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Procrastination in the Looking Glass of Self-Awareness

Can Gamified Self-Monitoring Reduce Academic Procrastination?

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Abstract

Procrastination impedes students' study progress, achievement, and well-being. In light of its high prevalence among students, scalable, low-threshold interventions are needed. This contribution was inspired by the effect of gamification on learning behavior. It set out to test whether self-monitoring of learning activities in a gamified smartphone application can reduce procrastination. In both a quasi-experimental (study 1) and an experimental pretest-posttest control group study (study 2), however, self-reported procrastination increased instead of decreased. We discuss this effect as being caused by heightened awareness of one's own procrastination and show how this effect can be effectively used in procrastination prevention and intervention programs.

Keywords: academic procrastination; procrastination; self-monitoring; gamification; progress bars

„Selbsterkenntnis ist der erste Schritt zur Besserung": Kann Selbstbeobachtung in einer gamifizierten Smartphone-Anwendung akademische Prokrastination reduzieren?

Zusammenfassung

Prokrastination kann den Lernfortschritt, die Leistung und das Wohlbefinden von Studierenden beeinträchtigen. Angesichts des hohen Verbreitungsgrads akademischer Prokrastination unter Studierenden ist der Bedarf an skalierbaren, niederschwelligen Interventionen daher gr0ß. Dieser Beitrag wurde von der Wirkung von Gamification auf das Lernverhalten inspiriert. Ziel ist es zu überprüfen, ob die Selbstbeobachtung von Lernaktivitäten in einer gamifizierten Smartphone-App die akademische Prokrastination verringern kann. Sowohl in einer quasi-experimentellen (Studie 1) als auch in einer experimentellen Prätest-Posttest-Kontrollgruppenstudie (Studie 2) nahm die selbstberichtete Prokrastination jedoch zu statt ab. Wir erörtern diesen Effekt als Folge eines erhöhten Bewusstseins für die eigene Prokrastination und zeigen, wie dieser Effekt in Prokrastinationspräventions- und Interventionsprogrammen effektiv genutzt werden kann.

Schlagworte: Akademische Prokrastination; Prokrastination; Selbstbeobachtung; Gamification; Fortschrittsbalken

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1 Procrastination in the Looking Glass of Self-Awareness

Procrastination is a common problem for most students. Studies estimate that while the vast majority of students have engaged in procrastination, 75 % consider themselves habitual procrastinators, and for almost half of them procrastination is a real and persistent problem (Steel 2007) which they want to tackle. Previous interventions have concentrated on self-management training and cognitive-behavioral therapy in order to reduce procrastination (van Eerde and Klingsieck 2018). As these types of intervention are delivered on a one-to-one basis, they are labor-intensive and can only be made available for a few students at the same time. Given the prevalence of procrastination, however, it seems more realistic and cost-effective to provide low-threshold, and scalable, interventions for all students who want to reduce their procrastination.

With this in mind, this study investigated whether the technique of self-monitoring could function as such a low-threshold intervention. The principle of self-monitoring in itself is not new to procrastination research. The scalability of its implementation, however, is new. The study tested the effectiveness of self-monitoring via a gamified smartphone application (app) to reduce academic procrastination. The effectiveness of gamification—"the use of game-design elements in non-game contexts" (Deterding, Dixon, Khaled and Nacke 2011)— to promote behavior change has already been shown in education and health settings (e. g., Seaborn and Fels 2015). In the following, we first introduce the concepts of self-monitoring in relation to academic procrastination, and of gamification, used in educational and health settings.

2 Conceptual Framework

2.1 Self-Monitoring in the Realm of Academic Procrastination

In academic procrastination, students delay tasks and activities inherent to learning and studying, despite knowing that they will be worse off because of the delay (cf. Steel and Klingsieck 2016; Steel 2007). Its negative consequences should not be underestimated. Meta-analytic results impressively demonstrate that habitual procrastination is negatively linked to academic achievement, health, and well-being (e. g., Kim and Seo 2015). Academic procrastination is most fully understood as the difficulty to self-regulate (cf. Steel 2007). This difficulty manifests itself in all three phases of self-regulated learning (Zimmerman 2000): in the *forethought phase*, it affects planning and self-motivation; in the *performance phase*, it causes problems with concentrating on the task at hand, and in the *self-reflection phase*, it decreases self-efficacy (for a summary see Klingsieck 2013). Procrastination is also linked to difficulties with correctly applying cognitive and meta-cognitive learning strategies (e. g., Howell and Watson 2007). Consequently, previous interventions have concentrated on self-management training and cognitive-behavioral therapy in order to reduce procrastination (van Eerde and Klingsieck 2018).

Most of these interventions use some form of self-monitoring as a technique (van Eerde and Klingsieck 2018). Generally speaking, self-monitoring refers to observing oneself and evaluating information about specific personal processes while being engaged in (goal-directed) behavior. In self-regulated learning, for instance, students observe their learning behavior and evaluate the information attained to see whether they need to change their behavior in order to reach their goals (Zimmerman and Paulsen 1995). Because self-monitoring helps to shape behavior, it forms a core element of prevention and intervention programs aimed at instigating new behavioral patterns (Krampen 2008). Incorporating self-monitoring in programs targeting procrastination would appear to be particularly useful because students who tend to procrastinate have also been shown to struggle with applying meta-cognitive strategies such as self-monitoring (e. g., Howell and Watson 2007). So far, it has only been implicitly assumed that self-monitoring reduces procrastination, but little is known about the size and the direction of this effect.

2.2 Gamification

While different definitions of gamification stress different aspects of the concept, they come together in this prominent definition: "'Gamification' refers to the *use* (rather than the extension) of *design* (rather than game-based technology or other game-related practices) *elements* (rather than full-fledged games) *characteristic for games* (rather than play or playfulness) in *non-game contexts* (regardless of specific usage intentions, contexts, or media of implementation)." (Deterding et al. 2011; p. 9). Gamification is often used to engage users in problem-solving and other desired behaviors (Deterding et al. 2011). Hamari and colleagues stress that gamification is the process of altering previously non-gamified settings and services in a way that evoke the same psychological experiences as games (generally) do. The motivational aspects of this experience are to entail further behavioral outcomes (Hamari, Koivisto and Sarsa 2014; Huotari and Hamari 2012). The end product of the gamification process is usually not a fully-fledged game, nor does it even have to be game-like at all as long as it enables a playful experience (cf.; Deterding et al. 2011).

2.3 Gamification to Promote Behavior Change in Educational and Health Settings

Gamification relies on the individual's motivation as a key factor in behavior change. It often draws on forms of extrinsic and intrinsic motivation as in Self-Determination Theory, Flow-Theory, and Behaviour Reinforcement Theory (cf. Zainuddin, Chu, Shujahat and Perera 2020) by using extrinsic rewards such as levels, points, and badges. In gamification, behavior change results from either an extrinsically or an intrinsically rewarding experience which meaningfully engages the user in a new behavior (cf. Hamari et al. 2014; for a specific example see: Sailer, Hense, Mayr and Mandl 2017).

In educational settings, game design elements "have been used in instructional systems as long as those have existed" (Dicheva, Dichev, Agre and Angelova 2015 S. 4). Results of systematic literature reviews and meta-analyses show the positive effects of a gamified learning experience, ranging from increased attendance, higher engagement in learning activities, more contributions, and increased participation in voluntary activities to a higher percentage of students passing their exams. Students reported the gamified learning experience to be more motivating, interesting, and easier compared to non-gamified learning experiences. However, these studies also bring to light that the learning outcome might not be affected, or might even be negatively affected by the gamified learning (for a summary of results see Bai, Hew and Huang 2020; Dicheva et al. 2015; Dichev and Dicheva 2017; Hamari et al. 2014; Ofosu-Ampong 2020; Sailer and Homner 2020; Seaborn and Fels 2015; Zainuddin et al. 2020).

The other setting gamification has been applied to the most is the health context (cf. Warmelink, Koivisto, Mayer, Vesa and Hamari 2018). Gamified websites and smartphone apps that aim to alter health behaviors have become increasingly popular, and due to their wide accessibility and applicability, they have the potential to intrinsically motivate engagement in health and well-being behaviors. In particular, apps are currently applied to encourage physical activity, weight management and diets, reduce drug use, and improve mental well-being. As in the educational context, results of systematic literature reviews and meta-analyses show that the positive effects of a gamified system on behavioral and cognitive outcomes seem to outweigh the neutral or mixed effects. Indeed, even when users experienced some negative impacts, it was always alongside positive ones (cf. Johnson, Deterding, Kuhn, Staneva, Stoyanov and Hides 2016).

2.4 Game Design Elements used in Educational and Health Settings

Game design elements can be differentiated into *gamification objects* and *gamification mechanics* (Liu, Santhanam and Webster 2017). Gamification objects are the basic building blocks of a gamified system. They comprise items, characters, scripts, and visual assets, that appear in the form of badges, leaderboards, levels, and progress bars, amongst others. Gamification mechanics refers to the rules that govern the interaction between users and gamification objects. They determine, for example, what kind of actions a user has to perform to gain points, and how many points are nee-

ded to receive a specific badge. *Gamification design principles* are the high-level design rules for the designers of the gamified system (Liu et al. 2017). They include, for instance, goals, customization, progress, feedback, and storytelling etc. (Dicheva et al. 2015). Liu et al. use the following example to illustrate a gamification design principle: "To make badges work, one needs an object (e. g., a badge as a visual component), a mechanic governing the rules for awarding badges, and a principle suggesting that there should be different badges for different user styles and stages" (2017, p. 1015). A gamification design principle should address user motivation and engagement directly in order to achieve desirable experiential outcomes (e. g., enjoyment, feeling more positive, improved engagement) and instrumental outcomes (e. g., improved fitness, reduced stress; Liu et al. 2017). Likewise, gamification objects have to be aligned to specific motivational features in order to achieve the desired outcomes. For instance, some gamification objects such as point scores, badges, levels, and competitions, are linked to extrinsic rewards, while leaderboards, teams, and communication functions allow the establishment of social affiliations (cf. Johnson et al. 2016; Sailer et al. 2017; Seaborn and Fels 2015; Zainuddin et al. 2020). While there is no commonly agreed classification of these elements, they are defined at several levels of abstraction (Dicheva et al. 2015). For this paper, the differentiation between self and social gamification objects (Hsin-Yuan Huang and Soman 2013), although of low complexity, is sufficient. Self-gamification objects—such as points, progress bars, achievement badges, and levels—allow users to compete against themselves and recognize their self-achievements. Social elements—such as leader boards, competitions, virtual currency, and avatars—get players to interact with others through competition or cooperation, whereby their progress and achievements are made public.

In both educational and health settings, the most commonly investigated gamification objects are leader boards, badges, points, and rewards in combination with associated gamification mechanics (Dicheva et al. 2015; Edwards et al. 2016; Zainuddin et al. 2020). The gamification object applied in the present study corresponds to progress bars. Progress bars "provide a percentage-based graphical representation of the players' progress" (Dicheva et al. 2015, p. 4) to show goal achievement, activity level, and skill progression in a game (Bertholdo, Melo, Rozestraten, Gerosa and O'Brien 2018; Morrison and DiSalvo 2014). As such, progress bars offer a simple visual way to inform users about the activities to be done, those that are completed and those that are not (Karra, Karampa and Paraskeva 2019). If applied properly, this continuous feedback shapes judgments of current and desired performance (Garcia-Marquez and Bauer 2021). These judgments, in turn, can lead to changes in perceptions of self-efficacy (Garcia-Marquez and Bauer 2021). Hence, progress bars can be a useful tool to support self-regulation (Karra at al. 2019) through self-monitoring (Buchem, Carlino, Amenduni and Poce 2020). Studies in educational settings have highlighted the potential of progress bars to motivate learners to stay tuned into the learning activity (Berkling and Thomas 2013; Ding, Kim and Orey 2017; Ding, Er and Orey 2018; Farzan and Brusilovsky 2011; Holman, Aguilar and Fishman 2013), increase learners' self-control, and facilitate the overview in e-learning platforms (Olsson, Mozelius and Collin 2015).

The majority of studies on the effectiveness of gamification on behavior change have only examined a combination of multiple, rather than single, game design elements and most gamified systems have not been properly evaluated (Dicheva et al. 2015; Dichev and Dicheva 2017; Hamari et al. 2014). This has prompted a call for the implementation of more rigid methods in gamification research (Dicheva et al. 2014; Hamari et al. 2014; Sailer and Homner 2020).

3 The Study

The study set out to test the effectiveness of self-monitoring on reducing academic procrastination. Students self-monitored their own study progress within a gamified app. Three hierarchically-linked progress bars allowed them to directly track their completion of learning activities. By implementing quasi-experimental and experimental designs, we tested the hypothesis that students

who are tracking their completion of learning activities report less procrastination than students who are not tracking their completion of learning activities.

4 Materials and Methods

4.1 Overall Design

A between-subjects pretest-posttest control design with two experimental conditions (using the app vs. not using the app) was chosen in both studies. The first study used a quasi-experimental design while the second study replicated the findings from study 1 by means of an experiment. Participants were Economics and Business students of the University of Paderborn, Germany. In the quasi-experiment, two classes got to know the app in the first session of the term. One class solely received some information on procrastination and on the app (CG). Students of the other class (EG) not only received this information but, in addition, they could earn extra course credits by participating in a diary study on the improvement of the app which required their using the app on a regular basis. Prior to the introduction, both groups filled out a survey (T1). In the experiment, students of one large class filled out an online survey (T1) during the first session of the term. The survey software randomly assigned students to the group that was introduced to the app and asked to use it for this term (EG) or to the control group (CG). Students in the EG were to regularly use the app and to provide feedback on a regular basis in exchange for extra course credit. In both studies, all students were asked to participate in a second survey (T2) at the end of the term, nine weeks later.

The dependent variable, academic procrastination, was measured by the German version of the Academic Procrastination State Inventory (APSI; Patzelt and Opitz 2014). While traits are dispositional aspects of personality, states are transitory aspects of personality which can vary from situation to situation. State procrastination is the actual procrastination characteristic in a specific time span. The APSI assesses three facets of academic state procrastination which are state procrastination (APSI_ST; 12 Items), anxiety and doubt (APSI_AD; 6 Items), and task aversion (APSI_AV: 5 items). Students rated their frequency of behaviors and feelings such as "I was lacking the energy for studying" on a five-point scale (1 = *never*; 5 = *always*). The dispositional aspect of academic procrastination was measured by the German short version of the General Procrastination Scale (GPS; Klingsieck and Fries 2012; 9 items; 1 = *very untypical for me*; 4 = *very typical for me*) and, in study 2, by the Procrastination Scale for Students (PFS; Glöckner-Rist, Engberding, Höcker and Rist 2014). The dispositional aspect of academic procrastination was measured by a reduced, adapted German version of the Aitken Procrastination Scale (APS; 1982). Participants had to rate seven items, such as "I postpone the start of an important task until the last moment" on a 7-point scale (1 = *never*; 7 = *always*). The sample of study 2 was restricted to procrastinators by using the scores on the PFS. See Table 2 und 3 for the descriptive statistics and psychometrics of these scales.

Both studies were approved by the ethical board of the university involved. Students were informed about the goal of the study (i. e., evaluating a new app). They consented by ticking a box in the online survey, agreeing that their data would be used anonymously in the analysis of the study.

4.2 Intervention: Gamified System Used

The smartphone app (called StudyNow) provided the gamification design principle of direct tracking through the gamification objects *check marks*, *doughnut chart*, and *stacked column chart*. Mobile devices have become commonplace daily companions for nearly all students. Thus, students were able to access the app with minimal effort, independently of time and place. Moreover, no training on how to use the gamified system was needed (e. g., Bomhold 2013). The app was developed by an interdisciplinary team and improved over several iterations and over several terms based on the results of pilot studies and on student feedback (Feldotto, John, Kundisch, Hemsen, Klingsieck and Skopalik 2017; John, Feldotto, Hemsen, Klingsieck, Kundisch and Langendorf 2017).

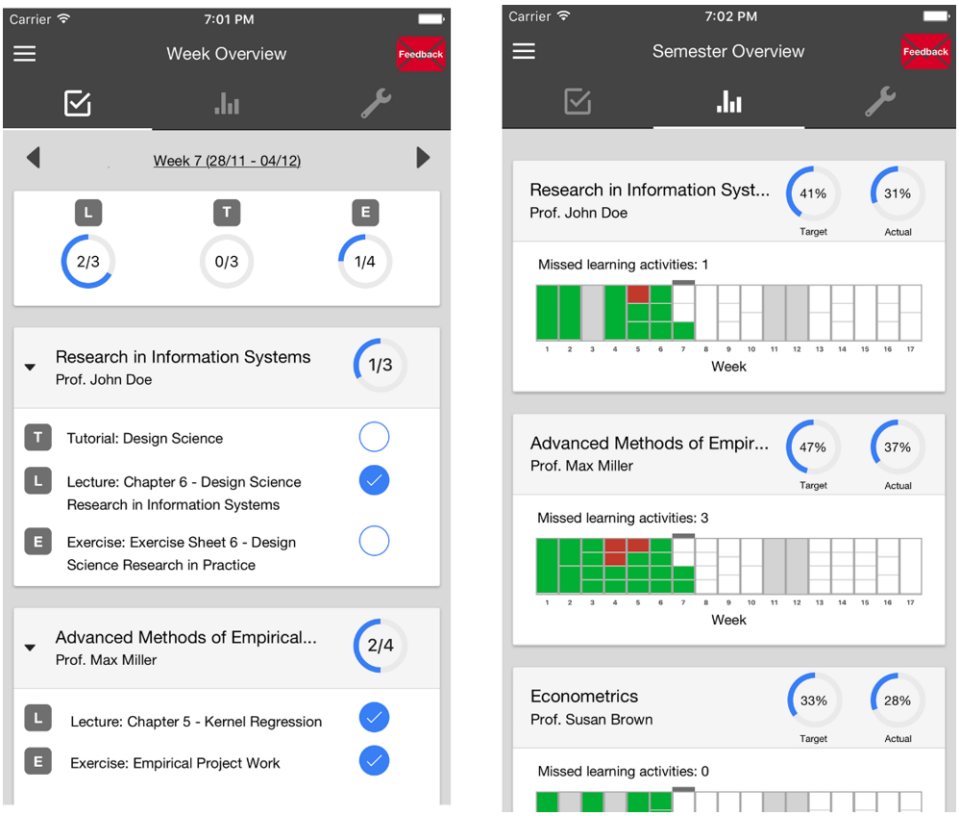

Figure 1: Week Overview (left panel) and Semester Overview (right panel)

The object of the gamification is to help students monitor their progress against the targeted learning activities set for each term. These pertain to activities such as attending classes, reading, answering multiple choice self-study questions, and preparing for tests and exams. The course instructors provide the activities to be entered into the app by the project team. These are activities that the course instructor either requires or suggests to help learners to reach specific learning outcomes. Users (students) select the courses they have enrolled in in a specific term and can navigate between two overviews (see Figure 1). A *weekly overview* lists the learning activities for each week, grouped by the courses that they belong to. Each activity comes with a short description, an icon for the type of learning activity (e. g., write essay), and a checkbox to indicate whether the student has completed the activity (gamification object: check mark). The check marks are aggregated on the activity type level (e. g., tutorial, lecture, etc.) per week and displayed as total numbers and in doughnut charts. Hence, students also see statistics on the number of pending and completed activities in a given week. The weekly overview also allows students to switch between weeks, past to future. The *term overview* shows students a high-level view of their learning activities in the whole term. For each course, students see a timeline that represents the weeks of the term, while boxes on the timeline represent the learning activities that belong to a certain course. Each box shows the current status of a learning activity through its color (green = activities performed, red = activities outstanding, grey = no activity in this week). Additionally, the total number of overdue learning activities for each course is shown and two doughnut charts display the percentage of all learning activities for a specific course that should have been performed (i. e., target) and the percentage of all learning activities for a specific course that have already been performed (i. e., actual).

Thus, the three progress bars are hierarchically-linked in that the check marks (progress bar 1) are aggregated in doughnut charts for the weekly overview (progress bar 2) and in stacked column charts (progress bar 3) for the semester overview. By means of diverse aggregated statistics users can see how many learning activities they have completed so far and how many they have missed. This presentation makes it easy for them to monitor their progress against the targeted learning

activities. Regarding the desirable experiential outcomes, users are intended to feel competent and autonomous concerning the organization of their learning activities, thereby leading to internalized forms of extrinsic motivation as proposed by Self-Determination Theory (Deci and Ryan 2012). This form of motivation should induce a positive feeling about learning activities (e. g., anticipation, curiosity), thus, leading to an improved engagement with the app, and maybe even to a playful experience. Desirable instrumental outcomes for individuals should include reduced procrastination, greater academic achievement, and enhanced subjective well-being. Desirable instrumental outcomes for society could include, for example, a reduced university dropout rate. Table 1 summarizes the study's game design elements, the gamification design principles it implemented, and the desired outcomes of the smartphone app.

Table 1: Overview Showing the Used Game Design Elements, the Implemented Gamification Design Principles, and Desired Outcomes of the Smartphone App

Game design elements	Gamification objects	Week overview • Check marks: Displays whether a student has performed a certain planned learning activity in a specific week • Doughnut chart: Illustrates a student's performed and planned learning activities in absolute numbers in a specific week Semester overview • Doughnut chart: Illustrates a student's performed (Actual) and planned (Target) learning as a percentage of the overall learning activities in a specific semester • Stacked column chart: Illustrates a student's performed and not-performed learning activities in a specific semester
	Gamification mechanics	Week overview • Conferring rewarding symbol: for each activity finished, an individual receives a "check" Semester overview • Conferring rewarding symbol: for each activity finished, an individual receives a "green bar"
Implemented gamification design principles		• Direct tracking progress on learning activities*:* makes it easy to monitor progress towards being up to speed with the planned learning activities and get notified in real time
Meaningful engagement	Desirable experiential outcomes	• Feeling of mastery and autonomy (see Self-Determination Theory) • Internalized forms of motivation (see Self-Determination Theory) • Feeling more positive about learning activities • Anticipation and curiosity about learning activities • Improved engagement with the app
	Desirable instrumental outcomes	• For individuals: reduced procrastination, improved academic achievement, health, and well-being • For society: reduced university dropout rate, improved academic education of students

4.3 Statistical Procedures

In both studies, multivariate analyses of variance with repeated measurements (rm-ANOVAs) were performed. The requirements for this method are met for the data. The normal distribution of the dependent variables was shown by a nonsignificant Kolmogorov-Smirnov Normality Test (study 1: $p = .20$; study 2: $p = .20$) while sphericity was given due to the two-level inner-subject factor (time). There were no outliers and the dependent variable was metric while the inner-subject factor was scaled on a nominal level. Significance was set at 0.05.

5 Study 1: Quasi-Experimental Pretest-Posttest Control Group Study

5.1 Methods

5.1.1 Sample

Of the 161 students who participated in the pretest (T1), 51 also participated in the posttest (T2). Gender, age, and number of semesters completed so far were equally distributed in the two groups (e. g., female students in experimental group [EG] 50 %; in control group [CG] 44 %). However, the number of participants in the EG ($n = 42$) greatly exceeded the number of participants in the CG ($n = 9$). More importantly, the two groups differed significantly for some of the dependent variables. Thus, propensity score matching (via R using the MatchIt package with the nearest-neighbor 1-to-1 matching; Randolph, Falbe, Manuel and Balloun 2014) matched the control to the experimental cases based on sociodemographic variables (age, gender, terms studied) and their pretest scores on smartphone anxiety, smartphone self-efficacy, dispositional procrastination, and academic state procrastination as measured.

Table 2 presents the descriptive statistics before and after propensity score matching. Our final sample comprised nine participants in the EG (33 % female) and nine participants in the CG (44 % female). Participants in the CG had used the app only once during the term, while the participants in the EG had used it at least once a week ($n = 7$), twice a week ($n = 1$) or daily ($n = 1$). Scores on the dispositional procrastination scale reveal that participants rated procrastination as untypical for themselves.

5.1.2 Instruments

Besides the APSI and the GPS, the following control variables were assessed at T1: (1) smartphone anxiety (3 items; 1 = *do not agree at all*; 7 = *fully agree*) and (2) smartphone self-efficacy (4 items; 1 = *do not agree at all*; 10 = *fully agree*). These items are translations of items developed by Minkman, Rutten and van der Sanden (2016) based on a study by Venkatesh and Bala (2008) in the field of technology acceptance research.

Table 2: Study 1 – Demographics, Psychometric Properties of the Major Variables, and Results of the ANOVA for the Dependent Variable

	Sample					Sample used for ANOVA				Main effect *time*			Main effect *group*			Interaction *time* × *group*		
	Pretest (T1)			Posttest (T2)														
	n	*M*	*SD*	α	*n*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2	*F*	*p*	η^2	*F*	*p*	η^2
Age																		
EG	42	22.17	2.04		9	21.00	1.00											
CG	6	21.50	2.43		6	21.5	2.43											
Terms studied																		
EG	42	6.29	1.93		9	5.56	1.67											
CG	6	5.33	2.42		6	5.33	2.42											
Smartphone anxiety				.66														
EG	42	6.10	1.08	.64	9	6.41	.68											
CG	9	6.85	.34	.61	9	6.85	.34											
Smartphone self-efficacy				.69														
EG	42	7.64	2.25	.71	9	6.56	.84											
CG	9	8.22	1.90	.59	9	6.44	.59											
General procrastination scale				.91														
EG	42	2.66	.61	.89	9	2.62	.61											
CG	9	2.56	.87	.95	9	2.56	.87											
APSI_state procrastination				.89						5.17	.04	.24	.04	.85	.00	12.83	.01	.45
EG	42	3.53	.60	.88	9	3.72	.44	3.88	.53									
CG	9	4.14	.47	.84	9	4.10	.47	3.40	.87									
APSI_anxiety and doubt				.79						10.67	.01	.40	.22	.65	.01	13.82	.01	.46
EG	42	3.69	.64	.78	9	3.91	.43	3.96	.66									
CG	9	4.24	.51	.72	9	4.24	.51	3.39	.79									
APSI_task aversion				.87						12.51	.01	.44	1.13	.30	.07	2.14	.16	.11
EG	42	3.61	.82	.86	9	4.07	.69	3.69	.69									
CG	9	4.02	.74	.89	9	4.02	.74	3.11	.80									

Note. APSI = Academic Procrastination State Inventory; $df = 1, 16$ (for multivariate ANOVA); $df = 1,18$ (for univariate ANOVAs)

5.2 Results

Results of the rm-ANOVAs show a significant main effect for time, $F(3,14) = 4.97$, $p = .02$, partial $\eta^2 = .52$, while the main effect for group is not significant, $F(3,14) = .42$, $p = .74$, partial $\eta^2 = .08$. The result of power analyses shows that a sample size of 76 (cf. Faul, Erdfelder, Lang and Buchner 2007) would have been needed to show this effect. The interaction for time × group is significant, $F(3,14) = 5.33$, $p = .01$, partial $\eta^2 = .53$.

Looking at the results of the univariate tests (see Table 2), there is a significant interaction for time × group for the subscales APSI_state procrastination and APSI_anxiety&doubt, while this interaction is not significant for the subscale APSI_task aversion. The main effect of time is significant for all three APSI subscales. It is, however, not interpretable in case of APSI_state procrastination and APSI_anxiety&doubt, because the interactions in these cases are disordinal in nature. All effects resemble large effects (Cohen 1988). Thus, state procrastination increases over time in the EG and decreases in the CG. While anxiety and doubt remain stable over time for the EG, it decreases in the CG. Task aversion decreases in both groups.

5.3 Discussion

In summary, first, self-monitoring by directly tracking progress on learning activities seems to have a differential effect on each of the three facets of academic procrastination. While there seems to be no impact on task aversion, there is an effect on state procrastination and on anxiety and doubt. Second, the effect it has on the latter two facets is opposite to the hypothesized effect; namely, gamified self-monitoring seems to have increased rather than reduced self-reported procrastination. While our hypothesis could not be confirmed, this opposite effect provides interesting insights into the effects of self-monitoring: The increase of self-reported state procrastination might be due to the weekly contrasting between the targeted learning activities and those actually completed. This constant monitoring might have highlighted the intention-action gap for the participants of the EG and, thus, made them aware of their procrastination. This awareness probably also reinforced their doubt and anxiety. This might explain why doubt and anxiety remained stable over time in the EG and did not decrease as they did in the CG. The decrease of state procrastination in the CG can be explained by the normal decrease of procrastination towards the end of a term (cf. Dewitte and Schouwenburg 2002; Rothblum, Solomon and Murakami 1986; Tice and Baumeister 1997). However, it is important to note that the results need to be interpreted very cautiously due to the very small sample size and the limits this entails for the statistical procedures. In light of the methodical weaknesses of the first study, study 2 implemented an experimental design with increased statistical power and sample size. It set out to explore whether this contradictory effect can also be found in students who rated themselves as typical procrastinators.

6 Study 2: Experimental Pretest-Posttest Control Group Study

6.1 Sample

Altogether, 164 students participated in T1 and T2 (EG: 74; CG: 90). The attrition rate was 35 % (EG: 24 %; CG: 41 %) with N = 251 filling out the survey at T1. The samples did not differ systematically between T1 and T2 with regard to dispositional procrastination (PFS), academic state procrastination (APSI), and socio-demographics (e. g., terms number of terms studied). To reduce the data to procrastinators solely, only data from students with a score above 4.5 on the PFS were analyzed. The EG comprised 20 participants (of which 30 % were female), the CG 34 participants (29 % female). There were no significant differences between the groups at T1 with regards to age, number of terms studied and their scores on the PFS and APSI. See Table 3 for demographic details of each group.

Table 3: Study 2 – Demographics, Psychometric Properties of the Major Variables, and Results of the ANOVA for the Dependent Variable

	Pretest (T1)				Posttest (T2)			Sample used for ANOVA		Main effect *time*			Main effect *group*			Interaction *time* × *group*		
	n	*M*	*SD*	α	*n*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2	*F*	*p*	η^2	*F*	*p*	η^2
Age																		
EG	74	22.16	2.00		20	22.35	2.13											
CG	90	22.13	2.52		34	22.38	2.08											
Terms studied																		
EG	74	5.74	2.64		20	7.25	3.31											
CG	90	6.33	2.42		34	7.21	2.31											
Procrastination scale for students																		
EG	74	3.82	1.11	.92	20	5.21	.46											
CG	90	3.91	1.32	.95	34	5.20	.49											
APSI_state procrastination										.62	.44	.01	.07	.79	.00	2.17	.15	.04
EG	74	2.83	.54	.85	20	3.20	.52	3.25	.60									
CG	90	2.89	.60	.88	34	3.35	.49	3.16	.50									
APSI_anxiety and doubt										.01	.98	.00	1.61	.21	.03	.06	.81	.00
EG	74	2.68	.69	.81	20	2.62	.86	2.63	.76									
CG	90	2.73	.72	.83	34	2.88	.73	2.86	.62									
APSI_task aversion										.03	.86	.00	1.61	.21	.03	.03	.86	.00
EG	74	2.52	.67	.80	20	2.62	.87	2.62	.78									
CG	90	2.74	.69	.77	34	2.88	.71	2.77	.73									

Note. APSI = Academic Procrastination State Inventory; *df* = 1,50 (for multivariate ANOVA); *df* = 1,52 (for univariate ANOVAs)

6.2 Results

Results of the rm-ANOVAs show neither significant main effects for time, $F(3,50) = .23$, $p = .88$, partial $\eta^2 = .01$, and group, $F(3,50) = .84$, $p = .48$, partial $\eta^2 = .05$, nor a significant interaction for time × group, $F(3,50) = .77$, $p = .52$, partial $\eta^2 = .04$. This pattern can also be seen on the level of the univariate tests on the subscale level (see Table 3). On a purely descriptive level, the results for APSI_state procrastination do resemble the results of study 1: It increases over time in the EG, while it decreases in the CG. However, the effects are so small that a sample size of 281 (cf. Faul, et al. 2007) would have been needed to show the interaction effect while the sample size needed to show the main effect for time is 130, and for group it is 120.

6.3 Discussion

Summing up, the effects of self-monitoring on self-reported academic procrastination through directly tracking progress on learning activities could not be replicated by this experimental design limited to procrastinators alone. On a purely descriptive level, the results for self-reported state procrastination do, however, resemble the results of study 1.

7 General Discussion

This paper presented a study which investigated the effect of self-monitoring on academic procrastination by means of directly tracking progress on learning activities within a gamified app. The gamification objects, namely progress bars, indicated to students to what extent they had completed a learning activity. In the quasi-experiment (study 1), direct tracking was associated with a higher degree of self-reported academic procrastination. In the experiment with procrastinators only (study 2), this effect did not show with statistical significance but only on a purely descriptive level. Thus, the hypothesis that self-monitoring of learning by directly tracking one's progress against learning targets reduces academic procrastination was not confirmed. On the contrary, self-monitoring of the learning activities seemed to increase self-reported academic procrastination. This finding can be explained by the fact that monitoring the gap between one's intention ("these are the learning activities I should have completed by now") and action ("these are the learning activities I have actually completed") probably increased students' awareness of their intention-action gap: What was once a dull gut feeling suddenly becomes very obvious through the colors of the gamification objects. This awareness led students to self-report higher procrastination scores than they had reported in the pretest. In a sense, awareness of a problematic behavior might be a first step in behavior change. Thus, self-monitoring might have the potential of a low-threshold intervention that assists all students who want to tackle their procrastination, especially if methods to work on the problematic behavior are offered once the students have become aware of it.

It is yet to be shown in future studies whether this awareness might have actually reduced procrastination behavior. Even in this study, it is possible that procrastination may actually have decreased on a behavioral level and that this decrease is not reflected in the self-reported scores due to heightened self-awareness of this problematic behavior. Considering the limitations inherent in assessing procrastination by self-reports only, future studies need to assess procrastination with objective measures to validate this explanation. If it turns out that self-monitoring is able to decrease procrastination behavior by increasing self-awareness for this behavior, this self-awareness can be used in order to shape behavior. If, however, it turns out that self-monitoring does not reduce procrastination behavior, it needs to be bolstered by other techniques to reduce procrastination (cf. van Eerde and Klingsieck 2018).

Looked at from a gamification research perspective, the contradictory findings and the insignificant results in study 2 reflect the finding of a recent meta-analysis (Huang et al. 2020). In this meta-analysis dissertations and theses on gamification in educational settings often showed statistically insignificant results while both journal articles and conference proceedings reported signifi-

cant effects. By not locking our contradictory and partly insignificant results up in a file-drawer (cf. file-drawer-problem; Rosenthal 1979) but by explicitly leaving the stage to these findings, the present contribution intends to make a difference to the common preference for mostly publishing the positive effects from the interventions under investigation. For future studies, it is essential to consider *how* game design elements that address self-monitoring are implemented and different forms of gamification objects contribute to effectiveness of behavior change. For example, it might make a difference whether progress is shown in terms of learning activities remaining or in terms of learning activities completed (see small-area hypothesis by Koo and Fishbach 2012, and an application in an online question and answer community with information on progress towards goal achievement by Kundisch and von Rechenberg 2017).

Concerning the limitations of the study, while it meets the demand for validated psychometric measurements and the use of control groups to investigate specific gamification design principles (i. e., directly tracking progress on learning activities), and for interference statistics (cf. Hamari et al. 2014), it does share one pitfall common to previous studies on gamification which is the extremely small sample size in study 1 and low statistical power in study 2. Another issue is that mediator variables such as type of motivation – in the lens of Self-Determination Theory – linked to the gamification design principle were not included. It could have been that some users understood the progress bars as an extrinsic reward while others felt it as being linked to their need to achieve mastery. Linked to this issue is the question of how the progress bars were actually perceived and dealt with by the students. On the one hand, students might forget to check activities they have already completed while, on the other hand, also check activities they have not completed. Furthermore, checking activities might only work for students who actually do almost all of the activities while it might not work for students who leave out a lot of the activities. They might be demotivated by seeing what they have not done. In addition, in study 2, we do not have any insights into how well and how often participants in the experimental group actually used the app before providing their feedback. Triangulating the quantitative studies with qualitative interviews with a subsample of the participants might have helped to find answers to these questions. Concerning the criteria of behavior change, future studies should gather achievement data for the student. Finally, the study is based on the widely established definition of gamification by Deterding et al. (2011). As we make use of progress bars—a well-known game design element frequently used in various contexts—in a non-game context, we evidently comply with this definition. Still, we note that the important aspect of "gameful experiences" (Huotari and Hamari 2012) is neither entailed in this definition nor controlled in our study. We could not monitor the degree of gamefulness the users experienced during the intervention. Further, the posttest did not cover gamefulness. Hence, it remains an open issue fur future research to uncover whether the implemented affordances for gameful experiences in our app were sufficiently strong.

To sum up, future research has yet to show whether gamified self-monitoring can potentially provide a low-threshold, scalable, and inexpensive prevention or intervention targeting procrastination among students. Based on our findings, we can tentatively conclude that self-monitoring heightens the self-awareness for the intention-action gap characteristic of procrastination, which might, in turn, lead to a change in procrastination behavior. This direct effect of self-awareness on behavior change will probably only work for students who are mildly affected by academic procrastination. Students who truly suffer from procrastination, might need other techniques that scaffold the effect of self-awareness to reduce procrastination. These techniques could either be provided in course of a self-management training or a cognitive-behavioral therapy tailored to procrastination (van Eerde and Klingsieck 2018) or could be integrated directly into the gamified app. Furthermore, having an evidence-based map of game-design principles and their effects on learning variables would help to introduce efficient and effective gamification more widely into higher education.

References

Aitken, M. E. (1982). A personality profile of the college student procrastinator. (Doctoral dissertation, University of Pittsburgh, 1982). *Dissertation Abstracts International,* 43, 722.

Bai, S., Hew, K. F., & Huang, B. (2020). Does gamification improve student learning outcome? Evidence from a meta-analysis and synthesis of qualitative data in educational contexts. *Educational Research Review,* https://doi.org/10.1016/j.edurev.2020.100322

Berkling, K., & Thomas, C. (2013). Gamification of a software engineering course and a detailed analysis of the factors that lead to its failure. *International Conference on Interactive Collaborative Learning, Russia,* https://doi.org/10.1109/ICL.2013.6644642

Bertholdo, A. P., Melo, C., Rozestraten, A., Gerosa, M., & O'Brien, H. (2018). User engagement in an open collaboration community after the insertion of a game design element: An online field experiment. In Association for Information Systems (Ed.*), Proceedings of the Twenty-fourth Americas Conference on Information Systems, USA,* 6, 3794–3803.

Bomhold, C. (2013). Educational use of smart phone technology: A survey of mobile phone application use by undergraduate university students. *Program,* https://doi.org/10.1108/PROG-01-2013-0003

Buchem, I., Carlino, C., Amenduni, F., & Poce, A. (2020). Meaningful gamification in MOOCs. Designing and examining learner engagement in the Open Virtual Mobility Learning Hub. In *Proceedings of the 14th International Technology, Education and Development Conference,* 9529–9534, http://dx.doi.org/10.21125/inted.2020.1661

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd Ed.). Hillsdale, NJ: Erlbaum.

Deci, E. L., & Ryan, R. M. (2012). Motivation, personality, and development within embedded social contexts: An overview of self-determination theory. In R. M. Ryan (Ed.), *The Oxford Handbook of Human Motivation* (pp. 85–107). Oxford: Oxford University Press.

Deterding, S., Dixon, D., Khaled, R., & Nacke, L., (2011). From game design elements to gamefulness: defining "gamification". In A. Lugmayr (Ed.), *Proceedings of the 15th International Academic Mind Trek Conference: Envisioning Future Media Environments, Finland,* 9–15.

DeWitte, S., & Schouwenburg, H. C. (2002). Procrastination, temptations, and incentives: The struggle between the present and the future in procrastinators and the punctual. *European Journal of Personality,* https://doi.org/10.1002/per.461

Dicheva, D., Dichev, C., Agre, G., & Angelova, G. (2015). Gamification in education: A systematic mapping study. *Educational Technology & Society,* 18, 75–88.

Dichev, C., & Dicheva, D. (2017). Gamifying education: what is known, what is believed and what remains uncertain: a critical review. *International Journal of Educational Technology in Higher Education, 14,* https://doi.org/10.1186/s41239-017-0042-5

Ding, L., Kim, C., & Orey, M. (2017). Studies of student engagement in gamified online discussions. *Computers & Education,* http://dx.doi.org/10.1016/j.compedu.2017.06.016

Ding, L., Er, E., & Orey, M. (2018). An exploratory study of student engagement in gamified online discussions. *Computers & Education,* https://doi.org/10.1016/j.compedu.2018.02.007

Edwards, E. A., Lumsden, J., Rivas, C., Steed, L., Edwards, L. A., Thiyagarajan, A. et al. (2016). Gamification for health promotion: systematic review of behaviour change techniques in smartphone apps. *BMJ open,* http://dx.doi.org/10.1136/bmjopen-2016-012447

Farzan, R., & Brusilovsky, P. (2011). Encouraging user participation in a course recommender system: An impact on user behavior, *Computers in Human Behavior,* https://doi.org/10.1016/j.chb.2010.08.005

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*(2), 175–191.

Feldotto, M., John, T., Kundisch, D., Hemsen, P., Klingsieck, K., & Skopalik, A. (2017). Making gamification easy for the professor: Decoupling game and content with the studynow mobile app. In *Proceedings of the 12th International Conference on Design Science Research in Information Systems and Technology* (DESRIST), Karlsruhe, Germany.

Garcia-Marquez, C., & Bauer, K. N. (2021). An examination and extension of the theory of gamified learning: The moderating role of goal orientation. *Simulation & Gaming, 52,* 407–434, https://doi.org/10.1177/1046878120958741

Glöckner-Rist, A., Engberding, M., Höcker, A., & Rist, F. (2014). Prokrastinationsfragebogen für Studierende (PFS). *Zusammenstellung sozialwissenschaftlicher Items und Skalen,* https://doi.org/10.6102/zis140

Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does gamification work? – A literature review of empirical studies on gamification. In Ralph H. Sprague, Jr. (Ed.), *Proceedings of the 47th Hawaii International Conference on System Sciences, USA,* 3025–3034.

Holman, C., Aguilar, S., & Fishman, B. (2013). GradeCraft: what can we learn from a game-inspired learning management system? In D. Suthers, & K. Verbert (Ed.), Proceedings of the *Third International Conference on Learning Analytics and Knowledge, Belgium,* 260–264.

Howell, A. J., & Watson, D. C. (2007). Procrastination: Associations with achievement goal orientation and learning strategies. *Personality and Individual Differences,* https://doi.org/10.1016/j.paid.2006.11.017

Hsin-Yuan Huang, W., & Soman, D. (2013). A practitioner's guide to gamification of education. *Rotman School of Management, University of Toronto.*

Huang, R., Ritzhaupt, A. D., Sommer, M., Zhu, J., Stephen, A., Valle, N., ... & Li, J. (2020). The impact of gamification in educational settings on student learning outcomes: a meta-analysis. *Educational Technology Research and Development, 68,* https://doi.org/10.1007/s11423-020-09807-z

Huotari, K. & Hamari, J. (2012). Defining gamification: a service marketing perspective. In A. Lugmayr (Ed.), *MindTrek '12: Proceedings of the 16th International Academic Mind Trek Conference: Envisioning Future Media Environments, Finland,* https://doi.org/10.1145/2393132.2393137

John, J., Feldotto, M., Hemsen, P., Klingsieck, K., Kundisch, D., & Langendorf, M. (2017). Towards a lean approach to gamifying education. In *Proceedings of the European Conference On Information Systems* (ECIS), Guimarães, Portugal.

Johnson, D., Deterding, S., Kuhn, K. A., Staneva, A., Stoyanov, S., & Hides, L. (2016). Gamification for health and wellbeing: A systematic review of the literature. *Internet interventions,* https://doi.org/10.1016/j.invent.2016.10.002

Karra S., Karampa V., & Paraskeva F. (2019). Gamification design framework based on Self Determination Theory for adult motivation. In L. Uden, D. Liberona, G. Sanchez, & S. Rodríguez-González (Eds.), *Learning Technology for Education Challenges*, 1011, 67–78, https://doi.org/10.1007/978-3-030-20798-4_7

Kim, K. R., & Seo, E. H. (2015). The relationship between procrastination and academic performance: A meta-analysis. *Personality and Individual Differences,* https://doi.org/10.1016/j.paid.2015.02.038

Klingsieck, K. B. (2013). Procrastination: When good things don't come to those who wait. *European Psychologist,* https://doi.org/10.1027/1016-9040/a000138

Klingsieck, K. B., & Fries, S. (2012). Allgemeine Prokrastination: Entwicklung und Validierung einer deutschsprachigen Kurzskala der General Procrastination Scale (Lay, 1986). *Diagnostica*, https://doi.org/10.1026/0012-1924/a000060

Koo, M., & Fishbach, A. (2012). The small-area hypothesis: Effects of progress monitoring on goal adherence. *Journal of Consumer Research,* https://doi.org/10.1086/663827

Krampen, G. (2008). Systematic self-monitoring and reflection of health behavior in widely differing preventive settings. *Swiss Journal of Psychology*, https://doi.org/10.1024/1421–0185.67.4.205

Kundisch, D., & von Rechenberg, T. (2017). Does the framing of progress towards virtual rewards matter? Empirical evidence from an online community. *Business & Information Systems Engineering*, https://doi.org/10.1007/s12599-016-0441-5

Liu, D., Santhanam, R., & Webster, J. (2017). Toward meaningful engagement: A framework for design and research of gamified information systems. *MIS Quarterly*, https://doi.org/10.25300/MISQ/2017/41.4.01

Minkman, E., Rutten, M. M., & van der Sanden, M. C. (2016). Acceptance of mobile technology for citizen science in water resource management. *Journal of Irrigation and Drainage Engineering*, https://doi.org/10.1061/(ASCE)IR.1943-4774.0001043

Morrison, B., & DiSalvo, B. (2014). Khan academy gamifies computer science. In J. D. Dougherty, & K. Nagel (Ed.), *Proceedings of the 45th ACM Technical Symposium on Computer Science Education, USA,* 39–44.

Ofosu-Ampong, K. (2020). The shift to gamification in education: A review on dominant Issues. *Journal of Educational Technology Systems*, *49*, https://doi.org/10.1177/0047239520917629

Olsson, M., Mozelius, P., & Collin, J. (2015). Visualisation and gamification of e-Learning and programming education. *Electronic Journal of E-Learning, 13*, 452–465.

Patzelt, J. & Opitz, I. (2014). Deutsche Version des Academic Procrastination State Inventory (APSI-d). *Zusammenstellung sozialwissenschaftlicher Items und Skalen*, https://doi.org/10.6102/zis139

Randolph, J. J., Falbe, K., Kureethara Manuel, A., & Balloun, J. L. (2014). A step-by-step guide to propensity score matching in R. *Practical Assessment, Research & Evaluation, 19*(18), 1–6.

Rosenthal, R. (1979). The file drawer problem and tolerance for null results. *Psychological bulletin*, *86*(3), 638–641.

Rothblum, E. D., Solomon, L. J., & Murakami, J. (1986). Affective, cognitive, and behavioral differences between high and low procrastinators. *Journal of Counseling Psychology,* https://doi.org/10.1037/0022-0167.33.4.387

Sailer, M., Hense, J. U., Mayr, S. K., & Mandl, H. (2017). How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction. *Computers in Human Behavior*, https://doi.org/10.1016/j.chb.2016.12.033

Sailer, M., & Homner, L. (2020). The gamification of learning: A meta-analysis. *Educational Psychology Review*, https://doi.org/10.1007/s10648-019-09498-w

Seaborn, K., & Fels, D. I. (2015). Gamification in theory and action: A survey. *International Journal of Human-Computer Studies*, https://doi.org/10.1016/j.ijhcs.2014.09.006

Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin,* https://doi.org/10.1037/0033-2909.133.1.65

Steel, P., & Klingsieck, K. B. (2016). Academic procrastination: Psychological antecedents revisited. Australian Psychologist, https://doi.org/10.1111/ap.12173

Tice, D. M., & Baumeister, R. F. (1997). Longitudinal study of procrastination, performance, stress, and health: The costs and benefits of dawdling. *Psychological Science,* https://doi.org/10.1111/j.1467-9280.1997.tb00460.x

van Eerde, W., & Klingsieck, K. B. (2018). Overcoming procrastination? A meta-analysis of intervention studies. *Educational Research Review*, https://doi.org/10.1016/j.edurev.2018.09.002

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on 435 interventions. *Decision Sciences*, https://doi.org/10.1111/j.1540-5915.2008.00192.x

Warmelink, H., Koivisto, J., Mayer, I., Vesa, M., & Hamari, J. (2018). Gamification of the work floor: A literature review of gamifying production and logistics operations. In T. Bui (Ed.) *Proceedings of the 51th Hawaii International Conference on System Sciences, USA,* 1108–1117.

Zainuddin, Z., Chu, S. K. W., Shujahat, M., & Perera, C. J. (2020). The impact of gamification on learning and instruction: A systematic review of empirical evidence. *Educational Research Review*, https://doi.org/10.1016/j.edurev.2020.100326

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Ed.), *Handbook of self-regulation* (pp. 13–39). Academic Press.

Zimmerman, B. J., & Paulsen, A. S. (1995). Self-monitoring during collegiate studying: An invaluable tool for academic self-regulation. *New directions for teaching and learning*, https://doi.org/10.1002/tl.37219956305

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