SUTD 2021 02.145TS Take-Home Midterm Exam

Chosen Question Number: 3.

A high-quality social science study should be properly structured, focused, suitably scoped within reason, grounded in and driven by well-researched existing theoretical concepts, as well as backed up by sufficient data or concrete empirical evidence that are properly and ethically collected and analyzed. My advice to Kate consists of discussing the different sections of a social science study that would need to be considered, as well as weighing the different factors, advantages, and limitations of the different approaches that she could potentially take when conducting such a study. In my advice, I would assume that the scientific paradigm is to be used, as most social scientific research nowadays follow this paradigm and it also ensures some level of rigour in the study.

First of all, a proper definition of the terms used in the research question proposed by Kate should be obtained. This will help focus the study as more refined definitions will assist in reducing ambiguity and directing the overall approach of the study. For example, the term "video games" should be properly defined. Kate should specify the types of video games that are being considered. Some types of video games that can be considered depending on the medium include, but are not limited to: arcade games, television games, electronic games, computer games, virtual reality games, and mobile games. The level of interactivity and the genre-dependent features of the video games being studied also need to be considered. Some video games are also created for specific purposes in mind, such as emotional therapy, pain management, or training, and as such, they might have different effects on people. The type of "benefit" or "harm" should also be properly defined. For example, the benefits or harmful effects of video games could be mental or physical in nature. Finally, the term "people" should also be properly defined. The characteristics of the people being studied will define the scope of the study. This might include their sociopolitical background, economic status, age, race, ethnicity, nationality, and technological literacy, just to name a few. These definitions will help shape the goal of the research question.

Next, some prior literature review on the latest developments of social scientific research on the effects of video games on people would be very helpful. Numerous studies have been conducted on the psychological, behavioural, neural, cognitive, social, or emotional effects of various types of video games on people of differing backgrounds and social contexts. Most of these studies focus on how video games affect the mental faculties of people in different aspects, both positively and negatively (Palaus et al., 2017). For example, one study (Hill et al., 2017) attempts to analyze the efficacy of computerized cognitive training in people with mild cognitive impairment or dementia on cognition, visuospatial skills, and psychosocial functioning, while another study (Khan & Peña, 2017) attempts to analyze the effectiveness of mental health video games applications on participants with mild depression. Another study (Clemenson & Stark, 2015) explores how virtual environmental enrichment through 3D video games could improve hippocampal-associated memory, and yet another study (Anguera et al., 2013) finds that video game training might enhance cognitive control in older adults. Several studies also attempt to analyze the effects of video games on probabilistic learning (Schenk et al., 2017), psychological functioning (von der Heiden et al., 2019), attention, memory, and executive control (Boot et al., 2008). There are also more comparative studies, such as one (Diaz et al., 2016) that attempts to analyze the difference in facial emotion recognition between violent video game players and non-players. A proper literature review can allow Kate to potentially save some time and effort, if she is able to find literature that has studied the specific phenomenon that Kate is interested in, or at the very least, guide her and point her towards the appropriate direction. Some literature review can also help with gathering possible theories and concepts to help in the theorizing process by explicating certain phenomenons and relationships between whatever variables that Kate would be interested in.

After conducting some literature review, and depending on how Kate defines the various terms in her research question if she is able to find a possible research gap that she is interested to study on, she could proceed to choose the dependent and independent variables that she would like to study, and propose some kind of hypothesis or research question. A proper concept explication would also need to be conducted to show how the abstract independent and dependent variables in the conceptual level are related to the measurable observations specified at the operational level. For example, Kate might want to analyze the correlation between the number of hours spent per week playing video games as the independent variable and the level of absenteeism in school among young teenagers currently in secondary school and junior college in Singapore as the dependent variable. Some relevant theories could include self-determination theory, flow theory, and operant conditioning, all of which can be applied in the context of video game addiction. Some relevant concept explication could be that a higher level of absenteeism might imply worse harmful effects of video games on teenagers since they are spending more of their time playing video games instead of studying and concentrating on their academic studies. This time tradeoff could potentially decrease the ability of said teenagers in following the lessons properly, and as such, might lead to them obtaining lower grades and possessing a weaker understanding of concepts that are going to be needed in their next stages of academic journey or real-life work.

Once the concept explication and the variables are properly stated, Kate can proceed to select a suitable method that can help her to concretely measure and quantify the variables of interest. Depending on whether Kate wants to ensure internal validity or external validity, she could choose to conduct either an experiment or a survey respectively. She would need to select an appropriate type or level of measurement as well. She could also conduct additional auxiliary methods such as focus groups, content analysis, ethnography, in-depth interviews, or even computational ones such as screenomics and relevant digital big data traces that can provide a more nuanced and balanced analysis of the initial data collected during the experiment or the survey.

If Kate decides to conduct an experiment, she would need to ensure that threats to internal validity are properly accounted for. The advantage of conducting experiments would be that Kate can control the variability, ensuring ceteris paribus so that the effects of the independent variable can be isolated and observed on the dependent variable. She would need to ensure the conditions for causality to be present in her experiment, namely non-spuriousness, time order, and covariance. Experiments would also be of relatively low cost and it allows for replication. Kate would need to select either a lab experiment or a field experiment. Participants should be randomly assigned to control and treatment groups to deal with unknown confounding variables, using either posttest-only control group design or Solomon Four group design, with the latter requiring more effort, work, and time. If Kate is interested in studying some kind of interaction effect, she could also potentially explore a factorial design. In the post-analysis of the experiment, Kate would need to include possible confounding variables. One possible example of an experiment to address the earlier example of analyzing the relationship between the number of hours spent per week playing video games and the level of absenteeism in school among young teenagers would be to do randomized controlled trials with young teenagers as participants, whereby she can control the number of hours spent playing video games per week and observe how it will affect their level of absenteeism in their respective schools.

Otherwise, if Kate decides to conduct a survey, she would first need to decide on whether she would like to conduct a cross-sectional survey or a longitudinal survey. If she intends to conduct a longer survey across multiple points in time, perhaps to understand the trends of how the variables of interest change over time, or if she is interested in conducting some kind of a cohort or panel study, then she might prefer conducting a longitudinal survey. Kate would also need to decide on the type of sampling that she would like to use. If she wants the results that she would obtain to generalize well from her sample to the population, she would need to conduct some type of probability sampling. She would then also need to determine the confidence level and margin of error, which would affect

the sample size that she would need. Kate should also limit other coverage errors and random errors such as inaccuracies that could arise from selection bias and questionnaire construction, even if it sometimes might be impossible to completely eliminate them. Kate would then need to construct and design the survey questions, as well as decide on the survey procedure. For her survey questions, she would need to consider the principles of effective questionnaire design, in particular, the overall structure of the questionnaire, as well as the specific wording of each question. The overall structure might include the length and question order of the survey, as well as the number of both open-ended and closed-ended questions in the survey. For specific question wordings, Kate should make every question clear, precise, short, relevant, and valid. Responses should be mutually exclusive and exhaustive. She should also avoid asking double-barreled, leading, or embarrassing questions, and avoid biased terms in said questions. She should also select a psychometrically validated scale since it is more reliable and valid. For example, taking the earlier example of analyzing the correlation between the number of hours spent per week playing video games and the level of absenteeism in school among young teenagers, she could consider using the Assessment of Internet and Computer Game Addiction Scale (AICA-S) (Wölfling et al., 2011).

Last but not least, Kate would need to properly and ethically collect and analyze the data. She should ensure the quality of the measurements that she has collected in terms of both reliability and measurement validity. For an experiment, Kate would observe a test statistic to examine differences between groups that feature manipulations of an independent variable related to video games. Meanwhile, for a survey, Kate would observe correlations that indicate how two variables are related to each other. To reach some kind of conclusion, Kate would need to conduct some analysis on the significance of the test statistic with some specified p-value (usually 0.05). She would also need to consider the possibility of Type I and Type II errors, which might affect the conclusion that she would obtain. Data should also be ethically collected, by providing informed consent and ensuring data privacy. If deception or concealment is involved during data collection, proper debriefing should be conducted after the study. If the participants are considered vulnerable, such as the teenagers and young adults mentioned earlier, then both the consent of their guardian and the assent of the participants need to be obtained. Approval would be needed from the corresponding institutional review board of the country where she is conducting her study in. She should avoid doing questionable research practices, such as p-hacking or HARKing.

In conclusion, various factors need to be considered when designing a high-quality study. Assuming the scientific paradigm, Kate would need to properly take care of the definitions of the terms being used in the research question or hypothesis and its scope, the theories and concept explications being used to relate the abstract concepts to the corresponding operationalized constructs and variables of interest, as well as the method and ethical principles of data collection and analysis. Once Kate has taken care of all of the aforementioned sections, Kate would be able to design and conduct a high-quality study that would best study her phenomenon of interest, allowing her to understand if playing video games is beneficial or harmful for people.

References

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