# A Design Brief on Improving Student Productivity by Addressing the Planning Fallacy

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## Contents

# 1 Background and Purpose

One's ability to estimate how long it will take them to complete a task is often directly related to the productivity of that person. Unfortunately, it is typical for people, particularly students who make these predictions often, to hold an optimistic mindset when estimating how long it will take them to complete a task, despite having made the same mistake many times [1]. This phenomenon, generally referred to as the Planning Fallacy, is illustrated in Figure 1.

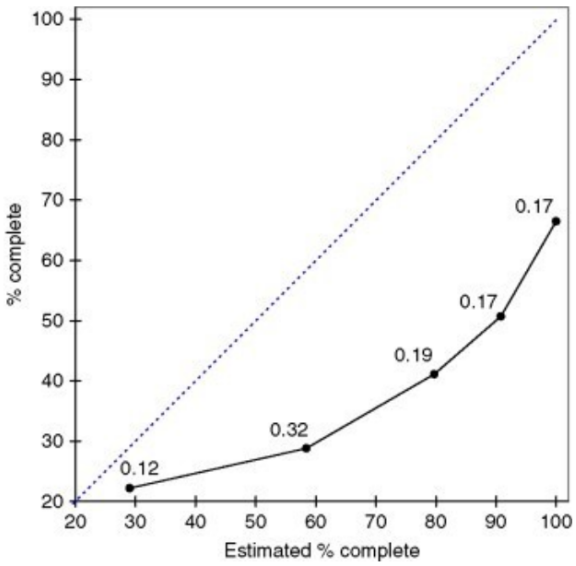


**Figure 1:** Calibration curve for estimated and actual probability of meeting task completion predictions. Numbers indicate the proportion of responses represented by each point on the curve. Dashed line represents perfect calibration [1].

Since students are going to be working remotely for the foreseeable future, they will be responsible for accounting for significantly more time than they they have in the past. It is therefore important to take this time to optimize work behaviours by diminishing problems like the Planning Fallacy, thereby helping students work more productively and consistently under these conditions.

This design brief seeks to frame an opportunity that could benefit students across the University of Toronto by providing them with means to overcome the Planning Fallacy.

# 2 Stakeholders and Their Objectives

While students are the main stakeholders in terms of use of the product, several other stakeholders must be considered for a solution to this opportunity. The order of the list of stakeholders and their objectives is not in any particular order.

## 2.1 Students

As users of the solution, students must be catered to in a solution to this problem. Currently, many students are using nothing better than "dead-reckoning" to judge how long and how well a project will go for them, despite the fact that students tend to be consistently overconfident in these areas. Students in general would therefore benefit from some sort of solution that provides them with guidance for making these decisions.

## 2.2 Professors and TAs

As the people administering the work students are working on, it is important to keep in mind how they will view and potentially interact with the solution. While the participation or cooperation of course

administrators cannot be guaranteed, it is always important to ensure that solutions don't violate their standards for academic honesty and the standards of their course.

### 2.3 The Facilitators of the Solution

While this group isn't necessary for every conceivable solution, it is likely that there will be a group of people distinct from the greater student body that are responsible for the upkeep and/or distribution of the solution. The function and therefore needs of this group depends on the solution, but should nevertheless be considered.

## 3 Objectives

There are 3 main objectives corresponding to the above stakeholders' demands, each of them responds to one DFx, scope namely usability, accessibility, and reliability.

### 3.1 Usability: Accuracy of Time Estimation

As the main purpose of the design brief is to help the main stakeholders, students, overcome the Planning Fallacy, thus improve their working efficiency, the effectiveness of the design, in other words, the precision of the time estimation by a potential design is crucial to consider. This objective must also include the ability of the design to adjust its estimation according to individual working habits, as this create flexibility and will therefore improve users' experiences.

### 3.2 Accessibility: Ease of Use

Given the current online working environment, it is necessary for an academic assisting service to support easy electronic access for every student. Knowing that the opportunity is aimed to improve users' efficiency and time management skills, it is also important to factor the user-friendliness into the design of the tool in order to minimize the learning time of the design itself for the clients.

### 3.3 Reliability: Privacy and Information Security

To ensure the maximum accuracy of time estimation provided, there must be sufficient data collected to produce a meaningful result. Therefore, the question of information security becomes the key as data may be gathered in an individual basis. Therefore, ensuring the safety of users' identities should also be emphasized to build a trusting relationship between the service provider as well as the common users.

## 4 Metrics

The following listed individual metrics will be determined based on the above objectives.

### 4.1 Deviations of Time Approximates

A quantitative metric that measures the average ratio between time estimates and actual task duration as:

$$\frac{estimates - actual}{actual} \cdot 100\%$$

This measurement will be in percentile form(%) using at least 3 trials for different categories of tasks. Providing a relative reference instead of an absolute value will allow comparisons, thus demonstrating the actual precision of potential solutions.

### 4.2 Personalization of solutions

A qualitative metric that follows the rubrics below:

### 4.3 Number of Available Accessible Platform

A quantitative metric that measures the number of

### 4.4 Tool-learning effectiveness for Users

A quantitative metric

### 4.5 Information Security for Users

A quantitative metric

## 5 Criteria

## 6 Constraints

## 7 Evaluations of Reference Designs

## 8 Source Extracts

[1] (P1) The planning fallacy refers to a readily observable phenomenon: the conviction that a current project will go as well as planned even though most projects from a relevant comparison set have failed to fulfill their planned outcomes. The term was first introduced to the psychological literature by Kahneman and Tversky (1979, 1982a, p. 415) to describe people's tendency 'to underestimate the time required to complete a project, even when they have considerable experience of past failures to live up to planned schedules.

[1] (P7) Figure 1.1 presents data from a related study (Griffin & Buehler, 1999, Study 1) where students reported probability estimates for their best guess completion times for 10 current projects across their academic and personal lives. Once again, about 45% of the projects were completed, compared to an average confidence level of 73%. The calibration plot reveals two interesting patterns: First, probability judgments are overly optimistic across the entire range; this does not match the canonical pattern of overconfidence in knowledge which is marked by underconfidence or underestimation at the low end of the probability scale and overconfidence or overestimation at the upper end, a pattern known as over-extremity. Thus, the phenomenon to explain is an optimistic bias, not an extremity bias...

[2] (P267) The act of prediction, by its very nature, elicits a focus on the future rather than on the past; a future orientation may prevent individuals from looking backward in time.

[2] (P366) This study tested 3 main hypotheses concerning people's predictions of task completion times: (a) People underestimate their own but not others' completion times, (b) people focus on plan-based scenarios rather than on relevant past experiences while generating their predictions, and (c) people's attributions diminish the relevance of past experiences. Results supported each hypothesis.

[2] (P376) The findings suggest that people make more realistic completion estimates when they use their past experiences to inform their predictions

## References


[1] R. Buehler, D. Griffin, and J. Peetz, "The planning fallacy: Cognitive, motivational, and social origins," in *Advances in experimental social psychology*, vol. 43, pp. 1–62, Elsevier, 2010.

[2] R. Buehler, D. Griffin, and M. Ross, "Exploring the" planning fallacy": Why people underestimate their task completion times.," *Journal of personality and social psychology*, vol. 67, no. 3, p. 366, 1994.