

Off-task Media Use in Academic Settings: Cycles of Self-regulation Failure

Daniel B. le Roux (Corresponding author - dbleroux@sun.ac.za)
Stellenbosch University, South Africa

and

Douglas A. Parry
Stellenbosch University, South Africa

This is an Accepted Manuscript of an article published by Taylor & Francis in The Journal of American College Health on 9 September 2019 available online: <https://www.tandfonline.com/doi/full/10.1080/07448481.2019.1656636>

Abstract

Objective: The effects of off-task media use in academic settings on academic performance have been widely reported. In response, a range of interventions have been proposed. Among these have been calls for the cultivation of more effective self-regulation of media use. Against this backdrop, the present study investigates students' self-regulation of off-task media in academic settings. **Method:** A series of focus groups was conducted involving 30 undergraduate students at a large, South African university. A combination of inductive and deductive analysis was conducted on the basis of prominent theories of self-regulation. **Results:** The presence of off-task media in academic settings create ongoing experiences of goal-conflict and many students become trapped in cycles of repeated self-regulation failure, ultimately culminating in procrastination. **Conclusions:** We refer to this phenomenon as the media procrastination cycle and argue that it contributes to negative affect, stress and anxiety among students.

Keywords: media use; self-regulation; procrastination; stress; anxiety

Introduction

Digital media are an ever-present feature in the lives of students today. Whether in class, alone, or in a social setting, media such as laptops, smartphones, instant-messaging services, and social networking services (SNSs) are readily accessible¹. A number of studies indicate that university students frequently engage in off-task media use (OTMU) in academic settings, interacting with media unrelated to their academic work. OTMU in such settings is not without its consequences. Studies indicate that the concurrent engagement with digital media in academic settings is associated with diminished task-performance². Additionally, such behaviour holds implications for socio-emotional well-

being³. In particular, OTMU potentially holds a number of implications for university students' mental health, with studies indicating associations with depression, social anxiety, distraction, feelings of normalcy, sleep, and stress². In response to these associations, rather than endorsing coercive interventions like out-right technology bans, scholars have emphasised the importance of students' abilities to self-regulate their OTMU in academic settings⁴. To evaluate the prescriptive value of these recommendations it is necessary to understand media-related self-regulation from the perspective of students and, additionally, to understand how OTMU relates to failures of self-regulation.

Self-regulation is key to understanding the interaction between media use and well-being⁵. Digital media enable users to attain short-term gratification by providing ubiquitous access to services offering entertainment, news and social connectivity⁶. Such activities, when off-task, manifest as distractions and may imply negative consequences for longer-term goals. The shifting of attention from academic tasks to media implies, at the least, an interference-related performance reduction for academic achievement². Additionally, the opportunities for escapism and procrastination offered by SNSs contribute adversely to well-being⁷.

Self-regulation functions through a set of related psychological processes. Monitoring (introspection into one's thoughts, feelings, and behaviour) enables the establishment of standards for behaviour against which present states are compared. On the basis of such comparisons, self-responses are applied to motivate the continuation of a given behaviour or set in motion processes to alter it. This exertion of control over one's own behaviour is termed self-control⁸ which refers to both the motivation and the capacity to inhibit an impulse that is in conflict with a standard⁵. Importantly, this process does not occur in a vacuum - social norms impact the development of individual standards¹⁰. In the context of a university the institutional academic standards and the associated expectations of lecturing staff will play a key role in determining the standards against which students compare their behaviour.

The process of self-response or operation enables the overriding of one process by another⁹. Actions occur as a result of the interplay between latent motivations and activating stimuli which produces impulses to initiate behaviour. It can occur automatically, as in the case of habitual behaviour, or it can be motivated by longer-term goals or intentions. Self-regulation involves monitoring and evaluating these impulses, and disrupting the stimuli-response cycle.

Given the complex nature of self-regulation, providing a single cause of self-regulation failure is neither desirable, nor useful. Failures arise as a result of particular patterns, chief of which are under-regulation and misregulation¹⁰. Under-regulation occurs because of inconsistent or unclear standards, inadequate monitoring of actions, or insufficient strength to override undesirable behaviour. Misregulation occurs when regulation attempts fail because of false assumptions about the world, beliefs or capabilities, or because attempts are made to regulate what is out of the regulator's control.

Self-regulation strength is generally believed to be a limited capacity¹¹. The “self’s acts of volition draw on some limited resource, akin to strength or energy and that, therefore, one act of volition will have a detrimental impact on subsequent volition”¹². Empirical support for this capacity model indicates that the frequency and recency of instances of self-regulation negatively predict subsequent self-regulation success¹³. The ability to transcend, i.e., “focus awareness beyond the immediate stimuli”, is key to effective self-regulation¹⁰. Importantly, lapse-activated patterns of self-regulation failure can occur through a number of mechanisms. For example, after initial self-regulation failure, monitoring may cease, either due to a loss of transcendence, or distress associated with failing to meet standards. Procrastination is an oft-cited form of this behavioural¹⁴.

In addition to impulses, failures of self-regulation have been associated with automatic behaviour and emotional control¹⁵. Emotions promote goal re-prioritization, increasing the salience of whatever stimuli produce them, thereby attracting the allocation of attention towards such stimuli¹⁰. Experiences of negative affect impact currently prevailing goals to the extent that affect-regulation receives a higher priority than other forms of behavioural regulation¹⁶. Accordingly, negative affect initiates misregulation which is directed towards the improvement of emotional states at the expense of achieving longer-term goals¹⁷.

Recently, two experience-sampling studies provide evidence that OTMU is perceived to be one of the most prevalent forms of everyday self-regulation failure^{13,18}. Four affordances of digital media — immediate gratifications, habitualised use, ubiquitous availability, and attentionally demanding notifications — increase the strength of associated impulses, and contribute to instances of self-regulation failure⁵. Additionally, such affordances serve to increase the automaticity of media engagements. Stimuli which initiate automatic responses are linked to increases in impulsive behaviour, irrespective of longer-term goals. It is both the affordances of media, and the automatic affective responses they engender that account for increased reports of associated self-regulation failures⁵.

A number of studies indicate that media engagement is frequently a form of procrastination^{3,18,19} which, in turn, is associated with a short-term increase in negative affect (e.g., stress, guilt or anxiety)⁵. These immediate consequences are separated from the more distal rewards associated with task completion and overall academic success. Both the subjectively aversive nature of these tasks, as well as the immediate gratification associated with media engagement, contribute to the frequency of media-related procrastination of academic tasks⁵. Despite these findings, it has been shown that using media to take a break from aversive tasks can positively impact well-being²⁰.

If self-regulation enhancement is to emerge as a viable response to the negative affective and performance-related consequences of OTMU, it is necessary to understand how students interpret their OTMU. In particular, it is necessary to consider whether students perceive their OTMU to be appropriate, and, if not, whether the psychological implications

of dysfunctional media breaks are appreciated¹⁹. To guide the investigation we posed a single, primary research aim:

To provide a descriptive account of the success or failure of the self-regulation of OTMU behaviour in academic settings among university students.

Methods

To address this aim we adopted a qualitative method based on the belief that epistemological value exists in the analysis of students' interpretations of and reflections about reality, and that this reality is the product of subjective and inter-subjective sense-making processes. The student in the academic setting is framed as continuously engaged in self-regulation in an attempt to resolve goal-conflicts.

To achieve this aim we adopted a focus group methodology. In such a methodology data are produced through the sharing and discussion of interpretations and experiences amongst a group of participants. The dynamics of group sharing support the participants in sharing their experiences and interpretations in a manner not necessarily possible in surveys or interviews²¹. Additionally, this methodology enables the evaluation of consensus amongst the participants. Rather than simply aggregating individual data, focus groups enable participants to compare their interpretations and experiences with each other²².

Participants

The target population for the study consisted of full-time undergraduate university students at the authors' institution. To obtain a sample of participants from this population we used three recruitment approaches: an interview on the campus radio station; A4 posters in all academic buildings of the main campus; and in-person and on-line announcements in four undergraduate courses. Additionally, we incentivised participation through the provision of a financial reward of 50 ZAR. After an advertising period of two weeks 30 undergraduate students (n = 15 female; eight 1st year, 17 2nd year, and five 3rd year students) responded. Each participant selected one of five available sessions. With the exception of the first (six participants) and the fourth (nine participants) sessions, the focus groups each involved five participants. A sample size of 30 is considered sufficient for five focus groups and achievement of thematic saturation²².

Procedure

A topic guide, informed by the literature reviewed and the objectives of the study, was produced to direct discussions in the focus groups. A pilot study involving a single focus group (consisting of five students) was conducted to test the appropriateness of the topic guide. Five separate focus groups, each with a unique group of participants, were conducted. All five sessions, occurring over a two-week period, were moderated by the same researcher, a white male in his mid-twenties who attended the same institution for his

undergraduate and postgraduate studies. At the time of the focus groups all participants were unknown to him. All five sessions took place in a large classroom-style venue, with the participants sitting around a table in the centre of the room. An audio-recording device was placed on this table. Other than the researcher, who sat among the participants, no one else was present. Each session had a duration of approximately 60 minutes.

Ethical Considerations

Prior to recruitment we received ethical clearance from our institution's research ethics board. Additionally, upon commencement of each session, the purpose of the study, and the procedures for data collection, protection, analysis and reporting were communicated to all participants.

Data Analysis

Analysis focused on identifying and classifying patterns in the data as descriptive themes pertinent to self-regulation of OTMU in academic settings. Given the study aim, we adopted a hybrid approach to our analysis involving both inductive and deductive analysis. This enabled our thematic analysis to be grounded in self-regulation theory, while still allowing for the emergence of themes from the data.

We commenced analysis by familiarising ourselves with the transcriptions of the audio-recordings. Each participant was identified with a unique code constructed on the basis of his/her focus group (Px-y where x represented the focus group and y the individual). We then coded the dataset using Atlas.ti 7. For the deductive coding we developed a framework of codes derived from self-regulation theory. This framework is presented in Table 1. These codes were used to identify high-level themes in the data that correspond to aspects of self-regulation theory.

[Table 1]

Following the a priori coding, a process of inductive coding was performed on the extracts associated with each of the theory-derived codes. New codes were developed inductively and assigned to extracts by two independent coders. After completion the outcomes were compared and integrated into a single set. While there was a high degree of correspondence between the two coders, differences in the interpretation of the data did occur. In such instances they were resolved through discussion between the coders to seek accuracy and validity. We used the final set of codes to identify recurrent patterns in the data that related to the study objective. These patterns were then treated as candidate themes and, to consider the theme's viability, were considered in relation to the associated coded extracts. Following this process certain themes were merged or separated to form a final set of themes. We then returned to the original codes to determine whether we achieved thematic saturation. We did not find any codes that were not adequately covered by the final set of themes. Each theme was then analysed with the aim of developing a descriptive narrative.

Results

The findings are presented in three sections. The first section describes themes relating to the ideals, standards and goals which students prescribe to. The second describes themes relating to successful self-regulation, while the third describes themes relating to self-regulation failure.

Ideals, Goals and Standards

Our data suggest that students generally subscribe to a shared set of ideas about what constitutes behaviour that promotes optimal academic performance. These ideas are influenced by both personal experience and social norms (i.e., dominant, shared ideas about how students that perform well behave). Behaviour that promote the achievement of academic performance goals is seen to be characterised by being engrossed in and stimulated by academic material. Such behaviour promotes academic achievement by producing positive outcomes like attentiveness during lectures, timeous completion of assignments and adequate preparation for assessments. Additionally, these behaviours are associated with positive affect characterised by feelings of goal attainment and self-actualisation. The majority of students, however, aim to achieve a balance between their academic performance goals and non-academic goals. These non-academic goals often involve the use of OTM with the aim of optimising mood through short-term gratification by partaking in the potentially fulfilling experiences these offer. To achieve this, students often adjust academic performance standards to satisfice, rather than optimise. This flexibility in standards allows students to develop attentional strategies which involve frequent switching between OTMU and academic material. For example, P3-1 stated that:

I sort of just like weigh it up, the pros and cons. For me, like freaking out for two, three days before a test or essay. Disciplining myself for a few days is worth it. To like the rest of the term just do nothing.

Impulses to engage in OTMU become accentuated when the academic setting is experienced as tedious, creating a sense of frustration or disappointment among students about their experiences. Previous studies have used the term FoMo — the fear of missing out on potentially fulfilling²³— to describe the latent motivation to engage in other fulfilling experiences. Our data support earlier findings suggesting that FoMo triggers procrastination²⁴. When considered in relation to this motivation, the affordances of online media, SNSs in particular, make their use a highly appealing form of short term gratification. For instance, P4-5 stated that:

It's the FOMO-syndrome. The fear of missing out. You need to be on social media in order to know what's happening.

Our data also raised the possibility that students view engagement in, for example, social media as part of achieving a long-term goal which concerns social acceptance and mobility within their peer groups. Students attribute value to the manner in which an online presence

enhances their social stature. This effect seems to relate primarily to the student's being 'in the know'. P1-1 explained:

But, socially also, I think it's important to have a media presence. Like, the fact that I don't have Instagram is like a big thing. So, I meet people and it's like 'oh ok, what's your Instagram?' And I'm like 'I don't have it'. Then it's this thing of you're a little bit ostracised because we can't tag you on our Instagram photos and you're gonna miss out now. So I think it's very important that you're kind of on all social media... It's important that you have a presence on social media for you to socialise properly.

Our data suggest that two subjective-situational factors influence the balancing of academic and other goals. The first is the importance of the specific activity in relation to academic performance outcomes (i.e., how the activity will influence grades).

This week I have a lot of things due, so I'm a bit more disciplined. I have to be more serious or else I'm not going to get this degree. (P4-8)

The second factor is students' level of interest in the subject matter covered in the particular setting. Students regulate behaviour more effectively when they find the material engaging.

I think in the classes where I am 100% interested in what I am studying then I don't tend to go on to my phone... I am going to pay attention all the time. Because I want to know every single thing that that lecturer is saying. (P2-1)

Successful Self-regulation

Our data provided evidence that high academic standards promote OTMU regulation. This does not necessarily imply that OTM is not used, but rather that use is effectively managed.

I always know that I am always in control of the way that I'm doing it and I know that I will always get the work done. I have a really high standard for my work and I will never let it drop below that. So even though I will have short breaks, when I need to I will always go back to the work. (P1-5)

A strategy students employ, particularly when deadlines approach, is to impose control over OTMU triggers by removing devices from their immediate environments and closing OTM applications.

But if I have a project or something to do and I'm in [the lab], I try to put my phone away or close my [browser]. [I make a] conscious decision to try and focus. (P1-2)

I think a lot of people work well under pressure. I know I do anyway. So I rather just chill on my phone and like watch series and stuff and then literally, just before something is due, I'm like 'Ok, now it's crunch time'. I think it's the pressure of the due date that gets me to put my phone away. Because I'm stressed now I'm gonna be on my phone a lot less. (P3-2)

Throughout the focus groups, it was evident that students monitor their OTMU in academic settings effectively. This was particularly clear in statements reflecting negative affect experienced when behaviours failed to conform to standards. Participants associated feelings of stress and anxiety with OTMU due to its conflict with academic performance goals.

For me I just have this thing, I call it the panic monster. That's the monster that scares me every single time I go on my phone. Remember why you're here, this is crunch time. My phone can be right here next to me, but I won't even touch it. I feel like I'm just wasting time. (P2-4)

We also found evidence, though limited, of effective OTMU management where the student maintains control over the amount of time spent using OTM.

Like you know what is going on, you're studying here and then you go back to your phone like oh, what did I miss in the world. I catch up again and then I go back to my work.

Self-regulation Failure

Here we outline our findings relating to OTMU and the failure of self-regulation in academic settings. We consider, firstly, the manner in which vague or flexible personal academic standards and goals enable students to resolve conflicting long and short-term goals; secondly, we consider ineffective monitoring; thirdly, we consider the inability to inhibit impulses to use OTM; and, finally, we consider failure to operate.

Under-regulation due to the obfuscation of academic goals

As reported in the preceding section, our data suggest that most students are prepared to adapt their academic performance expectations to enable the gratification of other short-term goals. Lecture attendance emerged as an important theme in this regard. In some subject areas lectures are seen to be replaceable by personal study time, or simply "reading the slides". In other instances, participants argued that they could obtain or make recordings of lectures and were, as a result, less motivated to pay attention during the lecture. This behaviour devalues both the role of the lecturer and the primacy of lecture attendance in the learning process.

I started out in the beginning of the year taking notes on my laptop, but then by the second semester I was so bored with all my classes, so I just record all my classes and then I just spend all my time on social media. I know that sounds horrible, but I still get through the work - it's like extra time for me, cause then I have to go listen to the lecture anyway. But in a way I, I feel that I am not concentrating in any case, so might as well do it at home. (P4-8)

P1-4 supported this view by arguing that it is possible to achieve the required academic outcomes without attending lectures.

In the majority cases, at least in our faculty, let me put it this way, you can really do perfectly fine if you just do the self-study work.

While we expect that academic standards would vary across subject areas, it is evident that by seeking to satisfice rather than optimise, students obfuscate their long term academic performance goals. This lays the basis for deviation from behaviour that conforms to ideal states.

Under-regulation due to ineffective monitoring

We found only limited support for the proposition that OTMU is initiated due to students' failure to monitor their behaviour. The decision to engage in OTMU in these instances was framed as a habitual or automatic activity, occurring without any particular pattern of forethought or deliberation.

It happens so often, that you don't even think about it. You just go into class, sit down, immediately, phone out. It's a habit. (P1-3)

In the majority of cases, however, students make a deliberate decision to deviate from academic tasks with OTMU after weighing the costs of such deviation.

We make that conscious decision every time. So, it's not like we don't know that we're doing the wrong thing. (P1-4)

While the decision to deviate from academic tasks seems to be well monitored, once OTMU is under way, students stop monitoring their behaviour effectively. In such instances students report spending more time online than they intended to when commencing the session. This form of deficient self-regulation provides an indication of the extent to which the designers of online platforms have been successful at maintaining users' attention.

Even if [I] finish on [my] phone and I'm, like, I'm gonna start on this essay now. But then I just quickly want to watch this YouTube video and then like, five hours later, you're like, why [am I reading] conspiracy theories? (P1-2)

So, it's like a snowball effect, it's a conversation and next thing you know you've spent an hour talking to one person. (P2-3)

Participants emphasised how they become preoccupied by OTMU and how this limits their awareness of events in their direct environment - a phenomenon that has been referred to as Internet cognitive failure²⁵.

Literally, when I am on my phone I do not hear or see anything, I literally shield myself. People are trying to talk to me and I don't hear her, because I am literally fixated on my phone. I hear nothing, nothing. The only time I'll look up is because everyone is getting up because the lecture is done.

While a small number of participants suggested that they are able to effectively operate and return to academic tasks, many admitted that they become so absorbed in OTMU that

they neglect academic tasks. Moreover, participants shared the view that their ability to learn is hampered when they switch between academic material and OTMU.

There's very little else you can do while actually texting. You can't multitask. It's a bit of a myth... (P1-6)

Based on these reports we believe that, while the initial decision to engage in OTMU mostly involves conscious deliberation, the monitoring of behaviour and thoughts diminish in the course of OTMU sessions. However, some degree of monitoring still occurs. In accordance with earlier findings⁵, our data suggest that, because OTMU implies academic task procrastination, students associate feelings of guilt, stress and anxiety with OTMU. These associations suggest awareness that OTMU behaviour is in conflict with the achievement of their long term academic goals.

I'm not on my phone that much, I don't want to be on my phone. It, like, [makes me] stress. (P3-3)

Another participant (P4-6) explained that, while she does feel guilty about using her phone during a lecture, the prevailing OTMU norms serve to soothe her conscience. Our data suggest that these norms have largely been determined in a bottom-up manner. OTMU in academic settings (lectures in particular) has come to be considered as normal behaviour.

Sometimes I feel really bad actually, that I'm on my phone in class, and I'll stop and then I look around me... [other participant completes sentence] Everyone else is on their phones.

Under-regulation due to failure to inhibit OTMU impulses

In accordance with a strength model of self-regulation, we propose that a student's decision to engage in OTMU results from the relative strength of the impulse to gratify short term goals through OTMU versus that of the impulse to remain on-task. When experiencing these impulses conscientious students may be able to transcend the lure of gratifying short-term goals and remain engaged in the academic activity, while less conscientious peers succumb and initiate OTMU.

We're aware of the costs, but, at that point in time that immediate satisfaction factor is just too high. And it's just [too high] to actually counter. You know that two cookie metaphor, you can get one cookie now or you can get two cookies later. That one cookie now is just good enough. (P1-4)

Our data confirm findings about the forms of situational stimuli which trigger impulses to shift away from academic tasks. The first form of stimuli we found, which has been widely reported⁵, is notifications received on devices. The second, which has also been noted in earlier work¹, is the visibility or awareness of others' online activities. Furthermore, participants indicated that feelings of disengagement, boredom or lack of fulfilment in the academic setting strengthen the impulse to use OTM.

When I'm listening to the lecturer, if I don't really find it useful, or they're just like losing me, then I'll go on my phone. (P2-4)

Conversely, as argued in preceding sections, the strength of the impulse to attend to academic tasks is influenced by its importance and urgency in terms of performance outcomes, and the alignment between subject matter and personal interests. We argue, consequently, that the decision to switch to OTMU would be influenced by both trait procrastination and subjective-situational factors.

Failure to operate

After OTMU has been initiated, students can successfully regulate behaviour by operating - i.e., by curtailing OTMU and returning to academic tasks. Three principles of self-regulation are important in this regard. The first is that students tend to monitor their thoughts and behaviour ineffectively when they are engaged in OTMU. This implies that the meta-cognition required to operate is diminished as students become captivated by the short-term positive affect offered by media. The second is the inertia principle which dictates that effective self-regulation "often seems to involve intervening as early as possible"¹⁰. Operating becomes more challenging the longer OTMU is underway. SNS designers effectively harness this principle when delivering 'never-ending' streams of content to users. The third is the principle that self-regulatory strength is vulnerable to depletions due to emotional instability, stress or anxiety. The negative emotions associated with OTMU as a form of procrastination are likely to inhibit students' ability to operate.

The resulting behavioural pattern is a feedback loop in which OTMU as a form of procrastination leads to negative affect which, in turn, depletes the strength required to return to academic tasks. We term this the media procrastination cycle and argue that it deteriorates academic performance and leads to high levels of stress and anxiety among university students. Iterations of this cycle only end when approaching deadlines create enough arousal, experienced as stress, to strengthen the impulse to engage in academic tasks, often leaving inadequate time to produce high quality work.

For me, I had an essay due on Monday which I have known about since the beginning of this semester. I told myself during the week-long break I was going to start with it and get a few articles. I was like 'Ok, I will start reading them closer to the time'. Every time I was free I knew I had an essay, but I was like 'no, let me just watch Youtube videos'. And I only started doing it the weekend before, and it was very stressful. (P2-2)

I'm like literally the worst procrastinator in the world. If I know I have an essay due, I'll literally do more social media or anything else for like two days before it has to be in. So, I have to be on that last verge of panic and then I start. (P4-2)

P3-4 explained how this cycle has become the norm among students:

The thing about those kind of stress environments is that we've almost conditioned ourselves to work really well [like that].

OTMU serves different purposes at different points in the cycle. Initially, it is undertaken to gratify short-term goals through the entertainment or stimulation, the aim being to optimise mood in the face of unengaging academic work. While this optimisation may be achieved in the short term, it eventually culminates in negative emotional consequences associated with the awareness that procrastination is occurring. This, in turn, triggers further OTMU as an attempt to stabilise mood and dull the negative affect experienced due to procrastination. A number of authors^{5,18} have argued that such efforts to regulate mood in the short term are a common form of misregulation which exacerbates the experienced problem rather than solving it.

Comment

Our findings further corroborate evidence that the affordances of online media promote the habitualisation of OTMU in academic settings⁵. The ubiquity of both device ownership and Internet access among university students are important enablers of this behaviour, but the nature of new media also plays a key role. The perpetual availability of streams of new content (social or other) and the notifications which direct attention to these engender high degrees of OTMU among this demographic. From the perspective of self-regulation, these affordances provide students with an array of attractive short-term gratification options, posing substantial challenges to their ability to transcend the immediate pleasures they associate with media use. While studies of self-regulation have often considered behaviours which are widely recognised as harmful or unhealthy (e.g., drug or alcohol abuse), the effects of chronic media multitasking are less clear and, to a great extent, unknown to the general student population. This greatly complicates efforts to cultivate media self-regulation. A further complicating factor is the ease with which a student can switch between on-task and off-task activities across settings. The devices students use to complete their academic tasks are the same devices they use to engage in OTMU.

Our study confirms previous evidence that students experience goal conflict related to OTMU²⁵. The long-term goal of performing well academically encourages them to remain on-task in academic settings, something they experience as particularly challenging when the content or style of a lecture fails to engage them. To regulate this behaviour, they must continuously resist the impulse to gratify their short-term goals through OTMU. These short-term goals seem to be concerned, primarily, with the consumption of media for hedonic purposes and affect-regulation. Students manage these conflicts by considering the value and importance, relative to their long-term goals, of academic settings and regulate their behaviour accordingly.

This form of self-regulation seems to be successful for many students and tacitly accepted as the way things are these days by university lecturers. While media can be used to

facilitate breaks from academic work, our data show that the affordances of new media often lead to internet cognitive failure and failures to operate. A key consequence of this form of behaviour is elevated stress and anxiety levels due to the procrastination of academic tasks.

It is self-evident that engaging academic settings improve attentiveness and, as a result, reduce the strength of impulses to engage in OTMU. However, it is our view that, relative to the lure of the experiences offered by new media, cultivating engagement presents a significant challenge to lecturers. Based on our findings we suggest a number of techniques in this regard. The first is the clarification of the manner in which a given academic setting aligns with and enables the achievement of long-term goals. This would serve the dual purpose of heightening students' awareness of their long-term goals, as well as emphasising the importance of the particular setting. Secondly, lecturers can bring attention to the implications of frequent attentional switching and multitasking for task performance. By this we do not suggest the vilification of media per se, but rather the lauding of cognitive control. Thirdly, lecturers can enlighten students on the techniques that media designers employ to maintain their attention for extended periods of time. This will encourage meta-cognition about behavioural patterns and how media determine these. Finally, it may be valuable to provide guidance on the control of devices to limit the triggers which typically lead to OTMU. This includes, in particular, controlling notifications, turning devices off, placing devices out of sight, or using silent or do-not-disturb modes to limit OTMU in a lecture setting. It should be noted, however, that while banning technology use from lectures may encourage attentiveness and engagement among students, this strategy limits the extent to which technology can be used for productive, task-related purposes. Moreover, the enforcement of top-down policies is in conflict with the notion of self-regulation where the individual takes responsibility for the alignment between their goals and behavior.

Conclusion

We conclude, on the basis of our findings, that OTM pose a series of challenges to self-regulation among students by offering, independent of time and place, a broad range of potentially fulfilling experiences. Moreover, the nature of the affordances of OTM are such that students often become trapped in a cycle of repeated self-regulation failure which results in the procrastination of academic tasks. We refer to this as the media procrastination cycle and propose that it is a key source of stress and anxiety among the current cohort of students. Future studies should consider the design and efficacy of interventions which promote self-regulation of media use among students as a means of breaking this cycle. Similarly, studies should assess the efficacy and usefulness of top-down policies implemented by lecturers and university administrators to promote attentiveness and focus among students during lectures. In such investigations it is recommended that mixed methods approaches involving both qualitative and quantitative

data be implemented to enable a holistic appreciation of the behaviour and its possible mental health effects. Where feasible, media use data should be collected through applications rather than self-report.

Limitations

Finally, we briefly acknowledge four limitations in our study. The first concerns the use of focus groups as data collection method. While we value the manner in which this technique enables the emergence of topics and themes through discussion among participants, we acknowledge that certain views or opinions may be suppressed due to the presence of other participants. It is possible, consequently, that participants were not entirely honest about their behaviour. Secondly, as is the case with all qualitative analyses, the researchers' interpretations of the data are not objective. While we aimed, through the research design, to ensure that these interpretations are valid, we acknowledge alternative interpretations are possible. Thirdly, summaries of the focus group discussion were made after as opposed to during the focus group sessions, creating the possibility that certain details of the discussions were not accurately recorded. Finally, the empirical work was performed among students in South Africa, which raises the question of external validity. We argue that, while differences in behavioural forms and their impacts may exist, the findings are extrapolatable to any university setting where OTMU is prevalent, independent of country.

References

1. Le Roux DB, Parry DA. A new generation of students: digital media in academic contexts. In: *Comm Com Inf Sc*. Vol 730. Springer, Cham; 2017:19-36. doi:10.1007/978-3-319-69670-6_2
2. Van der Schuur W, Baumgartner SE, Sumter SR, Valkenburg PM. The consequences of media multitasking for youth: a review. *Comput Hum Behav*. 2015;53:204-215. doi:10.1016/j.chb.2015.06.035
3. Meier A, Reinecke L, Meltzer CE. Facebookrastination? Predictors of using Facebook for procrastination and its effects on students' well-being. *Comput Hum Behav*. 2016;64(November):65-76. doi:10.1016/j.chb.2016.06.011
4. Flanigan AE, Kiewra KA. What college instructors can do about student cyber-slacking. *Educ Psychol Rev*. 2018;30(2):585-597. doi:10.1007/s10648-017-9418-2
5. Hoffmann W, Reinecke L, Meier A. Of sweet temptations and bitter aftertaste: self-control as a moderator of the effects of media use on well-being. In:

Reinecke L, Oliver M., eds. *The Routledge Handbook of Media Use and Well-Being: International Perspectives on Theory and Research on Positive Media Effects*. New York City: Routledge; 2017:211-222.

6. Zhang W, Zhang L. Explicating multitasking with computers: gratifications and situations. *Comput Hum Behav*. 2012;28(5):1883-1891.
7. Meier A, Meltzer CE, Reinecke L. Coping with stress or losing control? Facebook-induced strains among emerging adults as a consequence of escapism versus procrastination. In: Kuhne, R, Baumgartner, SE., Koch, T., Hofer, M., eds. *Youth and media: current perspectives on media use and effects*. Baden-Baden: Nomos Verlagsgesellschaft; 2018:167-186.
doi:10.5771/9783845280455-167
8. Muraven M, Baumeister RF. Self-regulation and depletion of limited resources: does self-control resemble a muscle? *Psychol Bull*. 2000;126(2):247-259. doi:10.1037/0033-2909.126.2.247
9. Baumeister RF, Heatherton TF, Tice DM. *Losing control : how and why people fail at self-regulation*. Academic Press; 1994.
10. Baumeister RF, Heatherton TF. Self-regulation failure: an overview. *Psychol Inq*. 1996;7(1):1-15. doi:10.1207/s15327965pli0701_1
11. Baumeister R. *Self-regulation and self-control*. Routledge; 2018.
doi:10.4324/9781315175775
12. Baumeister RF, Bratslavsky E, Muraven M, Tice DM. Ego depletion: is the active self a limited resource? *J Pers Soc Psychol*. 1998;74(5):1252-1265.
doi:10.1037/0022-3514.74.5.1252
13. Hofmann W, Vohs KD, Baumeister RF. What people desire, feel conflicted about, and try to resist in everyday life. *Psychol Sci*. 2012;23(6):582-588.
doi:10.1177/0956797612437426
14. Sirois F, Pychyl T. Procrastination and the priority of short-term mood regulation: consequences for future self. *Soc Personal Psychol Compass*. 2013;7(2):115-127. doi:10.1111/spc3.12011
15. Carver CS, Scheier MF. Action, affect, multitasking, and layers of control. In: Forgas, J., Baumeister, RE., Tice, DM., eds. *Psychology of Self-Regulation:*

Cognitive, Affective, and Motivational Processes. New York, NY, US: Psychology Press; 2009:109-126.

16. Tice DM, Bratslavsky E, Baumeister RF. Emotional distress regulation takes precedence over impulse control: if you feel bad, do it! *J Pers Soc Psychol*. 2001;80(1):53-67.
17. Heatherton TF, Wagner DD. Cognitive neuroscience of self-regulation failure. *Trends Cogn Sci*. 2011;15(3):132-139. doi:10.1016/j.tics.2010.12.005
18. Reinecke L, Hofmann W. Slacking off or winding down? An experience sampling study on the drivers and consequences of media use for recovery versus procrastination. *Hum Commun Res*. 2016;42(3):441-461. doi:10.1111/hcre.12082
19. Reinecke L, Meier A, Aufenanger S, et al. Permanently online and permanently procrastinating? The mediating role of Internet use for the effects of trait procrastination on psychological health and well-being. *New Media Soc*. 2018;20(3):862-880. doi:10.1177/1461444816675437
20. Reinecke L, Vorderer P, Knop K. Entertainment 2.0? The role of intrinsic and extrinsic need satisfaction for the enjoyment of facebook use. *J Commun*. 2014;64(3):417-438. doi:10.1111/jcom.12099
21. Kitzinger J. Qualitative research: introducing focus groups. *BMJ*. 1995;311(7000):299-302. doi:10.1136/bmj.311.7000.299
22. Morgan D. Focus groups as qualitative research. *Qual Res Methods Ser*. 1997;16(2):6-17. doi:10.4135/9781412984287
23. Przybylski AK, Murayama K, Dehaan CR, Gladwell V. Motivational, emotional, and behavioral correlates of fear of missing out. *Comput Hum Behav*. 2013;29(4):1841-1848. doi:10.1016/j.chb.2013.02.014
24. Whelan E, Islam N, Brooks S. Cognitive control and social media overload. In: *AMCIS 2017 Proceedings*. ; 2017:1-10. doi:10.1002/dvdy.10228
25. Van Koningsbruggen GM, Hartmann T, Du JD. Always on? Explicating impulsive influences on media use. In: Vorderer P, Hefner D, Reinecke L, Klimmt C, eds. *Permanently Online, Permanently Connected*. New York City: Routledge; 2018:51-60.

