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# Academic procrastination by design: an exploration of challenges and coping strategies for educators and design students

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**Abstract**
The nature of designing and the professional characteristics of many student designers leave them vulnerable to the delay of tasks and decisions, known as procrastination, which is not addressed in literature. Procrastination is defined as the voluntary delay or inability to complete a task or make a decision that will knowingly lead to a detrimental outcome. A questionnaire about the frequency, form of procrastination, and influences on behaviour when trying to undertake stages of a design process was completed by 146 students and 9 staff within a UK design and creative arts school. Over 45% of students indicated they would 'walk away' from tasks, chronic procrastination, due to lack of confidence or too many tasks to complete at the same time, with over 75% being distracted from a design task every week. The 80% total of the student group who indicated they procrastinated matched with similar student-based surveys, but the level of chronic procrastination was higher in this survey. Student respondents highlighted the lack of discussion about procrastination nor advice on coping strategies. Activities to reduce the effects of procrastination were: 1) prioritise tasks; and 2) reduce complexity of each task. Additional support included: development of professional self-confidence; ensuring students understand a given task, how to address and complete it; realistic goal planning; minimising external distraction; working in study groups; developing virtuous routines at optimal times during the day for themselves; and use of technology to optimise self-regulation. Online resources were produced to support students and educators address these challenges.

**Keywords** Design process · Procrastination · Design education · Well-being

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This exploratory study originated in one of the authors need to address their own issue with procrastination. Defining their reaction when faced with complex or difficult tasks as those associated with procrastination made the author realise many of their own actions mirrored those of students they taught. Academic procrastination had not been previously discussed by the author with other colleagues in their faculty, with an assumption that design students appeared to be 'poor time mangers' when completing given design tasks. Training sessions and resources had been made available to design students over several years without any noticeable effect on grades or completion rates of given projects. Design practice modules and programmes had been simplified to reduce complexity of time management. However, the issue of leaving assignments to 'the last minute' to complete was still evident from many design-practice based submissions reviewed by this author. There was also a notable level of student support services involvement related to issues of stress and well-being that were consistent over many years despite measures to address them that aligned with comments across the sector via national student surveys. Through discussion with colleagues, the issue of procrastination by design students was seen as needing further exploration. It was the authors assertion that student and practicing designers and creatives were more vulnerable to procrastination due to the nature of decision-making based on ill-defined problems, and limited experience of research training. Tacit knowledge suggested there was a larger proportion of the population of student creatives and designers who had a range of societal-constructed barriers associated with dyslexia, dyspraxia and attention-deficit hyperactivity disorder, ADHD. Dyslexia is often associated with creative activity (Eide and Eide, 2023), which is a condition that may further compound a student designer's vulnerability to procrastination.

The aim of this exploratory study was to provide evidence of the scale and frequency of procrastination with a student design population, the nature or form of the phenomena, and recommendations on how it may be addressed.

The objectives of the study were to: 1) review existing knowledge relating to procrastination and how it may affect design students; 2) Visualise a theoretical model of how procrastination occurs; 3) review experiences of procrastination with design students; and, 4) provide optimum coping strategies suitable for design students.

To better understand the phenomena, and associated drivers for behaviours, the authors completed a literature review before undertaking a survey questionnaire with students and staff within a Faculty of Design and Creative Arts. The outcome of the review and survey are documented later in this communication, with suggested approach and techniques to minimise the effect of procrastination for design students.

The focus of the literature review was on the mechanisms of procrastination and the definition of characteristics often associated with creative artists and designers that make them vulnerable to this behaviour. Solutions to the highlighted challenges of academic procrastination were also reviewed. Keywords used within Google Scholar, World Catalogue, and Articles Plus search engines for the review included: Procrastination, self-regulatory failure, design and creative. No limit was placed on the age of the articles to be used to capture early definitions and their evolution. A review of textbooks, articles, and blogs was competed to provide additional information current available. Online resources were also identified as providing additional support to the advice given in this article. Titles of articles and abstracts were used as part of the selection process, to reduce the number of items for reference in the review. Over 150 articles, websites and books were identified. There were limited citations pre-1980. The description of procrastination and associated terms were based around the meta-analysis articles from

Lay (1987), Steel (2007), and Rozental and Carlbring (2014), augmented by Ãskaree et al. (2025), Jin (2025), and Maisel et al. (2023).

Procrastination is the action of unnecessarily and voluntarily delaying or postponing something despite knowing that there will be negative consequences for doing so (Steel, 2006). Lay defines procrastination in two categories, cognitive 'postponing of decisions' and behaviour of 'not doing what was intended'. Other studies have classified this delay as a self-regulatory failure (Hong et al., 2021), or irrational thinking (Bridges & Roig, 1997). Procrastination is well known within organisations, a general population (Klingsieck, 2013), and marketing (Xiao & Spanjol, 2021). It is also linked to reduction in prospective memory function (Zuber et al., 2021) with chronic cases associated with stress, anxiety, and depression (Sirois, 2016). Pollack and Herres (2020) highlighted the generation of negative emotions in subsequent days following experiencing the phenomena of procrastination. In his book, 'The procrastination equation', Steel suggests 95% of a general population have admitted to procrastinating from his meta-analysis of available studies, with 20% considered chronic procrastinators. Procrastination in academia is prominent both within students and staff (Asio, 2021). Steel (2007) highlighted that 80%−90% of US College students engaged in procrastination. Academic procrastination has been demonstrated to have a negative effect on student grades (Gareau et al., 2019; Olí, 2025). Gayary and Kalita (2025) also found no discernible difference in levels of female and male procrastination in contrast to earlier studies that suggest males were more likely to procrastinate. There were no United Kingdom based studies found against which to make a comparison.

Studies have defined categories of procrastinators as optimistic, pessimistic, and a third category of those who miss deadlines. (Lay, 1988; McCown et al., 1989; McCown & Johnson, 1991; Milgram & Naaman, 1996; Rahimi, 2023). Optimistic procrastinators put off or delay their intentions but do not worry about the consequence. They are confident of ultimate success, regardless of engagement in an intended action; and overestimate progress and potential for succeed and underestimate the time needed to achieve their goal. Pessimistic procrastinators are aware of and worry about their dilatory behaviour. This group still procrastinate because they are unsure how to address the task. A student may experience cognitive stress when learning or reframing their previous constructs, or building new ones, when applying a new process or skill set. not understanding the task to be completed; being given a task without adequate explanation of its importance, or its value; boredom and or lack of challenge; and or a lack of acknowledgement given to the individual for completing a task. In some cases, this may result in rebellious or stubborn behaviour of increasing procrastination. (Milgram et al., 1992) Additional internal actors include personal confidence and or professional confidence in their competency, e.g., 'Can I do this?', (Harrington, 2000) They may feel incompetent and are afraid of being found out, which is imposter syndrome (Clance & Imes, 1978) resulting in feelings of guilt, decreased well-being, poorer mental health, lower performance, and even financial difficulties. They procrastinate to avoid such unpleasant experiences. Klingsieck (2013) highlighted the association between delay and distress caused. Flett et al. (1995) suggest the difference between the two types may be their degree of adaptiveness. Whilst procrastination appears related to several psychopathological symptoms these are mainly associated with pessimistic procrastinators. Studies suggest optimistic procrastinators cope better with this phenomenon. (Ferrari et al., 1995).

Studies have identified a third group of people who fail to meet deadlines (Depreeuw and Neve, 2019). The main difference in this group is that they do not formulate intentions and so do not postpone them, which means they are not procrastinators as defined by Steel or Lay's definition. There are other studies that suggest that in some cases deliberate delay

aligned with procrastination is associated with 'thrill-seeking' (Grunschel et al., 2013). The positive emotion of 'eustress' (Selye, 1956) associated with delay has been challenged by some researchers who do not categorise this form of behaviour as procrastination, as it does not appear to have the negative affect on performance (Dewitte & Lens, 1999; Pinxten et al., 2019). These two groups of people will not be considered in this article.

External actors that influence cognitive process and behaviours may come from many sources that result in dilatory outcome. Dewitte and Lens (2000) define action identity and performance, an individual's awareness of what they are doing, and level of action identity as a high level (general) and low level (specific) task (Dewitte & Lens, 2000). Their definition led to identifying optimistic procrastinators as high-level action identities with a lack of ability to evaluate when a goal has been researched nor effectively estimate progress relative to the time left to achieve it, resulting in underestimation even though they also use low-level actions to complete some detailed tasks. Pessimistic procrastinators may also over-emphasise the importance of a failure at a detail level, associating it with the failure of the whole action. Focusing on detail also makes time estimation difficult for this group, as it appears to go more quickly; and, difficulty in judging progress towards the overall goal. This undermines their self-confidence, as defined earlier, resulting in a tendency to overestimate time needed for a task. This group have been identified as having high levels of test anxiety that damages their motivation and persistence (Depreeuw & De Neve, 2019).

Maladaptive perfectionism has also been associated with this phenomenon, how it affects individuals at different times during a period of academic procrastination, and their resulting grades (Rice et al., 2012). Using data mining techniques Hooshyar et al. (2019) demonstrated they could predict academic grade outcome based on time periods between student engagement with online teaching resources, which they associated with procrastination.

Steel and Konig offer a compelling description of the elements of procrastination or self-regulatory failure under the title of Temporal Motivation Theory, TMT (Steel & Konig, 2006). Steel goes on in later articles and his book to provide a concise description of the elements of procrastination. The elements of procrastination are in two parts. The positive components (1) are expectancy, what is the perceived outcome of an action, its value and or reward. The second negative components (2) are impulsiveness and delay. The TMT formula suggests the motivation to do an action (expectancy and value), are directly influenced by the level of self-regulation of the individual and length of delay of a reward. The more impulsive the characteristics of the individual and the longer the delay in reward, the more likely procrastination to occur. The release of dopamine into the brain as part of 'reward' has been well documented within the field of psychology. Short-term reward is part of TMT. Online visceral stimuli, such as multi-media, social networks, and gaming provide instant 'highs' of dopamine release. When addressing motivation, Kim and Kankanhalli (2009) suggest that 'status quo' may have an influence on the motivation to undertake a task or decision-making. The motivation to choose a short-term reward over a potential larger reward in the future has been documented.

Compounding issues such as Dyslexia and Attention-deficit hyperactivity disorder, ADHD, add to the challenge of and demotivation to learn new skills or knowledge. From some of the authors' own experiences and tacit knowledge, students defer to known or default experience and seek instant reward activities such as gaming watching films, or online socialising. This view is supported by other studies, (Sirois, 2022; Irman et al., 2025; Fuentes Chavez, 2025). Tolani and Venkatesan (2025) highlight time blindness as a form of "temporal myopia" associated with ADHD that impairs an individual's ability to judge how long a task may take along with a diminished recognition of past or future.

Hen and Goroshit (2014) highlighted students with learning difficulties demonstrated a higher level of procrastination than students without learning difficulties. The authors could not find any evidence or studies to indicate the ratio of students with learning difficulties in creative arts and design compared with those studying other subjects. However, there are more recent studies that suggest 'positive' procrastination can benefit a creative outcome through additional 'incubation' time (Shin & Grant, 2021).

The available articles and textbooks provide a range of characteristic forms of procrastination, but do not appear to prioritise them. Maisel and Monk (2023) used the example of an artist to explain 12 reasons for not completing a painting: 1) Not matching the original vision, 2) 'hard bits won't come', 3) fear of it not being their best idea, 4) Appraising (judging) would have to being, 5) lack of a 'completion list' (when it is 'good enough'), 6) Doubts (confidence), 7) What and how much to reveal (of themselves) in the artwork, 8) when is it complete?, 9) fear of losing your happy place, 10) Not ready to repeat the process, 11) Potentially experiencing criticism, silence, and rejection, 12) Not wanting to sell their work and experiencing further criticism, silence, and rejection (others not valuing their work). Their book highlights the specific additional vulnerability of creative artists and designers to procrastination due to their strong link between the value of their work and themselves as professionals and individuals. Creative artists and designers often bring personal values to their decision-making resulting in a perception 'the design or artwork is me.' This is supported by Fiore (2007).

The issue of learning difficulties resulting from social constructs, such as dyslexia or dyspraxia, align with the discussion of visceral reward mentioned earlier in the review. For example, if a creative arts or design student is asked to review information in a text-only format, without an evocative multi-media format alternative, it may reduce their motivation to complete the task. Reduction of motivation may be compounded through not having a clear understanding of the assignment purpose, or a multi-component coursework submission only assessed at the end of an academic year. Ultimately, this may lead to students seeking alternative sources of visceral, instant reward. Table 1 provides a summary of characteristics.

Based on the literature, there appears two major groups of procrastination: a) alternative activities or distractions, e.g. playing video games, house cleaning (cognitive postponement); and, b) no action at all, e.g. going back to bed and not engaging with any activity (not doing behaviour). The latter is more of a concern as it would appear to be the more severe maladapted behaviour, which could lead to issues of well-being such as anxiety and depression highlighted in the description of a pessimistic procrastinator.

Figure 1 provides a summarised visualisation of a temporal procrastination process. The horizontal lines above and below the main symbols indicate when a choice has been made to do either an alternative task or not to engage. To arrows pointing right indicate flow and progression of tasks. Arrows pointing left indicate resistance to flow. This may be internal or external distractors, such as value of task, time delay before reward, level of impulsiveness felt by the individual. At this point influences may include, self-confidence, understanding for the task, self-worth. The block indicates the challenges to flow generating resistance that could result in a choice to procrastinate. Key points within the timeline are increase in number of tasks and complexity of tasks. The vertical arrows pointing upward indicate the choice to disengage, the vertical arrows pointing downward indicate a choice to do an alternative task. The outer envelope indicates other factors such as intrinsic characteristics of an individual and external effects on them that influence their choices.

Solutions or coping strategies have been suggested for the elements of procrastination. Table 2 provides a summary of existing strategies published in Journals. Goal Setting Theory of Motivation is relevant here, as it is a psychological research-based theory of

**Table 1** Characteristics of the phenomena procrastination

| | |
|---|---|
| Procrastination action of unnecessarily and voluntarily delaying or postponing something despite knowing that there will be negative consequences for doing so | Steel, 2007 |
| Temporal Motivation Theory, TMT, motivation-(expectation and reward), self-regulation, delay duration to reward | Steel & Konig, 2006, p. 890 |
| Self-regulatory failure | Hong et al., 2021; Gayary & Kalita, 2025; Olí, 2025 |
| Reduction in prospective memory function | Zuber et al., 2021 |
| Irrational thinking | Bridges & Roig, 1997 |
| Optimistic procrastinator, overestimates progress and has a belief they will successfully complete | Milgram et al., 1992:124 |
| Pessimistic procrastinator, aware of behaviour | Lay, 1987; Lay, 1992 |
| Level of action identity | Flett et al., 1995; Dewitte & Lens, 1999 |
| Generation of negative emotions, chronic cases associated with stress, anxiety, and depression | Pollack & Herres, 2020; Sirois & Pychl, 2016 |
| Connection between delay and distress | Klingsieck, 2013 |
| Maladaptive perfectionism | Rice et al., 2012 |
| Lack of confidence in competency, lack of understanding of task or its value | Harrington, 2000; Fiore, 2007 |
| Relationship between engagement with online resources vs social media and grade | Hooshyar et al., 2019; Ṣetiawan et al., 2025; Fuentes Chavez et al., 2025; Āskaree et al., 2025; Imran et al., 2025 |
| Short-term reward over a potential larger future reward, lack of acknowledgement of completing the task | Kim & Kankanhalli, 2009; Milgram & Naaman, 1996; Eysenck, 1997 |
| Compounding issues dyslexia, dyspraxia, attention-deficit hyperactivity disorder (ADHD), higher levels of procrastination | Hen & Goroshit, 2014; Williams, 2024; Sirois, 2022 |

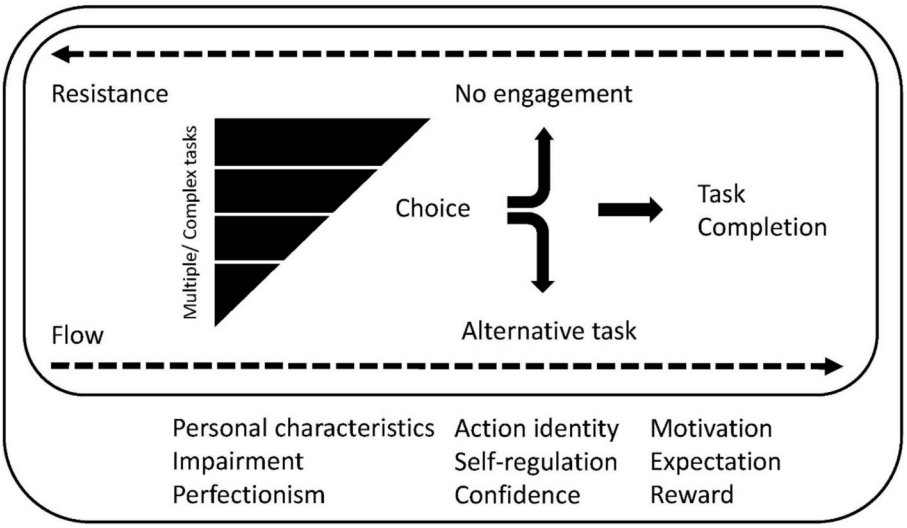



**Fig. 1** Shows the visualisation of a procrastination process

**Table 2** Proposed solutions and coping strategies to address procrastination

| | |
|---|---|
| **Awareness:** Transtheoretical model (TTM) | O'Brien, 2000 |
| Acceptance-based behaviour therapies, Counselling | Glick & Orsillo, 2015; Sidiq & Awalya, 2020; Jin, 2025; Fiore, 2007; Myers et al., 2022 |
| **Overcoming inertia:** Group support | Zhao et al., 2021; Chen & Chang 2016 |
| Attaining eustress or flow | Steel, 2007; Rozental & Carlbring, 2014; Csikszentmihalyi, 1975, p. 10; Csikszentmihalyi, et al.,2014; Biasutti, 2011 |
| Self-regulation | Tuckman, 2005, Hong et al., 2021, Wong et al. 2019, Gareau et al., 2019, Xu & Qiu 2021, Andreae et al. 2019, Park & Sperling, 2012, Zhao et al., 2021, Myers et al., 2022 |
| Process focus | Krause & Freund, 2016; Jin, 2025; Maisel & Monk, 2023; Williams, 2024 |
| Time management | Peirro et al., 2011; Lu et al., 2014; Martin et al., 2015; AlJarrah et al., 2018; Hafner, 2014, |
| Goal setting | Kaftan & Freund, 2019; Steel et al. 2018; Stewart et al. 2016; Setiawan & Sari, 2025 |
| Study contracting | Sidiq, 2020; Lamwers & Jazwinski, 1989 |
| Threat | Bui, 2007 |
| Reward | Ferrari & Scher, 1995 |
| Sleep regulation | Valshtein et al. 2020 |
| Goal development | Kaftan & Freund, 2019; Steel et al. 2018; Stewart et al. 2016 |
| **Building self-confidence:** | Visser et al., 2017; Zhang et al., 2017 |
| Theory of Motivation | Locke & Latham, 1990 |
| Enhancing motivation | Harandi, 2015; Gebara, 2010; Pereira, 2025 |
| Understanding a brief, 'satisficing' | Ball et al., 2001 |
| Knowledge and strategies to solve ill-defined problems | Schraw, 1995; Klein & Weitzenfeld, 1978; Setamaa-Hakkarainen, 2000; Nagai & Noguchi, 2003 |

how to increase productivity and motivation., (Locke & Latham, 1990). It involves setting specific goals and receiving regular feedback on progress. It is based on the notion that people's goal and intentions play an important role in determining behaviour. The theory outlines 5 key principles of goal setting: clarity, challenge, task complexity, feedback, and commitment. (Klotz et al., 2012) Attaining a form of eustress and or flow may also minimise procrastination. Meta studies suggest that once the inertia of engaging with a task has been overcome, procrastination is rapidly reduced. (Rozental & Carlbring, 2014; Steel, 2007).

Flow state refers to a state of mind that brings together cognitive, physiological, and affective aspects (Csikszentmihalyi, 1975; Csikszentmihalyi et al., 2014; Biasutti, 2011). Flow state is characterised by a complete absorption in an activity, usually enjoyable, resulting in a change in the individual's sense of time. E.g. 'where did the time go?'. When considering complexity of a creative art or design task, students are often asked to address novel and complex problems that require decision-making at multiple levels that are ill-defined and rely on a range of cognitive processes to solve them. For this reason, procrastination may be reduced if more knowledge and strategies are provided to solve ill-defined

problems (Schraw, 1995; Klein & Weitzenfeld, 1978; Setamaa & Hakkarainen, 2000). In addition, understanding a brief, associated specification and the standard of work required is essential to avoiding perfectionism and applying a principle of 'sufficing. Sufficing is doing something adequately, just enough. Every design project is constrained by time and resource and so will always be 'sufficient' not perfection.

Generic scales to indicate levels of procrastination exist, such as the Pure Procrastination Scale and Irrational Procrastination scale (Svartdal, 2017), but the lack of specific studies focused on creative artists and designers suggested that matching this group to other larger populations of procrastinators would not be helpful in understanding the specific needs of a student designer. As no published survey had been found specifically addressing procrastination by creative arts or design students a questionnaire survey was completed with a sample population within a school of design and creative arts. The aim of the survey was to provide insights to focus and prioritise the application of available coping strategies to the phenomena of procrastination for design and creative art students.

The research questions were: 1) the scale of procrastination within the student cohort; 2) what form of procrastination was most frequent, e.g. alternative tasks, non-engagement; 3) the actors influencing behaviours; and, 4) what did respondents think were important aspects of procrastination to address?

## Method

### Participants

An online questionnaire survey was sent to staff and students (undergraduate and postgraduate) within a school of design and creative arts, with a total staff and student population of over 2000. There were no incentives offered to take part in the survey. The inclusion of design staff was to capture as many different viewpoints on procrastination as possible at this early stage. The assertion was that staff would not raise any different issues to students but may have some additional coping strategies.

Ethical approval was obtained for the survey prior to publication (Loughborough University Ethics approval ID: 7529). The web-based Online Surveys software was used to compile the questionnaire, (Online Surveys, 2022). The online questionnaire was considered to follow a grounded theory approach to scope the issues of procrastination.

### Design

A conventional questionnaire structure was used for the participant information and consent documents. A definition of procrastination was given in the survey introduction, along with details of aim and objectives for the study and how the information from participants would be used. There were ten questions, the first six characterised the respondent, e.g. age, health conditions, and experience of design. The question related to health condition and wellbeing was associated with known socially constructed impairments. Phrasing for questions about gender, health and welfare were considered before survey publication. A list of the questions is shown in Table 3. The full survey document is available to review, (Torrens, 2024). Question 3. was configured using age brackets: 18-19yrs old, 20-24yrs old, and then in multiples of ten years, up to 95 yrs old. Question 4. Listed dyslexia, dyspraxia, dyscalculia, Attention deficit hyperactivity disorder, Anxiety, Depression, None, and

**Table 3** Online questionnaire structure

| Questions |
|---|
| Unique Response Number |
| Introduction, participant information |
| Consent, confirmation through tick box |
| 1. I consent to take part in the study |
| 2. Please describe your gender? |
| 3. How Old are you? Please choose one of the following: |
| 4. Do you have any of the following conditions? Please choose any of the following: |
| 4.a. If you selected Other, please specify the condition: |
| 5. What is your current role? |
| 5.a. If you selected Other, please specify your current role: |
| 6. How many years' experience do you have of design training or professional practice? |
| 6.a. If you selected Other, please specify your experience: |
| 7. Which design task do you put off and how often? (choose only one answer per row) |
| 8. In what way do you put off a design task and how often? (choose only one answer per row) |
| 9. Which of the following influence your procrastination behaviour? (choose only one answer per row) |
| 10. Based on your experience of procrastination when designing, please tell us what you feel is the most important aspect to address through advice and support |
| Completion and thank you for taking part |
| Date |

'other' with an option to provide information about other associated conditions. Question 5. Listed the options: Between work, Homemaker, Student, Manual worker, Office worker, Manager, retired, and 'other' to specify their role. Question 6. captured the experience of design training and or professional practice. The groupings were: less than 1 year of study to, 1, 2, and 3 years of study; and, 1–3 years, 4–9 years, more than 10 years pf practice. There was an option to indicate 'other' experience, to capture other educational or professional experiences. See Figs. 2, 3 and 4.

Questions 7–9 were designed to capture information relating to frequency of procrastination at stages of a conventional student design project, the form of procrastination, and the influences that motivated either disengagement or alternative activities. The questions mirrored the current understanding of the phenomena and its effect on a general population

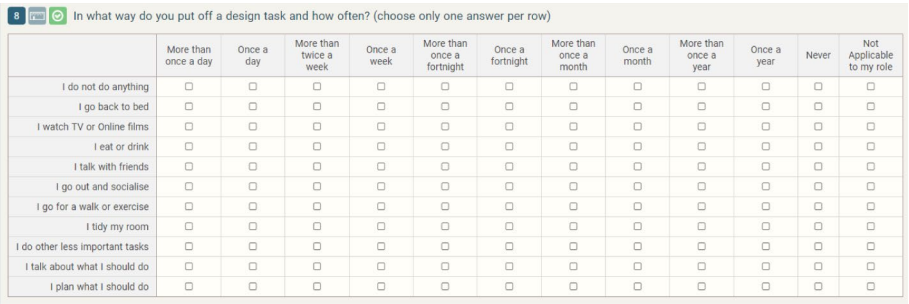
*Question 7 Template.*

7 Which design task do you put off and how often? (choose only one answer per row)

| | More than once a day | Once a day | More than twice a week | Once a week | More than once a fortnight | Once a fortnight | More than once a month | Once a month | More than once a year | Once a year | Never | Not Applicable to my role |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| How often do you put off literature review, reading? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| How often do you put off brand analysis and real-world deconstruction? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| How often do you put off ergonomic evaluation? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| How often do you put off technology review? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| How often do you put off ideation? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| How often do you put off design decision-making? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| How often do you put off making digital prototype versions of your design? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| How often do you put off making physical prototype versions of your design? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| How often do you put off writing reports? | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| How often do you put off completing documents? (e.g. time sheets, attendance, legal) | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**Fig. 2** Question 7 Template

*Question 8. Template*

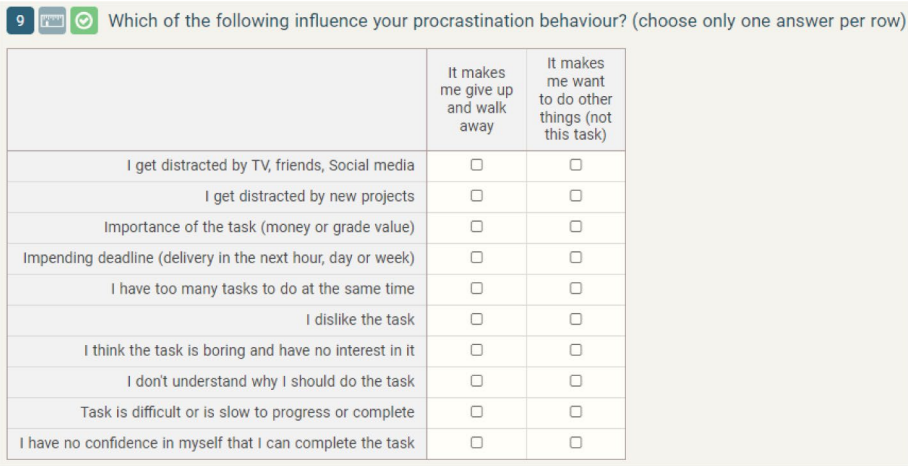


8 In what way do you put off a design task and how often? (choose only one answer per row)

| | More than once a day | Once a day | More than twice a week | Once a week | More than once a fortnight | Once a fortnight | More than once a month | Once a month | More than once a year | Once a year | Never | Not Applicable to my role |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I do not do anything | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| I go back to bed | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| I watch TV or Online films | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| I eat or drink | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| I talk with friends | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| I go out and socialise | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| I go for a walk or exercise | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| I tidy my room | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| I do other less important tasks | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| I talk about what I should do | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| I plan what I should do | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**Fig. 3** Question 8. Template

*Question 9. Template.*



9 Which of the following influence your procrastination behaviour? (choose only one answer per row)

| | It makes me give up and walk away | It makes me want to do other things (not this task) |
|---|---|---|
| I get distracted by TV, friends, Social media | ☐ | ☐ |
| I get distracted by new projects | ☐ | ☐ |
| Importance of the task (money or grade value) | ☐ | ☐ |
| Impending deadline (delivery in the next hour, day or week) | ☐ | ☐ |
| I have too many tasks to do at the same time | ☐ | ☐ |
| I dislike the task | ☐ | ☐ |
| I think the task is boring and have no interest in it | ☐ | ☐ |
| I don't understand why I should do the task | ☐ | ☐ |
| Task is difficult or is slow to progress or complete | ☐ | ☐ |
| I have no confidence in myself that I can complete the task | ☐ | ☐ |

**Fig. 4** Question 9. Template

of students. Using tasks from a conventional student design project provided context for participants and additional insights from the cohort of design and creative arts students.

Question 7. had a series of ten sub-questions relating to tasks often associated with a design project. For each question participants were asked to choose a frequency of putting off that task. The range went from more than once a day to never. There was also an option for respondents to indicate it was not applicable them. This was to capture responses from staff who may have been in administrative roles. (See Fig. 2).

Question 8. had a series of eleven sub-questions to capture the form of procrastination. This included two options that indicated disengagement with everything, e.g. 'I go back to bed'; three, involving tasks not related to work, e.g. 'I eat or drink'; three related to socialising not connected with the work tasks; and, three doing tasks indirectly connected to the work at hand, e.g. 'I talk about what I should do' or ' I do less important tasks'. The same frequency options were used as given in Question 7. (See Fig. 3.)

Question 9. had ten sub-questions to provide insights into the influences on participant's behaviour. Two were related to distraction; one related to perceived value of the work; one, related to the number of tasks to be completed in parallel; two related to their emotional response to the task; one, about their understanding; one related to difficulty and speed of completion; and, one related to their confidence to complete the task effectively. These influences align with the Temporal motivation theory of Steel and Konig discussed in the introduction.

Question 10. was an opportunity for respondents to provide their priority list of support for their needs. Respondents were able write as much as they wanted in a free text box. The written statements were used to cross-reference with each respondent's answers, to provide additional insights and understanding of the phenomena of procrastination as experienced by design and creative arts students.

Validity and standardisation of questions, as advocated by Coolican (2009) and Rust and Golombok (1999), were not checked through a pilot study. This was due to the limited time window of opportunity to access a large number of students and staff to complete the survey within the academic timetable. Time to complete the survey was estimated at ten minutes, dependent on consideration respondents gave on the last question (10) and their written response. The respondent's data was transferred to a secure computer from the Onlinesurveys.com cloud store.

## Scoring

The survey results were imported into the statistical software package IBM SPSS Version 28 for processing and analysis. Responses to questions relating to frequency of procrastination for different tasks, where 11 options were available ranging in increasing frequency from 'Never' to 'More than Once a day', were recoded numerically on a Likert scale of 1 to 11 where 1 represented 'Never' and 11 represented 'More than once a day'. An overall procrastination score was computed for each respondent based upon those tasks most frequently associated with the respondent's role. This was comprised of the sum of scores for each of the activities Literature Review, Ideation, Design Decision Making, Digital Prototyping, Physical Prototyping and Report Writing. A procrastination score was only calculated for respondents where they indicated that the activity to be included in the calculation was a part of their role.

Respondents were able to choose multiple options to the questions 'Do you have any of the following conditions?'. The responses were processed and separated into the overall presence of any condition 'Yes/No' and the presence of each individual condition; Dyslexia, Dyspraxia, Dyscalculia, ADHA, Anxiety and Depression.

The final question (10) required a written response. "Based on your experience of procrastination when designing, please tell us what you feel is the most important aspect to address through advice and support?" The open question was to capture opinions about procrastination and to qualify the answers to the structured questions. Content analysis was initially used to identify the priority order through frequency of comments. Reflexive thematic analysis was then used to capture themes (Bryman, 2004; Braun & Clarke, 2019, pp. 592–595).

The complete set of original data and post-processed outcomes were made available via online repository (Welsh et al., 2024; Torrens et al., 2022).

## Results

One hundred and fifty-five respondents (146 students and 9 staff) completed the online questionnaire that had been emailed request for participants over a two-week period. Due to the small number of responses from staff, the focus of the results presented concerns procrastination among the students (Figs. 5, 6, 7, 8 and Tables 4, 5, 6). Some early indications of differences between students and those with other roles are presented at the end of the results section. Table 4 shows the demographic of the student respondents according to age, self-reported health condition, and years of design experience.

Not all respondents completed the survey fully. Only 99 respondents provided comments in question10. There were 15 incomplete responses within the survey for questions 7 to 9.

All tests for statistical significance had been carried out at the 95% confidence level, a $p$-value $< 0.05$ indicating a significant result. Effect sizes ($r$ and $W$) are calculated for non-parametric tests according to Rosenthal, (1994) and Tomczak, (2014).

In order to answer the question 'Which tasks have higher prevalences of procrastination?' the subjective procrastination responses were analysed for similarity of distribution using Related-Samples Friedman's Two-Way analysis of Variance by Ranks. In-put variables were those most frequently associated with the role of student's (used to calculate the overall procrastination score, see methods section). The test was carried out under the null hypothesis H0: The distributions of Literature Review, Ideation, Design decision-making, Digital prototyping, Physical prototyping, and Report writing are all the same. This showed that the null hypothesis should be rejected ($\chi 2 = 35.1$, $p < 0.001$, $W = 0.07$) indicating significant differences in some of the distributions. The highest mean ranks were observed for the tasks Literature Review and Report Writing indicating that these tasks are associated with a higher prevalence of procrastination. (See Fig. 5). Post-hoc pair-wise

*Comparison of procrastination prevalence (n=103)*

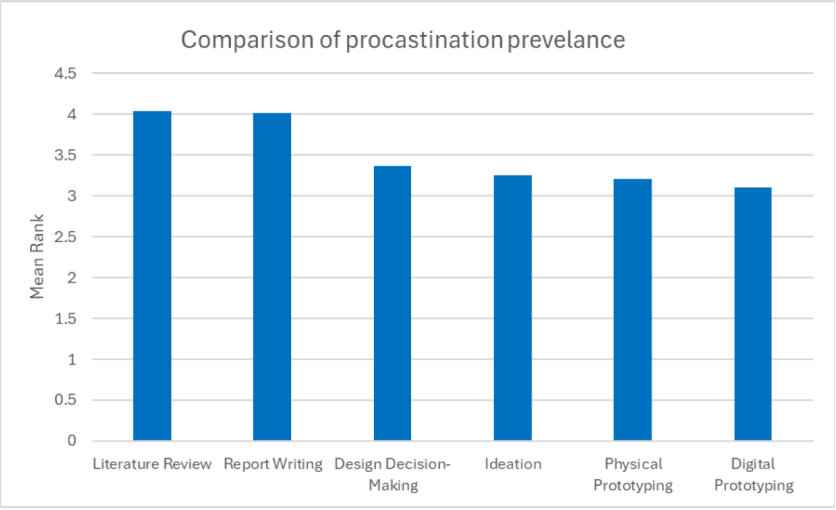



**Fig. 5** Comparison of procrastination prevalence (n = 103)

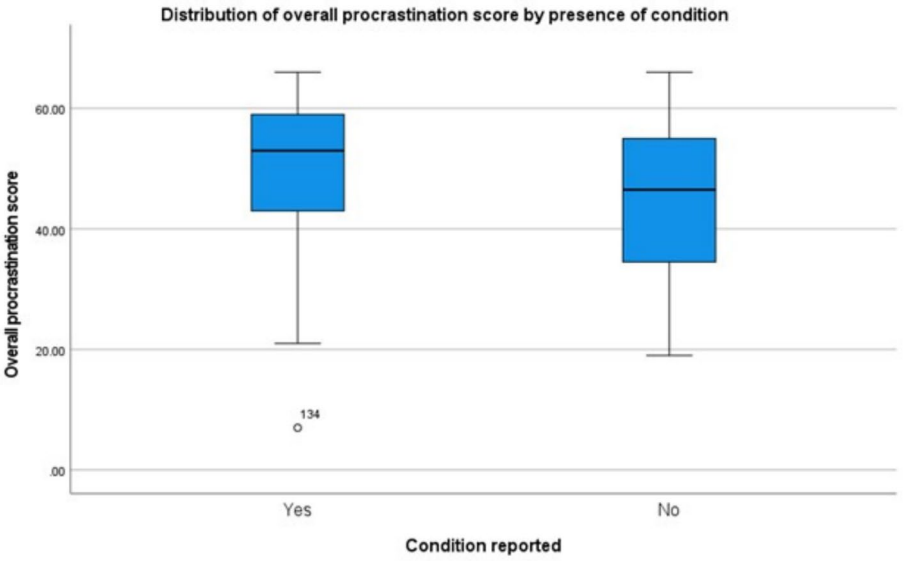



**Fig. 6** Distribution of overall procrastination score by presence of defined medical condition. (n = 103)

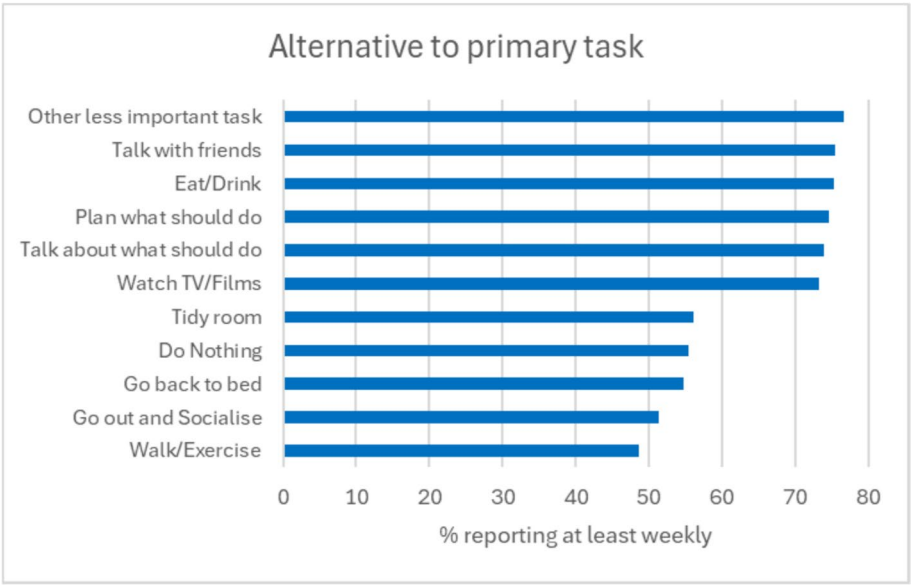



**Fig. 7** Percentage distraction choice as an alternative to primary task reporting "at least weekly" (n = 146)

comparisons, adjusted by the Bonferroni correction for multiple tests, showed some significant differences.

Procrastination was lower for Digital Prototyping than Report Writing ($z = -3.519$, $p = 0.004$, $r = 0.245$, 95% *CI* [0.5,1.0]) and also lower than Literature Review ($z = 3.594$,

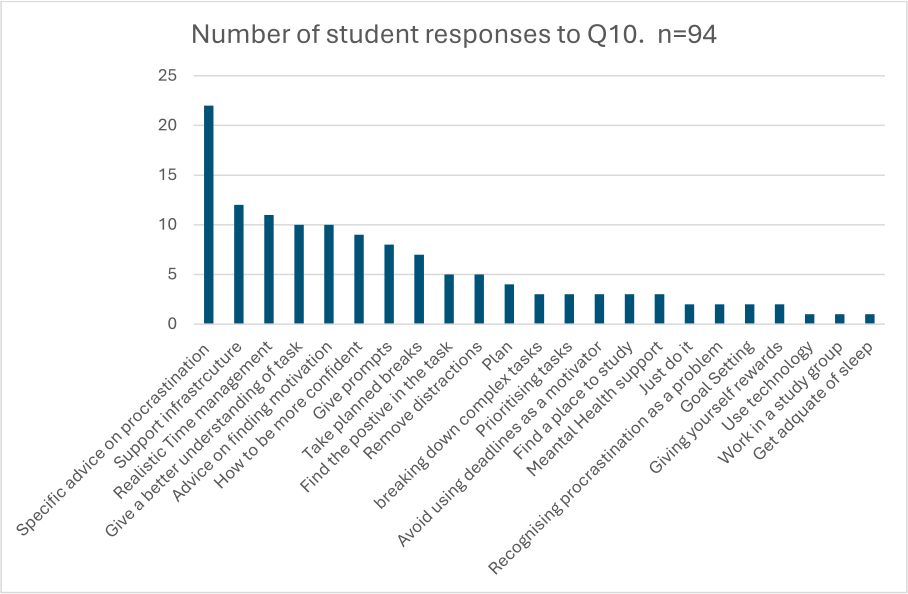



**Fig. 8** Content analysis of frequency of comments made through the written responses to the question 10. (n = 94)

**Table 4** Demographic of student survey respondents n = 146

| Students | | Male ($n$ = 48, 32.9%) | Female ($n$ = 93, 63.7%) | Other ($n$ = 5, 3.4%) | Total ($n$ = 146) |
|---|---|---|---|---|---|
| Age (years) | 18–19 | 16.4% | 24.0% | 2.1% | 42.5% |
| | 20–24 | 13.7% | 32.9% | 1.4% | 47.9% |
| | 25 + | 2.7% | 6.8% | 0.0% | 9.6% |
| | Total | 32.9% | 63.7% | 3.4% | 100.0% |
| Self-reported condition | Yes | 16.4% | 37.0% | 2.7% | 56.2% |
| | No | 16.4% | 26.7% | 0.7% | 43.8% |
| | Total | 32.9% | 63.7% | 3.4% | 100.0% |
| Design experience (years) | < 1 studying | 14.4% | 21.2% | 0.7% | 36.3% |
| | 1–2 studying | 7.5% | 8.2% | 0.7% | 16.4% |
| | > 2 studying | 8.9% | 24.7% | 1.4% | 34.9% |
| | 1–3 practicing | 2.1% | 1.4% | 0.0% | 3.4% |
| | 4 + practicing | 0.0% | 8.2% | 0.0% | 8.2% |
| | Other | 0.0% | 0.0% | 0.7% | 0.7% |
| | Total | 32.9% | 63.7% | 3.4% | 100.0% |

**Table 5** Self-reporting of cognitive impairment and or condition as a percentage of student sample group

| | Dyslexia | Dyspraxia | ADHD | Anxiety | Depression |
|---|---|---|---|---|---|
| % self- reported | 13.7% | 5.5% | 8.9% | 32.9% | 21.2% |

**Table 6** Presents the influencing actor impact for student group as a percentage (n = 146)

| Influencing actor | Give up and walk away | Do other things | Not answered |
|---|---|---|---|
| No confidence in self that task can be completed | 45.9% | 43.2% | 11.0% |
| Too many tasks to do at the same time | 45.9% | 43.8% | 10.3% |
| Dislike the task | 39.7% | 52.1% | 8.2% |
| Don't understand why should do task | 37.0% | 49.3% | 13.7% |
| Task is difficult or slow to progress or complete | 36.3% | 56.8% | 6.8% |
| Task is boring / not interested in it | 34.9% | 55.5% | 9.6% |
| Impending deadline | 32.2% | 51.4% | 16.4% |
| Importance of task (money or grade value) | 30.1% | 56.8% | 13.0% |
| Distracted by TV / friends / social media | 29.5% | 64.4% | 6.2% |
| Distracted by new projects | 18.5% | 73.3% | 8.2% |

$p = 0.003$, $r = 0.250$, 95% *CI* [0.5,1.5]). Physical Prototyping has lower procrastination scores than Report Writing ($z = -3.128$, $p = 0.015$, $r = 0.22$, 95% *CI* [0.5, 1.5]) and Literature Review ($z = 3.203$, $p = 0.011$, $r = 0.22$, 95% *CI* [0.5, 1.5]). Lasty, Ideation shows less procrastination than Report Writing ($z = -2.979$, $p = 0.020$, $r = 0.21$, 95% *CI* [0.5, 1.0]) and Literature Review ($z = 3.054$, $p = 0.015$, $r = 0.21$, 95% *CI* [0.5,1.5]). All other comparisons were non-significant.

The overall procrastination score was then used to establish if gender or presence of a condition relating to neurodiversity or mental health had an impact on prevalence of procrastination. Of the students where it was possible to calculate an overall score ($n = 103$), 60% were female, 37% male and 3% associated as 'non gender specific'. Due to the small number in 'non gender specific, these were excluded from the analysis. In respect of presence of a condition, a higher proportion of students reported the presence of a condition (57%) than not (43%).

For both dependent variables, the calculated procrastination score for each outcome was checked for normality using the Shapiro-Wilks test. Since the data did not follow a normal distribution the non-parametric Mann–Whitney U-test for independent samples was used in this analysis. The results showed no significant difference in overall procrastination according to gender ($z = -0.395$, $p = 0.693$, $r = 0.04$, 95% *CI* [−4.0, 7.0]), but that there is a significant difference in procrastination according to presence of a condition or not ($z = 2.116$, $p = 0.034$, $r = 0.21$, 95% *CI* [−11.0, 0.0]). Those reporting no condition had a lower mean rank (44.8), and therefore showed less procrastination, than those reporting a condition (57.4). A comparison of the distribution of responses is shown in the box plot, see Fig. 6. This shows that although the range of values for those with and without a condition is comparable, the median for those with a condition is higher (53) than for those without a condition (46.5). There is a case that is a suspected outlier, indicating that this person had a particularly low procrastination score compared to all the others who reported a condition.

Due to the significant result with respect to condition, a further analysis was undertaken that considered each condition (except Dyscalculia due to non-occurrence) in relation to each task using Mann–Whitney U-test. For reference, the positive self-reporting rate of each condition is shown in Table 5.

For dyslexia, dyspraxia and anxiety there were no significant differences according to presence of the condition in the prevalence of procrastination for any of the tasks or the overall score.

For ADHD there was a significant difference in the overall procrastination score ($z=-2.124$, $p=0.034$, $r=0.21$, 95% *CI* [0.0,15.0]) with those with ADHD having a higher prevalence of procrastination. Although there were no significant differences for any of the individual tasks comprising the overall score (as listed previously), there were significant differences for Brand Analysis ($z=-2.189$, $p=0.029$, $r=0.20$, 95% CI [0.0, 3.0]), Ergonomic Evaluation ($z=-2.099$, $p=0.036$, $r=0.21$, 95% *CI* [0.0, 3.0]) and Technology Review ($z=-2.910$, $p=0.004$, $r=0.29$, 95% CI [1.0,4.0]). In each case the prevalence of procrastination was higher for those with ADHD.

Depression appeared to have the most wide spread impact on the prevalence of procrastination with a significant increase for those with depression for the overall procrastination score ($z=-2.880$, $p=0.004$, $r=0.28$, 95% *CI* [3.0,14.0]) and for all of the following tasks: Literature Review ($z=-2.30$, $p=0.021$, $r=0.20$, 95% *CI* [0.0, 2.0]), Ergonomic Evaluation ($z=-2.286$, $p=0.022$, $r=0.23$, 95% *CI* [0.0, 2.0]), Technology Review ($z=-2.896$, $p=0.004$, $r=0.29$, 95% *CI* [1.0, 3.0]), Ideation ($z=-2.227$, $p=0.026$, $r=0.19$, 95% *CI* [0.0, 2.0]) and Design Decision-Making ($z=-2.703$, $p=0.007$, $r=0.23$, 95% *CI* [0.0, 2.0]).

On at least a weekly basis, design students are most likely to turn to other less important tasks, such as talking with friends and eating drinking. This is also reflected in the higher percentage reporting at least weekly engagement with talking about, and planning what they should do as well as watching TV or films.

Some of the factors that could impact upon task design task completion were also explored in the survey. For each influencing factor, respondents could answer with either 'It makes me give up and walk away' or 'It makes me want to do other things, not this task'. In the latter, the task referred to is intended as the primary design task. The results are shown in Table 6., ordered high to low according to percentage response for 'give up and walk away'. Out of the factors listed, those that are more likely to result in what could be interpreted as behavioural (give up and walk away) as opposed to cognitive choice (makes me want to do other things) were a) having no confidence in being able to complete the task and b) having too many tasks to complete at the same time.

Figure 8. shows a bar chart of the frequency of comments made through the written responses to the question 10: "Based on your experience of procrastination when designing, please tell us what you feel is the most important aspect to address through advice and support." One hundred students provided a written response. The most frequent comment was for more advice on combating procrastination, (22 respondents). This was followed by additional support infrastructure, (14 respondents). Understanding the task, (12 respondents); realistic time management, (11 respondents); advice on gaining motivation, (10 respondents); being more confident and giving prompts, (9 respondents), were the next most frequently mentioned. Question 10. Also provide a series of insights from written comment that confirmed the lack of awareness and support for procrastination,

Reflexive thematic analysis of the written responses resulted in six themes: 1) planning, task breakdown, setting internal targets and rewards; 2) support and guidance; 3) recognition of challenges; 4) Location and working in groups; 5) motivation and confidence; and, 6) overcoming distractions.

Over 30 respondents indicated they wanted additional support and advice relating to acknowledgement by staff of procrastination beyond time management and saying "don't procrastinate." [ID: 88640512] Respondents highlighted the need for guidance and

strategies for coping with the phenomenon. They also highlighted their feelings anxiousness, of lack of self-worth. "I feel lost and like my ideas are not worthy." [ID: 88794668] Respondents indicated they could be helped through a better understanding of the task being completed, its value to them, enhanced motivation, and when their work was 'good enough'.

There were 7 respondents whose current role was other than student. Of these, 5 reported being an office worker, whilst 2 reported as 'other'. One respondent did not complete survey. The sample size was too small for a statistical analysis; however, some preliminary comparisons were made. In respect of design tasks, those most common to design student were not common among other roles. Literature review, report writing and completing documents had most commonality between both respondent groups. 78.5% of students reported putting off literature review on at least a weekly basis compared to 75% who were not currently students. For report writing 76.2% of students put the task off on at least a weekly basis compared to 62.5% of those who were not students, whilst for completing documents the percentage for students and non-students was similar (66.1% and 66.6% respectively).

When the primary task was replaced by another task, for non-students this was most likely, on at least a weekly basis, to be eating or drinking (77.7%), another less important task (77.7%), planning what should be done (66.6%), talking about what should be done (50%) and walk or exercise (44.4%). Whilst there are some similarities with the alternative tasks undertaken by students, students were more likely to turn to watching TV and talking to friends, whilst non-students were more likely to turn to exercise.

Considering the factors most likely to result in walking away from the primary task, confidence in completing a given task and having too many tasks to complete had the greatest impact, which was also reflected in the results for the students.

## Discussion

A review of literature found some studies focused on designers or creatives, but mainly focused on self-help textbooks. Based on descriptions in the literature of academic procrastination in general, actors affecting procrastination include complexity of task, length of time to reward, status quo, and distractors. Added to these actors are the characteristics of a student that include a lack of understanding of a given task, confidence in their ability to achieve completion, and what are the characteristics of a good result. Compounding actors for design students include ill-defined problems to be solved and trying to achieve perfection. Additional compounding challenges for a proportion of design and creative students include dyslexia, ADHD and other neurodiverse conditions, which affect their ability to interpret information, plan, and time mange. The compounding actors and characteristics are often found within creative arts and design students.

Whilst the respondents self-selected themselves, they represented around 7% of the student population within a school of design and creative arts. The outcomes of the survey shown in Figs. 5–8, Tables 5 and 6, as well as themes and individual comments are aligned with literature. The detail of frequency and nature of individual design student's experience of procrastination appears to suggest an inclination to avoid design activities that do not provide short-term visceral response nor reward. This also is aligned with literature suggesting design students' vulnerability to procrastination. However, it does not show a notable difference between design and students studying other subjects.

There was a notable difference shown in procrastination due to challenges faced by neurodiverse students, but again the evidence and literature do not show a clear indication if this is only true for design students. There appears to be an equal split between optimistic and pessimistic procrastination characteristics within the student population due to the high level of anxiety and other conditions. Planning, task breakdown, setting short targets, working in groups, choosing your location for work, and overcoming distractions were positive measures respondents highlighted. These were highlighted in literature as coping strategies for any student experiencing procrastination. The more concerning comments were related to the lack of staff recognition of procrastination and its effect on academic performance, health and well-being, along with reflections on the support given.

Understanding of and confidence in their ability to complete a given task was frequently rated as key issues in statistical and thematic analysis. These were linked to written research methods, literature review and technical report writing. Historically, there has been a low level of training for designers and creatives in and the understanding of the value of research activities. This suggests practicing designers are likely to be less confident in the application of data gathering, essential to evidence-based design decision-making. The value of having to process data before gaining evidence and insights may not be as clear for a design student as it is for student studying a science. This could lead to impulsive distraction onto other tasks. In addition, self-confidence can be eroded through a lack of understanding of the role of a designer within a new product development, which has been highlighted by Johnson et al., 2019a and may lead to unfair or inappropriate criticism of a designer's contribution within a transdisciplinary team. Designers are required to make multiple decisions that are interconnected, using limited evidence for ill-defined problems, which are open to critical review by a range of professions within a new product development team (Rittel & Webber, 1973; Johnson et al., 2019b). A lack of professional and personal confidence has been highlighted in the literature as a contributing actor in procrastination. (De la Fuente et al., 2021, p. 18) A theme of lacking confidence and or professional self-worth was highlight in Table 4. and through frequency of comment in Fig. 8.

The most concerning issue was that of disengagement of over 45% of the respondents on such a frequent basis, i.e. "not doing anything" between 'more than once a fortnight' to 'more than once a day'. Disengagement suggests chronic procrastination that may lead to malformed behaviours and issues with long-term health and wellbeing, for which there is supporting evidence in the literature review from Rice, Pollack and Herres, Sirois and Pychl. Tim Urban (2016) discusses the "long-term pain suffered by academic researchers" in his TED talk. The loss of so many hours and days in progressing a design activity may also influence respondents feeling of a lack of confidence in their professional abilities. This is well documented in the literature as described by Steel, Rozental and Carlbring, Pinxten et al., and Rice. Distractions, such as a new project, result in other tasks being prioritised over the task being completed. However, distractions do not appear to overwhelm the respondents enough to disengage completely with all tasks, suggesting 'optimistic procrastination'. There may also be environmental actors inducing the feeling of 'being overwhelmed' and of others setting priorities that affect the behaviour of the participants in ways that are presented as procrastination. For example, while showing behaviours common to Health and Safety practice around stress: e.g., deadlines for exams that are common to staff and students causing a shift from a pattern of working to a pattern of procrastination, (HSE, 2022). The delay in reward along with a lack of the value of a task are stated as influences within Steel's TMT formula. The issue of delayed of reward was

highlighted by several respondents. Six respondents stated that acknowledgement and discussion of procrastination should be included within academic design training.

The following recommendations are based on the outcomes of survey, linked to supporting literature.

Providing awareness and support in an accessible format is the most important challenge for academic design staff. In his TED talk, Urban provided an accessible and evocative version of Steel's TMT formula, calling the different cognitive processes 'the rational decision-maker', 'instant gratification monkey', and 'the panic monster'. He highlighted that those working in the creative industry, entrepreneurs, and those doing tasks towards a greater goal without instant reward suffered more due to the lack of imminent or close deadlines. The 'panic monster' of imminent deadline was not motivating action, nor was there any instant gratification in the immediate future from the task at hand, resulting in a vulnerability to procrastination and control being given to the 'instant gratification monkey' (Urban, 2016).

Conducting trial and error or 'practice-based' realisation of problems and 'new learning through doing' may provide a perception of instant result and more immediate reward. The characteristics of design related tasks are that they provide some instant visceral reward from the creation or realisation of artifacts, media or concepts through words, iconography, line, form, colour, texture, or interaction, even if incomplete. Most of these outcomes are evocative stimuli associated with reward and dopamine release resulting in gratification. There is a consensus within the psychology community that dopamine release is associated with reward, with its highest release when stimulated by an 'unexpected reward' (Eysenck, 1997). This has been put forward as the basis for addictive behaviour or a lack of motivation when dopamine release is not present (Di Chiara & Bassareo, 2007). Undertaking learning or research activities that include the instant reward of dopamine release may provide motivation for a design student to continue.

Resources have been produced to help address some of the challenges of academic procrastination by student designers', (Torrens & Downs, 2024; Downs & Torrens, 2024; Usability-NET, 2025), which provide advice and signposting to other resources. (Krcmar & Horsman, 2014). The advice notes are based around addressing two key challenges: 1) prioritising tasks; and, 2) reducing the complexity of a chosen task. The resources have been made appealing and evocative for students. The resources include:

a) Procrastination 'hack', a list of suggested actions and signposting to other resources to help cope with aspects of the phenomenon of procrastination.
b) An Adobe Acrobat document displaying a summary list of similar advice in a poster format.
c) A short video presenting the phenomenon of procrastination.

Online resources produced by Steel and Vermeer are readily accessible for students and staff (Procrastinus, 2025; Vermeer, 2022). The resources also provide some suggestions for academics to help develop their own resources and approaches to presentation of taught material that may help students reduce their procrastination. (Meng et al 2025). Self-help books have also been highlighted alongside multi-media alternatives, such as YouTube.

## Conclusion

Acknowledgements of the phenomenon of procrastination requires design educators to be aware and discuss the specific challenges for design students when completing a design project. The approach is based on a convention of cognitive behavioural therapy: a) externalising issues, raising awareness of problems; b) provide choices and options for change; and, c) monitor and reflect on virtuous, positive behaviours.

Procrastination, and how to address its consequences, should be an essential discussion for any new design students. It would highlight the hidden challenges of professional confidence, self-regulation and time management as well as ensuring a good start for long-term health and well-being. For those students already experienced in a design process, integrating specific advice on how to manage multiple complex tasks may be important. A Design thinking approach offers some insights into how a balance may be achieved. (Nagai & Noguchi, 2003). Making students aware of procrastination and how they may be affected will be a useful start towards an on-going two-way conversation that should open into a discussion about understanding of the course content and time required to achieve specific milestones or academic goals. An umbrella term now commonly used for this methodology, is a dialogic approach. (Alexander, 2020).

The insights and literature given in this study provide an opportunity for educators to match the learning characteristics of design students to modified teaching styles, content, structure, and communication format. From the survey questionnaire the design student group appeared to be evenly split between optimistic and pessimistic procrastinators. There is no clarification within available research to know if a design student could be both types of procrastinators over an extended period, i.e. longer projects of more than twelve weeks.

From the thematic analysis, design students want clear guidance (or scaffolding) for work tasks, pathways to completion, and time required for each new skill or knowledge application. This matches literature advocating academic contracting. Accommodating slow reading and other learning difficulties should be acknowledged in the planned time for each activity. Alternative ways of gaining access to knowledge are worthwhile exploring, such as video multimedia and audio podcasts.

Lack of confidence was one of the prominent actors driving procrastination. Providing templates and presenting achievable examples up-front will help students know when to stop and what is sufficient to achieve a good grade. It will enhance their understanding of the taught material, linked to the intended learning outcomes of taught content and its value to them as professional designers. Separating a student designer's professional and personal worth from the value of the project they have created, as advocated by Fiore, may help reduce anxiety and fear of criticism that undermines confidence.

Educators should be aware of the change in the ways in which Generation Z students (born 1997 – 2012) consume new knowledge. Many design students have been observed by the authors using their smartphone for most online administration and learning, with laptops and desktops used only for reports, digital design work and computer aided design, CAD. Modifying communication formats to suit the scale and proportion of a smart phone is an issue to be addressed.

The issue of how much time should be allocated to practice is still difficult to answer. As an applied art from some viewpoints, developing drawing/visualisation skills and an understanding of how to apply a complex matrix of interdisciplinary theory is still currently based on trial-and-error practice. The advancement of Artificial Intelligence and software, such as Dall-E, Astria, and Luma in generating visualised design options further

complicates how much time may be appropriate to learn changing skills within future design and creative arts practice, and within an already overcrowded creative arts or design programme. This highlights the need, and importance, for academic researchers to study this topic and field.

A limitation of the study was the short time window in which the study had to be completed that also resulted in helpful checks on validity and standardisation being omitted. The outcomes of what was a grounded approach study may inform the focus and nature of future studies of procrastination with design and creative arts students. There is an opportunity to further explore the variance of available data; to review reported responses and behaviours that fitted the term procrastination, and how many may be aligned with other factors. The wider implications of procrastination on wellbeing, performance, and employability of design and creative arts students requires exploration, alongside the effect of gender and or neurodiversity. The authors welcome further discussion and collaboration with a wider design practice and academic community to explore this topic.

## Declarations

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**Compliance with Ethical Standards** Ethics approval was obtained via the Institutional Review Board of Loughborough University for the survey prior to the survey distribution and publication (ID: 7529). An anonymised questionnaire was used through web-based Online surveys (Online surveys, 2022) and General Data Protection Regulation (GDPR) guidelines were followed. Full details of the ethics and integrity procedure followed may be obtained via the Research ethics and integrity website, Loughborough University (Research ethics and integrity).

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