

ACADEMIC PROCRASTINATION IN ENGINEERING STUDENTS

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ABSTRACT

Procrastination is a common phenomenon in students in higher education. To voluntarily delay an intended course of action despite expecting to be worse off for the delay can affect academic performance, cause study delay, but also lead to frustration and stress. This study set out to explore students' beliefs about what causes procrastination, the extent to which online education and the use of digital devices affects their level of procrastination, and their coping mechanisms and ideas about the kind of support a study program can offer to mitigate the effects of procrastination. Focus group interviews were conducted with first-, second- and third year engineering students. Interviews were transcribed and coded to detect general themes in the students' responses. Students hold several beliefs about what causes procrastination, for example situational temptations and distractions, and task aversion. Regarding online education, students tend to procrastinate more. Digital devices are regarded a serious threat for productivity, students use various settings and apps on their phones to battle distraction. To conclude, students cope with procrastination in various ways. Creating study groups, developing fixed working patterns, and breaking down the task at hand are among the most common. Amongst other things, students state that a study program might invest in creating awareness of procrastination, accommodating group work, and creating enough

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separated physical spaces for study and relaxation to mitigate the effects of procrastination. This study will inform the design of a procrastination intervention program.

1 INTRODUCTION

1.1. Background

Procrastination is a common phenomenon in students in higher education. The concept can be defined as *“to voluntarily delay an intended course of action despite expecting to be worse off for the delay”* (Steel, 2007, p. 66). It is estimated that 80 – 95 percent of students engage in procrastination in their studies and there is evidence that procrastination is linked with poor performance and reduced well-being (Tice and Baumeister, 1997). Interventions to mitigate the effects of procrastination can have an effect, cognitive behavioural approaches being among the most powerful and lasting with medium to large effect sizes (van Eerde and Klingsieck, 2008). Although there are ways to cope with procrastination, study programs may underestimate the effort it takes for students to do so. What is more, there are indications that online education (Elvers, Polzella, and Graetz, 2003) and the intensified use of digital devices in students (Hidalgo-Fuentes, 2022) has put more strain on students in coping with procrastination. Therefore, continued efforts of study programs to support students in coping with procrastination are needed. This study is part of the University of Twente Teaching & Learning Fellowship of the first author. The Teaching & Learning Fellows are a selected group of university teachers that spent one day per week on a teaching or learning issue within their study program that needs mitigation. They adopt a scholarly approach to this issue and are supported by a group of educational science experts. Each group of Fellows is expected to work on a certain theme, the theme for the present cohort being “Digitalisation.” The main author is university lecturer in the ATLAS program of the University College Twente, a Bachelor of Science program in Technology, Liberal Arts & Science that aims at educating the ‘New Engineer’ (Goldberg and Sommerville, 2014). The program has embraced the concept of self-directed learning (Gibbons, 2002; Saks and Leijen, 2014), meaning that students attain learning goals mostly in their own way. Students are expected to shape, structure, and plan their own curriculum. Compared to more traditional programs, such educational environment might call upon students’ abilities to cope with procrastination more, therefore the need for support might be stronger in ATLAS. Procrastination is a well-researched topic, with many studies adopting a quantitative, survey-based approach. For this study, a more qualitative approach was adopted to learn about students’ own theories about procrastination, the coping strategies they adopt, the role of online education and use of digital devices, and their ideas about the kind of support they would need from their study program. The outcomes of this study and others to come (a study including study advisors and experienced teachers is being planned currently) are a means to identify design principles for a

generic mitigation program for all engineering students at the University of Twente which will first be tested and evaluated in the ATLAS program.

1.2 Research questions

The research questions of this study were threefold. The first pertained to students' ideas about what causes one to procrastinate. Any mitigation strategy should be aligned with participants' prior beliefs about the issue at hand. This question was meant to explore those beliefs.

The second research question pertained to digitalisation and its effects on procrastination. This question focused particularly on procrastination in relation to online education and the use of digital devices.

The third question pertained to coping strategies, especially the kind of coping strategies students adopt themselves, but also their ideas about what a study program can do to support students in dealing with procrastination.

2 METHODOLOGY

2.1 Participants

For the first research question, analysis was based upon data collected from six focus groups, two groups of first years (18 – 19 years, seven students, five males), two groups of second years (19 – 20 years, nine students, four males) and two groups of third years and higher (20+ years, nine students, five males). For the two remaining research questions, analysis was based upon one group of first years (4 students, three males), one group of second years (four students, two males) and one group of third years and higher (five students, two males). The groups could contain a minimum of three and a maximum of seven students. There is evidence to suggest (see Steel, 2007, p. 71) that experience affects procrastination, therefore the groups were divided by study year. All participants were randomly selected and approached by email. Ethical approval was requested for this study and granted by the ethics committee in the domain of humanities and social science of the University of Twente.

2.2 Materials

An interview protocol was designed that contained a standard introduction text (including the consent statement), five interview questions and a standard debriefing text. To address the first research question (prior beliefs), participants were asked: *What, do you think, causes one to procrastinate in their studies?* (Question 1 in the interview). For the second research question (digitalisation), the following interview questions were asked: *When the world switched to online education during the recent COVID-19 pandemic, did that affect your procrastination? How?* (Question 3) and *Consider all digital devices you use in your daily life (e.g. your laptop, phone, tablet, smartwatch), do they affect your procrastination in your studies? How? (if negative: how do you cope with that?). Do you use anything on your devices to cope with procrastination in general? Could you elaborate on that?* (Question 4). (Note that this interview question also partly related to the third main research question). For the third question (coping and mitigation), the following questions were asked: *What, in your view, are successful coping mechanisms for academic procrastination?* (Question 2) and *Do you think there is anything a study program*

can do to mitigate procrastination in students? (Question 5). All interviews were conducted by the main author, the second author assisted in recording each session with a microphone connected to a laptop with Microsoft Teams installed.

2.3 Procedure

For each interview, a separate meeting room was reserved. Before each focus group interview, participants were explained about the aim of the study, the interview procedure, and data treatment. Before the start of the interview, they declared their consent by responding to a consent statement to which they could respond with yes or no. These responses were audio recorded. The interviewer introduced the questions in a standardized way (reading them out loud from the interview protocol) and ensured that each participant could equally contribute to the discussion by, either verbally or non-verbally, inviting them to respond to the question at hand. The interviewer repeated the question when needed and when no new information was brought to the table, the next question was introduced. At the end of each focus group interview students were asked how they experienced the interview and whether they wanted to be informed about the outcome of the study. Participants were explained that they could, at any moment after the interview, approach the researchers with questions, comments, or suggestions.

2.4 Data analysis

All audio files were transcribed using Amberscript (<https://www.amberscript.com/en>) and edited by the second author to ensure all statements were sufficiently clear to be coded. The protocols were analysed per year group by the main author and checked by the second author. To analyse the data, the researcher first familiarized himself with the transcripts and identified categories (concepts), setting codes for each. Definitions for each code were made to ensure easy classification to each category. For each research question the main categories were identified and these are presented in the results section.

3 RESULTS

3.1 Beliefs about procrastination

The first research question pertained to students' beliefs about the causes of procrastination. For the current analysis, the functional framework of Svartdal and Løkke (2022) was adopted. This framework distinguishes between Antecedent conditions (A), Behavior (B), and Consequences (C). For example, an individual faced with an aversive task (A) might choose to respond with avoidance behavior (B) which leads to stress reduction and alleviated mood (C). This contingency might lead to the avoidance behavior becoming more likely when faced with an aversive task again. For the antecedents, Svartdal and Løkke distinguish between 1) Situational temptations and distractions, 2) Task aversion and 3) Lack of energy and tiredness. Statements in response to the interview questions fitted well with these categories. Situational temptations and distractions lead to an immediate mood increase compared to when working on a task with a distant desired outcome (*"for me, if I procrastinate, maybe it's because, I don't know, I want to watch a sports event"*, *"there's a vast difference in the work environment, because especially in the foyer, you see people, (...) And sometimes you just suddenly like you have a little bit of small talk and suddenly you're in a two hour deep conversation with someone and*

it's suddenly 6:00 pm"). With respect to Task aversion, certain characteristics of the task could be aversive, thus procrastinating the task would reduce negative feelings (*"usually when I procrastinate, and what I also see around me, is that it's the task that you would normally be doing is something with high mental effort or at least a high mental barrier to start the task", "making the task way larger in your head than that it actually is. And therefore getting paralyzed by only the idea of having to start a task"*). When there is a Lack of energy and tiredness, task aversion increases and procrastinating the task leads to relief (*"because I have any, like, bad feelings inside of me or anything in my head, that's just taking my attention", "I'd say general moods as well. (...) Like I know weeks where I've been like very productive, but I also know weeks where I was constantly procrastinating, couldn't get my focus on things, couldn't like, just the threshold to start working felt so big"*). Svartdal and Løkke also identify factors that interact with the antecedents, like temporal distance (*"you need to do something within three weeks, but then something pops up that needs to be done in one week. Then that like only time wise that has priority"*) and certain individual difference variables (e.g. a student mentioning not having the proper personal *"characteristics"*).

3.2 Procrastination and digitalisation

The second research question related to procrastination in relation to digitalisation, especially online learning, and the use of digital devices. Regarding online learning, not a clear picture emerged from the data. On the one hand, students stated that they would procrastinate more because of lack of consequences for not producing work, low expectations on the part of the study program (the first-year participants were still in high school when they switched to online education), distractions at home and increased flexibility (e.g. the possibility to watch online lectures in their own time). On the other hand, students stated that lack of certain distractions (e.g. social ones) were helpful in getting work done. The second years found it hard to say anything about online education and procrastination, because when the COVID-19 pandemic happened, they also switched from high school to university.

Regarding using digital devices, the distractive and addictive nature (difficult to escape *"from the rabbit hole"*) of media content was mentioned (Instagram, TikTok, Facebook, YouTube, Netflix). Especially the fact that phones can be used for work and leisure apparently poses a serious challenge (*"it's just, you can do anything on it"*). Loss of focus due to engaging with media content (*"and then someone else wants something from you that has nothing to do with what you're doing at the moment. And then you're already in a completely different mindset thinking about something else"*) and easy accessibility were also mentioned.

3.3. Coping with and mitigating procrastination

The third research question concerned students' coping mechanisms regarding procrastination. In general, social accountability (e.g. arranging a study group), fixed working patterns, breaking down the task at hand, identifying attractive features in the task, building up to the point of actual engagement (e.g. doing small tasks to make the transition to doing a task one is procrastinating on), manage distractions (e.g. giving one's phone to someone else for a while) and self-nudging (e.g. having a certain background on one's screen, organizing one's desk, or changing one's working environment) were most commonly mentioned. To a lesser extent, goal setting, planning breaks (as a rewarding mechanism), gamifying (e.g. counting how

many pages one can study in a certain time and then try to beat that time) and time blocking (taking a certain amount of time to do something) were mentioned. With regard to the use of digital devices, students mentioned applying device configurations (e.g. deleting distracting apps, using apps like Google Calendar, TimeTree, OneSec, Notion, set focus modes, use black and white settings, disabling notifications, set do-not-disturb settings, muting group chats, turning sound off, and make to-do-lists with check boxes that include smileys and satisfying visuals). To a lesser extent, students mentioned using separate phones (for work and pleasure) or deliberately do certain tasks on paper that they could also do on their phones.

Reflecting on what a study program could do to mitigate procrastination students mentioned creating awareness about the issue, fostering social accountability (e.g. by accommodating group work and have mentor meetings), proper planning (of deadlines), accommodate choice (on learning content, - approach and assessment of learning), promoting well-being, offering relevant learning content, designing a functional physical study environment (with ample and separate spaces for study and leisure) and proper planning of study breaks.

No systematic differences related to age category in responses to the interview questions were detected, although the third-year groups tended to give more elaborate answers, indicating a higher level of experience with procrastination.

4 SUMMARY AND ACKNOWLEDGMENTS

In summary, this study identified students' beliefs about what causes procrastination, the extent to which online education and the use of digital devices affects their level of procrastination, and their coping mechanism and ideas about the kind of support a study program can offer to mitigate the effects of procrastination. The insights propose several ideas for an intervention strategy that could contain personal (e.g. creating awareness, individual and group strategies) and environmental aspects (e.g. proper planning and creating optimal physical learning spaces).

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