Insights into postgraduate student behaviour, underpinned by motivational orientation, within an emergency remote teaching environment

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The authors have no competing interests to declare.

Key contributions:

- Utilising Self-Determination Theory, this study explores how self-regulation styles influence student needs, their responses to different teaching approaches and factors external to the learning environment.
- The study contributes an in-depth perspective on the influence of different factors, internal and external to the learning environment, on student motivation.
- The authors conclude that both educator and student need to be aligned to support the three psychological needs of autonomy, competence, and relatedness that support motivation.

Abstract

Much of the world switched to emergency remote teaching (ERT) as the Covid-19 pandemic unfolded and deciding which learnings to integrate into the return to normative practice, if any at all, is worthy of investigation. Opportunistic observation and inquiry into student behaviour in response to ERT can provide depth to our current understanding of pedagogical practice and theory. Here, we consider our students' perception of workload, which dropped consistently between 2019-2022, alongside our students' experiences and their self-regulation styles as defined by self-determination theory (SDT). Using SDT to consider how different self-regulation styles interacted with factors internal and external to the course allowed us to reflect on the impact of

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changes made to the teaching environment, and on effects of the global pandemic. We found students preferred asynchronous engagement with content that was designed to be synchronous, but issues with time management and pressure to work contributed to an imbalance that resulted in an increased perception of workload. Interestingly, how students reacted to and adapted to this imbalance differed depending on their self-regulation style. Understanding the changing needs of students is imperative to designing education effectively in our changing social climate. Evaluating course design to ensure that delivery methods offer value to students, and communicating the purpose of these design decisions is critical in an environment where education is competing with paid work. Ensuring students and teachers are aligned through the education process will be key to navigating the changing external pressures students are facing, helping to improve the student experience overall.

Introduction

Accounts of student experience during the global pandemic are rapidly emerging. While this has aided the development of best practice guidelines for emergency remote teaching (ERT) (Morgan, 2020), deciding which learnings to integrate into normative practice, if any at all, has fuelled great interest in this opportunistic area of inquiry (Stewart, 2021). Teasing apart a student's experience of the learning environment from the impacts of the pandemic itself is challenging. The success of ERT has been described as highly variable, based on the level of resource and preparedness of those delivering it (Robson & Mills, 2022). At worst, the impacts on learning include a lack of motivation, productivity, and student engagement (Petillion & McNeil, 2020). However, learning does not occur within a vacuum, so attention should be paid to factors, both internal to the 'designed' learning environment and external to this, such as a city-wide lockdown, that may impact on the student experience. The Global Pandemic provided a shared experience of remote education across the world, and collecting these perspectives using rich and varied scientific inquiry is highly valuable.

In 2020, the graduate diploma of reproductive sciences (GRS), a one-year, post graduate science degree taught at Monash University in Melbourne, implemented an ERT model. This student cohort experienced one of the strictest and longest lockdown periods in the world (245 days) (Williamson & Colley, 2022). Historically, the course had been taught as an entirely synchronous, in-person program with online learning management systems used only as a repository for audio recordings, lecture slides and assessment drop boxes. When swapping to ERT, the course purposefully remained synchronous, with lectures delivered live via Zoom. As Melbourne opened in

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2022, students returned to social and work contexts that they had been excluded from during the extended periods of lockdown, but we continued to use the remote teaching model, as we are based in a hospital. Attendance of synchronous activities rapidly declined, with students anecdotally citing work as a priority, against the backdrop of an inflated cost of living.

Alongside changes to attendance, between 2019 and 2022, as the global pandemic unfolded, students indicated they were experiencing an increasingly unmanageable workload. In response to the prompt, 'the workload in this unit was manageable', 93% of students agreed the workload was manageable in 2019, 80% in 2020, 57% in 2021, and only 18% agreed it was manageable in 2022. The prescribed workload within the course had not changed over this period, but the delivery of the course had, in response to ERT.

While objective measures of workload (i.e., weekly contact hours) are included in a unit handbook or syllabus, this can vary greatly from a student's perception of workload (Kember, 2004). Perception of workload is influenced by numerous factors, including the interpretation of the complexity of content, course and assessment design, peer relationships, student-staff relationships, and external time pressures (Kember 2004; Kyndt et al., 2014). Perception of workload has been shown to be closely related to feelings of motivation (Kyndt et al., 2011), which in turn can be influenced by the learner's self-regulation style as described by self-determination theory.

Self-determination Theory (SDT) as applied to educational psychology (Reeve, 2002), proposes that motivation falls on a continuum between 'autonomous', in which a person undertakes tasks through a sense of self-volition, and 'controlled', in which a person participates through obligation or external pressure (Howard et al., 2017). Understanding how motivation is fostered in education design can significantly influence a student's university experience. For example, students sitting at the more autonomously motivated end of the continuum experience a lowered perception of workload (Kyndt et al., 2014), while students sitting towards the more controlled end of the continuum experience a higher perception of workload when undertaking complex tasks (Kyndt et al., 2011). Consequently, both type of motivation and perception of workload influence the learning approaches students adopt, with surface-level approaches more common in students utilising controlled motivation and experiencing a higher perception of workload (Diseth et al., 2006; Kember, 2004).

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SDT describes three psychological needs that support a high level of autonomous or intrinsic motivation. These three needs are: (1) autonomy, the sense that someone is acting voluntarily and in support of their own authentic interests or values; (2) competence, feeling capable of doing a task; and (3) relatedness, feeling socially connected (Deci & Ryan, 2000). Given the role motivation plays in perception of workload, evaluating the learning environment in relation to its ability to support or thwart these three psychological needs could provide insight into how changes made during ERT impacted the motivation of learners. In particular, we hypothesise that the impact of synchronous and asynchronous learning environments changed during our ERT period.

Meta-analyses show that virtual learning environments are generally not superior to traditional teaching-learning environments in terms of cognitive, emotional, and motivational outcomes (Krammer et al., 2020). However, synchronous online settings, such as interactive virtual classes, question-and-answer sessions, and small group discussions are considered more supportive than asynchronous delivery (Chen et al., 2021; Gewin, 2020). Despite this, synchronous online learning is also linked to higher cognitive load, greater communication ambiguity, and lower learning activation (Blau et al., 2017). Regarding the psychological needs defined by SDT, synchronous activities provide familiar spaces to support relatedness, while asynchronous activities can be perceived as more autonomy supportive, as students can engage with learning in their own time and on their own terms.

Both synchronous and asynchronous online delivery could thwart competency, depending on previous exposure to such approaches. For example, students who are used to engaging in conversation with peers and staff in real-time, may feel competent doing so in the online environment of Zoom, whereas students who are more comfortable engaging through asynchronous messaging apps may opt into asynchronous approaches like reviewing a lecture recording instead. Furthermore, asynchronous online learning requires competency in time management and the ability to direct one's own learning (Muilenburg & Berge, 2005; Song et al., 2004). Students who have not had experience or support in developing these competencies may first enjoy the idea of asynchronous learning due to its flexibility but could become overwhelmed or demotivated if they fall behind or feel disconnected from their peers and teachers (Jackson et al., 2022). Students across Oceania, Europe, and North America reported an increase in their workloads in response to ERT, which was attributed to competency gaps related to self-motivation and self-discipline (Aristovnik

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et al., 2020). It is possible that our observations of increased perceived workload point to a mismatch between the design of the learning environment and the behaviours and motivations of students engaging in study over the ERT period.

The present study

Understanding the behaviours of COVID-19-era learners, with a focus on feelings of motivation and perception of workload, could have implications for designing education for emerging student demographics. The present study has two distinct but related aims:

(1) To describe student engagement by quantifying synchronous vs asynchronous learning patterns using online content delivery metrics.
(2) To understand how factors internal and external to the learning environment alter perception of workload and feelings of motivation.

Methods

Research paradigm and methodology

The researchers (NR & KB) are guided by a post-positivist epistemology that recognises the complexities of human behaviour, the role of the researcher, and the subjective nature of knowledge. Using a mixed method analysis, data on student interaction with unit content was captured, providing an insight into synchronous and asynchronous learning preferences. This was followed by a focus group to explore the subjective experiences of participants and how factors internal and external to the learning environment affected their perception of workload throughout the year. An existing questionnaire (Black & Deci, 2000) that measured learner self-regulation was used to identify the self-regulation style (autonomous or controlled) that participants most aligned with when approaching their studies in 2022. Classification of self-regulation style was used to observe how strategies exhibited by the participants related to experiences of workload within the course and allowed students to reflect on their own feelings of motivation throughout the year. By using this mixed methods approach, the study explored the preferences and perspectives of the COVID-19-era student population. While in a single university context, many of the observations made here are supported by larger, data-driven publications. The purpose here is to provide a richer context to these data to inform the course design within the current study and offer an example for extrapolation to other contexts.

Study context

This study gathered data and observations of the 2022 cohort of the graduate diploma of reproductive sciences (GRS), offered through the Medicine, Nursing and Health Science Faculty at Monash University in Melbourne, Australia. The GRS comprises eight, compulsory units with teaching staff working across units. The degree delivers a broad range of topics within reproductive sciences. Most students enrolling in the degree have completed a bachelor's degree in biomedical science with the GRS being their first post-graduate degree. Students typically undertake the GRS to either specialise in the research area of reproductive science, or as a pathway to medicine or clinical embryology. Having already completed a prior undergraduate degree, our post-graduate cohort is typically older and more autonomous, inviting the consideration of workload outside the course of study, as it is usually a core consideration for students at this stage of their lives. Constructive alignment with the learning outcomes defines the assessment undertaken by students, which is typically authentic in nature, a mix of summative and formative, and incorporates a wide variety of skills in written and oral communication and critical analysis. Practical skills were taught, but not directly assessed, and participation was highly encouraged but not mandatory. Assessment linked to practical content was conducted through online modules and quizzes that could be completed off-site, a model that was developed during our ERT period.

Prior to 2020, the GRS was delivered purely as an in-person course, with audio recordings made available on the learning management system, Moodle, for revision. Since 2020 the GRS has adapted to a remote teaching model, comprising of a majority synchronous online delivery, with a small number of asynchronous online activities and periods of in-person delivery when possible. In 2022, the GRS delivered most lectures and tutorials synchronously via Zoom.

Study demographic and recruitment

In 2022, the GRS had a cohort of 29 full-time enrolments and two part-time enrolments. All full-time enrolments in the 2022 cohort were contacted via their student emails and the GRS alumni page on Facebook, following the release of their results. They were asked for permission for use of their engagement analytics in the study and invited to complete a questionnaire and to take part in a focus group.

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Student engagement analytics

Zoom attendance logs were used to determined how many, and who, attended synchronous sessions. Panopto viewing data was used to determine the number of students who chose to engage asynchronously by watching a recording. Panopto data was restricted to views occurring within the week following the synchronous delivery and excluded students who had also attended the session synchronously to determine what proportion of students were engaging with content in the timeframe that educators felt best supported learning.

Questionnaire tool and administration

The questionnaire used consisted of three demographic questions relating to work and carer duties, followed by an adjusted learning self-regulation questionnaire (SRQ-L). The self-regulation questionnaire (SRQ) was developed by Ryan and Connell to identify individual differences in the type of behavioural regulation associated with why someone engages in a specified activity (Ryan &Connell, 1989). We have utilised an adjusted version of the SRQ, the SRQ-L, developed by Williams and Deci to determine the behavioural regulation of adults engaging in higher education (Williams & Deci, 1996). The SRQ-L involves a series of statements relating to why someone chooses to participate in a study to which respondents must indicate how true each statement is to them on a scale of 1 to 7 with 1 being 'not true at all' and 7 being 'very true'. The SRQ-L was further adapted by Black and Deci to comprise a series of twelve statements, and this adapted version of the SRQ-L (Black & Deci, 2000) formed the basis of our questionnaire with small modifications made to make the statements relevant to our course of study. For example, the prompt described by Black and Deci, 'I am likely to follow my instructor's suggestions for studying chemistry', was adjusted to, 'I am likely to follow my instructor's suggestions for studying reproductive science'. Five of the twelve statements measure autonomous self-regulation, while the other seven measure controlled self-regulation.

Autonomous and controlled subscale scores were calculated by averaging the scores for each participant for all autonomous and all controlled statements and then converting each average into a z-score (Black & Deci, 2000). A z-score is a standardised score that indicates how close a data point is to the mean for the data set, thus converting data sets with different means to the same scale for further analysis. The Relative Autonomy Index (RAI) for each participant was determined by subtracting the controlled sub-scale score from the autonomous sub-scale score. Participants with an RAI greater than zero were assigned an autonomous self-

regulation orientation, while those with an RAI less than zero were assigned a controlled self-regulation orientation. In the aforementioned studies, the alpha reliability of the autonomous sub-scale was approximately 0.8, while the controlled subscale was approximately 0.75 (Black & Deci, 2000; Williams & Deci, 1996). However, reliability testing using Cronbach's alpha is not possible in the present study due to the limited number of respondents (n = 9) (Bujang et al., 2018).

Focus group

The focus group was conducted via Zoom for ninety minutes with audio and visual recording and auto-transcription turned on. Participants completed a visualisation activity that asked them to plot their perception of workload as the course progressed over the year. They were provided with a scale from 1-10 and asked to think about a baseline perception of workload and moments when they felt a high workload as reference points. They then annotated their visualisation with images to explain why it was higher or lower at times. The participants were asked to describe their visualisations and explain their annotations to promote reflection and group discussion. Following a discussion of workload and motivation, the authors revealed to each participant their assigned regulation style based on their SRQ-L responses, described what this meant, and asked participants to reflect on this in the context of the conversations they had had prior.

Researcher characteristics and reflexivity

The authors are both education-focused academics involved in the design and delivery of the GRS program. KB is the course director and unit coordinator for three of the units included in the GRS and teaches across all eight units within the course. KB is a reproductive biologist who conducts both quantitative research on reproductive physiology and qualitative research into policy and patient experience, and health science education.

NR is a senior teaching fellow and unit coordinator for three of the units included in the GRS, teaches across all units, and facilitates the delivery of the course. NR has a background in biomedical science and is a previous graduate of the GRS following which she completed a PhD in reproductive science within the same department.

Both NR and KB have been engaged in teaching the participants within this study throughout their time in the GRS program. They have a vested interest in trying to improve their students' experience. The authors took into account that data collection

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should take place after students had received their results so that ethical participation was ensured.

Ethical issues pertaining to human subjects

This study was approved by the Monash University Human Research Ethics committee, approval number 36146.

Analysis

Sample size considerations

The GRS 2022 cohort was small, and with the ethical requirement of voluntary participation, it was assumed that this would result in a small sample size for our study. This informed our choice of conducting a focus group instead of interviews, allowing participants to amplify common experiences, or demonstrate clear dissenting views in group discussion potentially strengthening themes within the study. Guidance on a target sample size in qualitative methodology such as in this study is rarely evidence based, however, having a homogenous study population and narrowly defined objectives can make a small sample size more acceptable (Hennink & Kaiser, 2022), and it has been suggested that an intrinsic approach be taken to each study when considering specific methodologies (Vasileiou et al., 2018). While more participants would have strengthened identified themes and narratives, the rich data collected provides insight into the unique situation this study aims to capture and was supported by large quantitative observations made further afield (Fabriz et al., 2021).

Hours worked per week within the sample

Participants could volunteer to state the number of hours per week in which they were engaged in paid work outside of their studies. Where the participant had indicated they had participated in paid work, a mean and standard deviation for hours worked per week was generated using GraphPad Prism 9 for Mac OS version 9.1.0(216). Students who reported they did not work in 2022 were not included in this calculation, to ensure the average hours of work per week accurately reflected the situation of students engaging in paid employment and was not influenced by the minority who had the financial means to not work in 2022.

Comparison of academic performance between regulation strategies

To evaluate the learning outcomes of participants within our sample, for each questionnaire respondent, each participant's overall course mark was transformed into

a z-score using the mean and standard deviation of the course marks for the entire 29 full-time enrolment for GRS2022. Course mark Z-scores were compared between autonomous and controlled participants using an unpaired t-test in GraphPad Prism9 for Mac OS version 9.1.0(216) with a p-value less than 0.05 considered significant.

Coding of qualitative data

The Zoom-generated focus group transcript was edited for accuracy by a single investigator [NR] with the assistance of the video and audio recordings. Relevant passages and interactions were isolated for analysis in NVIVO (Release 1.7.1 (4844)). Passages were initially identified by speaker, with each speaker assigned their self-regulation strategy as an attribute being either 'autonomous' or 'controlled' based on the results of their SRQ-L questionnaire. Both investigators familiarised themselves with the transcripts before agreeing on the initial deductive coding for the content analysis, listed here:

- High workload – external to learning environment
- High workload – internal to learning environment
- Low workload – external to learning environment
- Low workload – internal to learning environment

NR completed the deductive coding prior to KB validating the coded content and reviewing the transcript to ensure all relevant sections were included in the framework. Four discrepancies were addressed between the investigators and following discussion a consensus was formed. The excerpts assigned to each code were interrogated further to generate inductive codes that were specific to the experiences of our participants. Inductive codes were generated by NR through an iterative process and reviewed by KB with no discrepancies identified.

Results

Recruitment and participant demographic detail

Of the 29 full-time enrolments in 2022, 31% completed the questionnaire (n = 9). Of this subsample, 6 students agreed to participate in a focus group, with two dropping out the day prior, resulting in a final focus group sample of four.

Seven of the nine questionnaire respondents indicated they had participated in paid work throughout their studies in 2022. For participants who had participated in paid

work, the mean number of hours attributed to paid employment was 28 ± 9.5 hours per week. Only one participant indicated they had carer duties in 2022.

Based on the results of the SRQ-L, five participants were assigned an autonomous self-regulation orientation, while four were assigned a controlled orientation. Self-regulation orientation had no significant ($p < 0.05$) influence on academic performance across the year among our study participants (Figure 1).

Figure 1

The Relationship between Academic Performance and Motivational Orientation of Students who Participated in the SRQ-L Questionnaire (n = 9), Data Represented as Transformed Z-Scores.
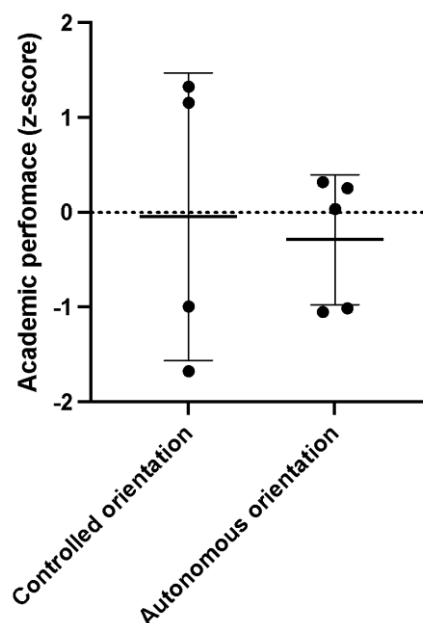
Of the four focus group participants, two were allocated a controlled orientation and two an autonomous orientation. All participants said they felt aligned with their assigned orientation, providing some internal validation of the SRQ-L questionnaire. All focus group participants indicated they had participated in paid work in 2022.

How students chose to engage in content

Synchronous engagement was initially high (81%), but quickly declined through the rest of the semester. Initially, most of the cohort were still engaging with course content within a week of delivery, with synchronous engagement sitting between 37-50% between lectures 2-6, and asynchronous between 21-40% between lectures 2-7 (Figure 2). From lecture 8 onwards, between 46 to 56% of the cohort did not engage with content at all within a week of delivery.

Figure 2

The Proportion of Students Interacting with Online Content in the First Week of Availability, for Lectures 1-12
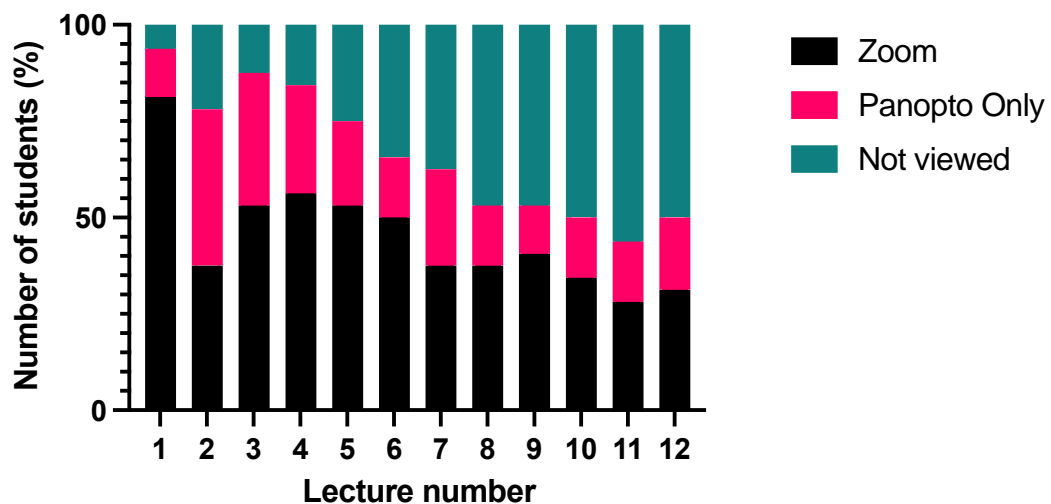

Focus group observations

The themes identified, their relationship to student perception of workload, and how they are nested within our coding framework are shown in Figure 3 and discussed in more detail, below.

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Figure 3

Themes Identified within the Coding Framework, and their Relationship to an Increased or Decreased Perception of Workload
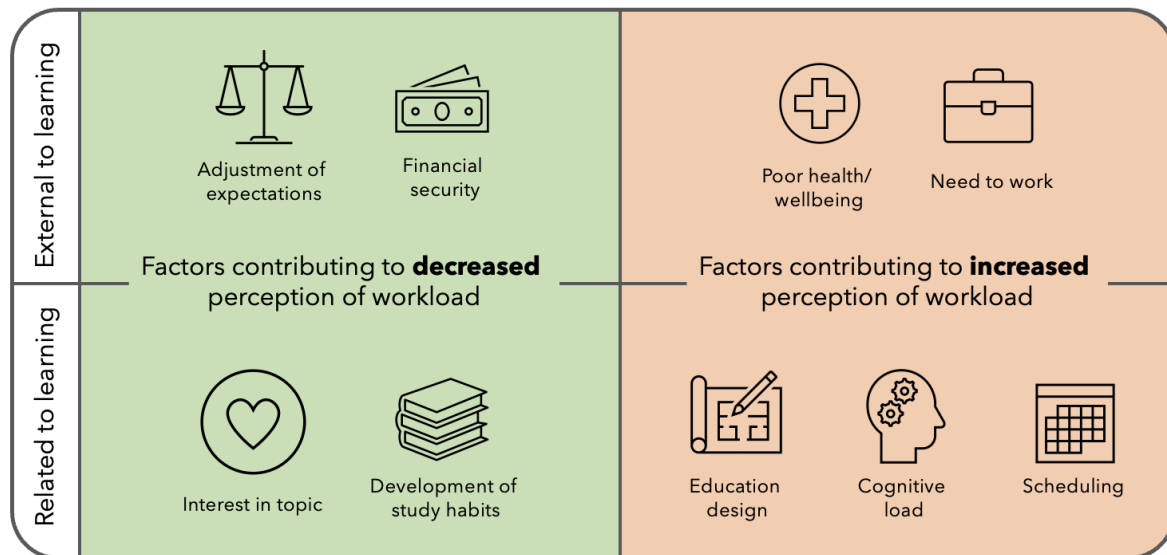
Shared experiences of workload perception

Perceived high workload

Factors outside of the learning environment were the dominant cause of an increased perception of workload in both controlled and autonomously oriented participants. Analysis of the transcripts within our 'high perception of workload - external factors' revealed two shared, dominant themes. First, the need to work was identified as a significant contributor to workload throughout the year.

> I am seeing it with lots of people… Having to work and make money is everyone's priority, it's huge. Rents are increasing, but also like going to the shop just to get groceries, you're still buying what you would have bought a year ago, but it's somehow $100 more expensive, you know… So, you've got to, you have to work. (Participant A, autonomous orientation)

> Losing a job and then trying to find a job again, that is a very high-stress point-I can relate. (Participant C, controlled orientation)

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The experiences of our participants suggest that in addition to time dedicated to paid work, the mental load and pressures associated with finding, maintaining or prospects of losing paid work opportunities also impacted participants' perceptions of workload negatively.

The second shared theme related to wellbeing, including illness or periods of poor mental health.

> I had a really bad, depressive episode around then, so I didn't study at all in the middle because I just was physically incapable. (Participant D, controlled orientation)

> I got sick when the website was due for the pregnancy unit, so I had to get an extension on that. (Participant B, autonomous orientation)

While the external environment was more dominantly referred to during periods of high workload, all focus group participants expressed the view that the scheduling of assessments contributed to increased perception of workload.

> The last 2 units were quite full on with the practicals, and then all the reports and how they were like set out deadlines and due dates. (Participant B, autonomous orientation)

> When we had our first round of exams and all those assessments were due, I was stressed because everything was happening at once. (Participant D, controlled orientation)

Perceived low workload

When analysing the factors that contributed to a lowered perception of workload, the theme of 'self-care' was expressed by participants from both motivational orientations.

> That was my little break away- the makeup artistry side of things was my creative outlet. (Participant A, autonomous orientation)

> I was focusing a lot on myself. I do pole dancing and I started going from 2 classes a week to like 7 to 10 a week, which is good fun for me. I had a new hobby, so I was a lot happier. (Participant D, controlled orientation)

In a confirmatory call-and-response, the theme of 'financial security' was associated with a lowered perception of workload in both autonomous and controlled participants.

This complemented the theme of needing to work and its relationship to a high perception of workload.

> I felt like I was more stable when it came to my job and earning a bit again after spending a lot of money. (Participant C, controlled orientation)

> In October, it [the workload] comes back down because everything started happening again, I had a job. (Participant A, autonomous orientation)

Finally, a consistent trend across both autonomously and controlled orientations was the protective role of feeling motivated, even when the workload was perceived as high.

> The end of the year where I enjoy the subject, even though the workload was pretty high, it was a super enjoyable workload. (Participant A, autonomous orientation)

> I loved that term so, so, so much… even though the stress and everything is really high, because I was really stressed about getting masks for MCE. I put in so much effort that term and I was enjoying everything, I was just really stressed. (Participant D, controlled orientation)

Experiences specific to self-regulation strategy

Autonomous orientation strategy

Some experiences of workload perception and motivation were coded similarly for all study participants, but the sub-themes identified differed between the two orientations. When discussing periods of increased perception of workload, autonomously oriented participants described conflicts between the structure of the learning activities and their preferential mode of learning as a contributing factor.

> When you give them stuff to learn... I think I sit there and go - how else can I read this? You know, I think like that, but there is no other way. And so, to do it, and to just sit down and read something that I don't enjoy, it's like it's forced, like you're forced to do this, and my body is just like no, this is not what I want to do. (Participant A, autonomous orientation)

Finally, autonomously oriented participants were more likely to attribute periods of low workload to external factors such as adjusting work schedules to accommodate their study workload.

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> I sort of managed a bit more with work to accommodate my time so the workload did decrease but I'm still very committed to work at around May-June. (Participant B, autonomous orientation)

Controlled orientation strategy

While participants with an autonomous orientation were more likely to attribute external factors to a lower perception of workload, participants with a controlled orientation were more likely to refer to the learning environment. Factors identified included 'the development of positive study habits' such as starting assessments earlier or 'working effectively within teams' to manage the workload.

> We had the IVF unit which was very interesting, and I was very keen to do it, and then the research unit which was me working with my group and we could split it between four of us which made it quite manageable. (Participant C, controlled orientation)

> By July, August, September, I kind of worked out that you start your assignments a bit earlier, so you have a bit more time and less stress. (Participant D, controlled orientation)

Additionally, control-oriented participants appeared to have some protection from periods of de-motivation if they had developed study habits or the self-awareness or discipline to persevere even when their interest in a subject waned.

> I feel like my period of internal motivation is very short. If I want to do something because I enjoy it, I know that feeling doesn't really last long for me. What I tend to do is rely on a more measurable style. So, I will do this for this period of time because at the end of it I'm going to get a good mark or I'm going to do well. It's much more measurable and I can kind of visualise that that is the end goal. (Participant C, controlled orientation)

> Motivation is hard, because to me motivation… it's a feeling, but you can't always just wait for that feeling to turn up. Sometimes you just have to do it because it's what you've got to do, even though you don't want to have to do it … yeah, [motivation] can be a driver, but I don't think it should be the only thing. (Participant D, controlled orientation)

Self-Determination Theory offers a valuable perspective for understanding students' needs and how social elements affect education. The framework used here illuminates

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specific themes both internal and external to the learning environment providing detailed insight into the participants' experience of ERT.

Discussion

We had intended for our course to be delivered in a synchronous manner but found that many students in 2022 were choosing to interact with the content asynchronously. Subsequently, the 2022 cohort reported that the workload was increasingly unmanageable in comparison to previous years. With perception of workload being closely linked to motivation, we used self-determination theory to consider the role of self-regulation in navigating the ERT environment and what internal and external factors students felt were supportive or challenging. The literature into online education is well established and provides many insights into better student engagement (Wong, 2020), but ERT is not online education. Our aim was to determine what elements we could influence to improve our students' perception of workload, and overall student experience.

The recurrence of the themes of 'need to work' and 'well-being' provides insight into the universal experience of learning in this context (Australian postgraduate education), and highlights factors that were potentially exacerbated by the pandemic. Participating in paid work decreases the time available to participate in learning, with students reporting this impacts their studies as well as their mental well-being (McGregor, 2015). A 2006 study estimates that more than 22 hours a week of paid employment negatively impacts grades (Applegate & Daly, 2006). Reports from 2002 and 2012 estimated the average number of hours students participated in paid work to be 15 hours, and 16-17 hours, respectively (Bexley, 2013; McInnis, 2002;). Our participants had a much higher average of 28 ± 9.5 hours dedicated to paid work per week. While this study was not designed to compare paid work hours between cohorts, the cost of living in Australia in 2022 has seen the steepest increase since the introduction of the GST in 2000 (McDonald, 2022), likely placing a greater external pressure on current students to participate in paid work.

When asked how courses could be adapted to assist with increased need to participate in paid work, a preference for asynchronous delivery was reported by students (McGregor, 2015). An 'on-demand' asynchronous curriculum is perceived as easier to manage due to its flexibility, however, students frequently underestimate the time management and self-regulation required to stay motivated when studying asynchronously (Jackson et al., 2022). The perception of 'having time' is described as

a precondition of perceiving a manageable workload (Kyndt et al., 2011). Misconceptions regarding asynchronous learning could contribute to time being dedicated to external activities, resulting in an imbalance when the reality of the course workload becomes apparent. Finally, synchronous settings have been shown to support the social interaction and basic psychological needs for autonomy, competence, and relatedness, more than asynchronous settings (Fabriz et al., 2021), and it can be understood why this change in content delivery alone had an influence of all participants regardless of motivational orientation.

Interestingly, the theme of 'scheduling' was an internal factor that contributed to a high perception of workload in our 2022 cohort and refers to workload associated with the scheduling of activities such as assessments. While a natural increase in study hours around key assessment periods is expected, the number and pacing of tasks throughout the semester had not significantly changed between the 2019 and 2022 cohorts, indicating a subjective, cohort-specific perception of the assessment load being less manageable in comparison to previous years. Appropriate time management is known to be a contributor to successful online learning (Song et al., 2004). A time management issue was observed in our engagement data where synchronous participation remained low but consistent, while asynchronous participation dropped throughout the first part of the semester to the point where half of students where not engaging within the intended timeframe.

While the themes of 'need to work', 'well-being' and 'scheduling' were consistently reported by participants of controlled and autonomous regulation orientations, other themes were reported disproportionately by the two groups. Our data show autonomously regulated participants were more sensitive to elements of the course design in comparison to control regulated learners. For example, autonomously regulated learners felt frustrated when they had to engage in an activity like reading or watching a recording, if the content was not aligned to their own interests. Conversely, control regulated learners were more accepting of the confines of the learning environment and had strategies in place for when their motivation waned. Similar observations were reported by Müller et al. (2021) where autonomous regulation styles felt less motivated during forced distance learning in comparison to in person learning.

The ways in which participants attempted to resolve the conflicts between work and study also differed. Participants with an autonomous regulation style reported more instances of a perceived high workload within the learning environment being

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alleviated by adjusting external time pressures to meet their studies. The opposite was observed in those with a control regulation strategy. Control regulated participants felt their workloads were more greatly impacted by the external environment but were more likely to report changes to their study habits reducing their perception of workload.

Conclusion

Knowing how the self-regulation style of students relates to different needs provides insight into how students respond to different teaching approaches. Both educator and student need to be aligned to support the three psychological needs of autonomy, competence, and relatedness, identified in Self-determination Theory (SDT). This study suggests that utilising a mixture of approaches, where time spent on tasks is justified to students while acknowledging their external pressures, may assist in rebalancing perception of workload. While this study is limited in breadth, the depth of the data analysed gives weight to the observations made and is consistent with larger quantitative data sets published in Covid-19 ERT literature. Finally, the changing external environment may need to be considered when applying modes of content delivery to tertiary education in an ever changing and complex world.

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