withdrawal was a grouping characteristic for one of the nodes. Students in this node had withdrawn from between 18.5% to 34.7% of the courses taken. The decision tree also indicates that students in this cluster are likely to perform worse-off as compared to other student-clusters. Using this data analytics approach, we were able to understand the characteristics that may have contributed to academic underperformance and withdrawal from university, and further use this information to identify potential student-clusters of interest for the next phase of qualitative study.

Qualitative research methods

While the data analytics approach, and the use of the TPB (next section) allow the study of large groups of students, qualitative research methods allow for more in-depth exploration of issues. Focus group discussions, one-on-one interviews, and case studies of selected students are three qualitative methods chosen to provide depth in our problem discovery stage. A total of 24 focus group discussions and 120 interviews/case studies are planned.

Theory of Planned Behaviour

A three phrase (Epton et al., 2015) approach to the TPB (*Figure 3*) is chosen. In phase 1, important beliefs underlying intention to improve academically, and intentions to withdraw from university are identified. A target 100 students will be recruited to answer questions eliciting their behavioural beliefs (e.g., what are the advantages of improving academically), normative beliefs (e.g., which individuals or groups would disapprove of you withdrawing from university?), and control or self-efficacy beliefs (e.g., what factors would make you more likely to improve academically?). Two independent raters will code and sort the participants' answers. Important beliefs will be taken to be those stated by at least 20% of the sample.

In phase 2, a target 1,000 students will complete a TPB survey based on the important beliefs identified in phase 1. For example, if "support from family" is a self-efficacy belief stated by more than 20% of phase 1 participant, participants in phase 2 will be asked to respond to the question "Support from family would make my improving academically…" using a semantic differential scale with "Less likely" and "More Likely" as opposing anchors. Phase 2 will establish, empirically, which beliefs significantly predict our target intentions and behaviours to 1) improve academically, and 2) withdraw from university.

Finally, in phase 3, another 100 students will be recruited to 1) generate arguments supporting our target behaviours, and 2) record short videos promoting such arguments. For example, a belief underpinning withdrawal from university might be that a degree may not help in career advancement. Phase 3 students will be asked to provide counterarguments to such beliefs (e.g., students might recall personal anecdotes of colleagues who advanced in their career after graduating from university). The use of such short video recordings is a form of a social reference nudge where behaviours are influenced and shaped by peers (Hummel & Maedche, 2019), as opposed to formal or authority figures such as university staff who may be perceived as threatening to their autonomy (Dewies et al., 2021).

DISCUSSION AND CONCLUSION

Students face multiple challenges in trying to perform academically, and in completing their academic journeys. These challenges are amplified for part-time and mature students who juggle other major life commitments. Seen in this light, it is no surprise that a majority of university students have been reported to consider withdrawing from university without completing their studies (Nieuwoudt & Megan, 2021).

Universities have a responsibility to support their students in their effort to perform academically and complete their degrees. In this paper, we described a multidisciplinary approach to problem discovery related to these twin goals. We explored how nudges alone may not be sufficient. To augment nudges, in-depth qualitative approaches, predictive data analytics, and multi-phase Theory of Planned Behaviour applications are required. We believe that our multidisciplinary approach can serve as a template for other institutes of higher education wanting to systematically discover problems related to student academic performance and degree completion, and develop and deploy intervening nudges. This is an ongoing project and refinements to our approach will validate its suitability as a template for wider application.

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APPENDIX

Figure 1

Funnel Approach to Problem Discovery

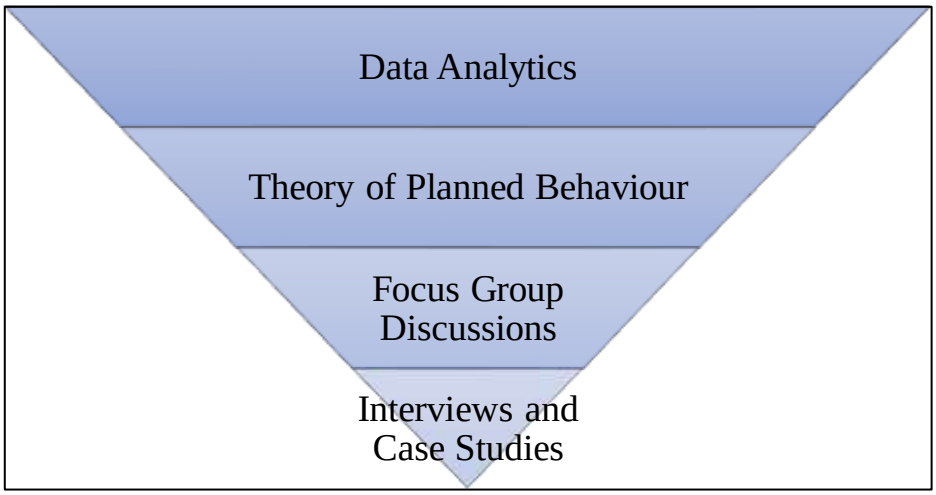

Figure 2

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An Illustration of Deployed Decision Trees

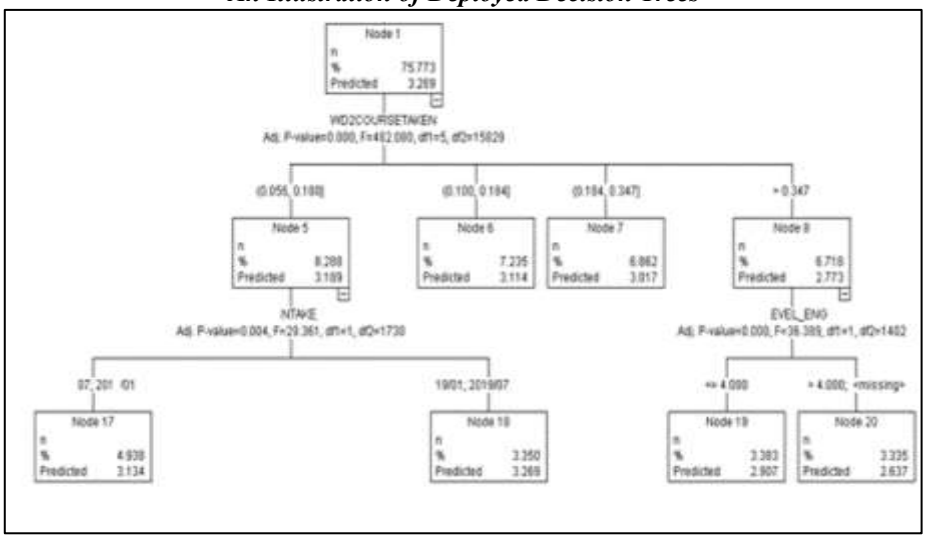

Figure 3

Theory of Planned Behaviour