The Role of Executive Functioning Skills in Achieving Academic Success and Navigating Current Pandemic Uncertainties: Introducing ExS.

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Abstract.

The ExS programme is a recently launched autonomous online learning tool designed to help students become more aware of their executive functioning skills. Executive functioning skills are the set of cognitive processes required to enable higher order thinking and are associated with self-regulation and academic success. Based on the work of Dawson and Guare (2016), the ExS online programme helps students identify their executive functioning skill strengths and weaknesses through the completion of an online questionnaire which is then used to tailor a learning path specific to the students' needs. The learning path consists of three or more tutorials relating to the skills that students have identified as their weakest areas. Each tutorial describes the executive skill in more detail and gives practical advice on how to improve or self-regulate these skills. It also provides strategies that can be used to compensate for weaker executive functioning skills that can contribute to a negative experience in higher education and consequently lead to poor academic success. The online programme also focuses on the importance of setting personal goals and encourages students to work towards them. In the current pandemic climate, stress can have a negative impact on executive functioning skills resulting in underperformance and the ExS online programme is one way to provide support to students who may be feeling overwhelmed by the changes to their learning environment as well as their social and personal lives.

Keywords: Executive functioning skills; ExS; online self-regulation tool.

1. Introduction.

Restrictions continue to be in place now that HEIs have reopened their physical campuses again and most have adopted a blended learning experience to manage the risk of COVID-19 and to safeguard public health during the 2020/21 academic year. Students will have to be prepared for an uncertain learning environment with possible periods of self-isolation if they are known to

have come in contact with the virus (Irish Universities Association, 2020). In May 2020, students at NUI Galway were invited to participate in an online survey to discuss their experiences of studying during the first COVID-19 lockdown, to explore their preferences for the forthcoming academic year, and to assess their well-being (MacNeela et al., 2020). One of the main purposes of the survey was to identify sources of stress for students during the initial two months of lockdown. The top-rated stressors identified by these students were exams and assignments followed by studies in general. The next highly rated stressors were related to management of daily life: employment, relationships, living situation, and finances. More than 80% of respondents reported they were concerned or very concerned about the impact COVID-19 conditions and its restrictions might have had on their interactions with peers and on their learning experience, and they further indicated that they felt stressed motivating themselves to complete tasks on time.

Students who have a sense of personal responsibility and are adept at self-management are more likely to succeed in this type of environment. Anecdotally, most educators have encountered students who display self-management deficits in various forms such as those who have difficulties meeting assignment deadlines; students who struggle to adjust to living away from home or being on placement; students who flit from one activity to the next without every fully finishing anything, or who have difficulties following through on well-intentioned plans; and students who only focus on the subjects that interest them and neglect the ones they find boring. In this current pandemic climate, in order to keep on top of the learning requirements of various modules as well as other commitments, students will need to be organised and competent at judging the time required for coursework, be able to plan their time appropriately, and prioritise their competing commitments.

Those who are self-disciplined and self-motivated to initiate college work and can sustain this form of self-regulation will succeed better than those who cannot. As the COVID-19 outbreak has already shown, drastic changes, such as lockdown measures, could suddenly be put in place to contain the virus and students will need to be able to proactively respond to these changes. They will be required to have resilience to adjust to hitherto unknown situations, have the ability to cope with fears for the health and safety of loved ones, and adjust to living a curtailed social life. These personal cognitive skills and corresponding behaviours and habits

are not only essential for navigating the stresses and strains of living during a pandemic but are also generally required for attaining success and happiness across the whole spectrum of living an independent adult life; these prerequisite skills are identified as executive functioning, or higher-order thinking skills.

2.   Executive Functioning.

Executive functioning is a hugely important construct in understanding academic performance (Strait et al., 2019). Executive functioning resides in the brain's frontal lobe and comprises the cognitive processes that control higher order thinking skills and their associated behaviours. Dawson and Guare (2012) classify these higher-order thinking skills as executive functioning skills which encompass a broad range of skills including time management, planning, task initiation, emotional control, response inhibition, and sustained attention. These executive functioning skills require conscious effort and continuous use (Diamond, 2013), and if not developed or used can lead to a skill deficit and consequently to academic underperformance. Studies in the area of self-regulation, of which executive functioning skills are part of, assert that individuals are responsible for driving their own learning successes or failures through the regulation of their own thoughts, actions, and in controlling factors in the surrounding environment (Bandura, 1991; CAST, 2020; Frye & Shapiro, 2020; Sandars & Cleary, 2011). When viewed from this social-cognitive perspective, self-regulation is a cyclical process which encourages students to take control of their academic performance by utilizing strategies such as goal setting and self-monitoring in order to achieve success. In short, self-regulation is a three-phase cycle where the first phase, also known as the forethought phase, sees self-regulated students prepare for the task by identifying the purpose of the assignment and then setting appropriate goals to succeed. It is important to note that the most successful of these students set both process and outcome goals. In the second phase, the performance phase, these self-regulated students stay focused by employing strategies which aid with concentration, motivation and relaxation. Finally, in the last phase, students use cognitive self-judgement to self-assess and identify the strategies and tactics which have led them to success or caused some problems with the recently completed task. Through this self-reflection, students can amend their approach to future tasks. In a study by Kitsantas (2002), it was noted that students with poorly developed self-regulation underperformed in tasks when compared to self-regulated ones. It was concluded that these underperforming students would require training in how to employ skills such as strategic process goal setting, self-monitoring of

progress and self-evaluation. Under normal circumstances, this type of training would be delivered by an instructor in the classroom and with possible support from peers. However, with the recent pandemic, access to instructors and support networks is no longer guaranteed or feasible and this may become a source of stress for students. When under stress, such as that caused by COVID-19, the prefrontal cortex and executive functioning skills underperform or 'suffer' (Diamond, 2013, p.153), leading to further exasperation of executive functioning skills deficits. An online programme which does not operate under such constraints would be one possible solution to this growing issue. Such a programme would have to continuously address executive function skills deficits while simultaneously promoting the development of self-regulation strategies as both skills sets are interrelated and dependent on three types of brain function: working memory, mental flexibility, and self-control (Centre on the Developing Child, Harvard University, 2019).

3.   ExS .

ExS is an online self-directed programme to raise students' awareness of the impact of executive functioning as a success factor and to equip students with strategies that they can use to compensate for skill deficits that contribute to a negative experience in higher education. We feel that it is important to address this, as weak executive functioning has been linked to poor academic success and low retention rates (Alloway, 2009; St Clair-Thompson & Gathercole 2006; Waber et al., 2006). Based on the work of Dawson and Guare (2016), ExS is designed to help students identify their weaker executive function skills through the completion of an online questionnaire which is then used to tailor a learning path specific to the students' needs. The eleven executive function skills modules are: flexibility, response inhibition, planning and prioritisation, working memory, organisation, task initiation, goal-directed persistence, metacognition, sustained attention, emotional control, and time management.

The initial learning path consists of three of the eleven modules, relating to the skills that students identify as their weakest areas through the questionnaire. Each module describes the executive skill in more detail, through video and interactive examples. Practical advice on how to improve or compensate for that weakness is then provided. Built into each module are checklists and quizzes to assist students in assessing their progress and to monitor their path towards achieving their goals. In addition, students are required to set a personal SMART goal and develop goal-striving strategies that are likely to work for them. Once the students have

completed their three recommended modules, they cement their new self-awareness by revisiting and committing to their SMART goal. All 11 executive functioning skill modules also become accessible to them and they can then further develop other areas as they choose.

As part of the programme, students are given guidance in how to develop and retain strategic thinking skills for future tasks. The ExS programme initially evolved as a response to the lack of executive functioning skills training provided in Irish education, a shortfall that is starkly highlighted when compared to other countries. Research into the US education system would seem to suggest that the teaching of executive functioning skills, while not formally part of the curriculum, is extensively supported during the formative and adolescent years. An example of one initiative is SMARTS Online Executive Function Curriculum which is being used in over a thousand elementary and secondary level classrooms in the US (ResearchILD, 2019) in response to students' academic performance being 'increasingly dependent on their ability to organize and prioritize complex information, shift flexibly, access working memory, and self-monitor, all critically important executive function processes' (https://smarts-ef.org/about/smarts/). However, this level of support lessens in college as executive functioning skills coaching is mainly available to students with diagnosed learning disabilities and is offered through colleges' disability services and initiatives such as College STAR (Supporting Transition Access and Retention). In comparison, very little executive functioning skills support appears to be provided in the Irish education system. The National Psychological Service has published short guides in developing executive functioning skills in children and while these guides are available on the Department of Education's website, as of yet, no formalised teaching strategy or promotion of these skills has been established in primary or secondary curricula. In higher education in Ireland, executive functioning skills have been included in the Universal Design for Learning (UDL) digital badge, which is based on the UDL framework created by CAST (2020). But while the importance of executive functioning skills is recognised anecdotally, formalised training in HEIs appears to be limited.

With the recent pandemic, there has never been more of an urgency to support students in the development of their executive functioning skills. Currently students have disrupted or limited access to their learning and development networks and the ExS online programme is one way to offer much needed guidance. By providing training in executive functioning skills and

consequently improving self-regulation, students can become better equipped to manage the uncertainties caused by COVID-19. Modules such as *Flexibility, Sustained Attention and Response Inhibition* offer students practical advice and techniques on how to navigate difficult situations thereby leading to better interactions and experiences.

The modules available on the ExS online programme have not only taken into consideration the educational needs of students but also the psychological aspects which influence learning and development. Educational psychologists from the UK based *Connections in Mind Foundation* that specializes in executive function coaching, mentored college staff through the development of a training plan targeting module content writing and programme facilitation. The most effective intervention method to improve executive skills is through coaching which builds self-awareness, self-management and self-advocacy due to personalised goal setting, feedback and accountability which one-on-one coaching offers. It was decided to create this tool online for a number of reasons: first, being online facilitates an intervention which allows students to develop a sense of responsibility for their own personal development and strengthen their capacity to regulate their goals autonomously; second, the vast majority of students carry smartphones nowadays and are comfortable accessing virtual learning environments and social media sites on their phone; and third, providing a programme online allows scalability that would not be possible otherwise. The ExS programme can be accessed whenever and wherever rather than face-to-face, and this is fortuitous in the current climate of requiring limited personal contact.

Testing the efficacy of ExS has commenced with a pilot group of 2020/21 1st Years at Shannon College of Hotel Management. The ExS project was funded by the National Forum for the Enhancement of Teaching and Learning and is freely available at www.exsapp.ie

Figure 1: ExS login page
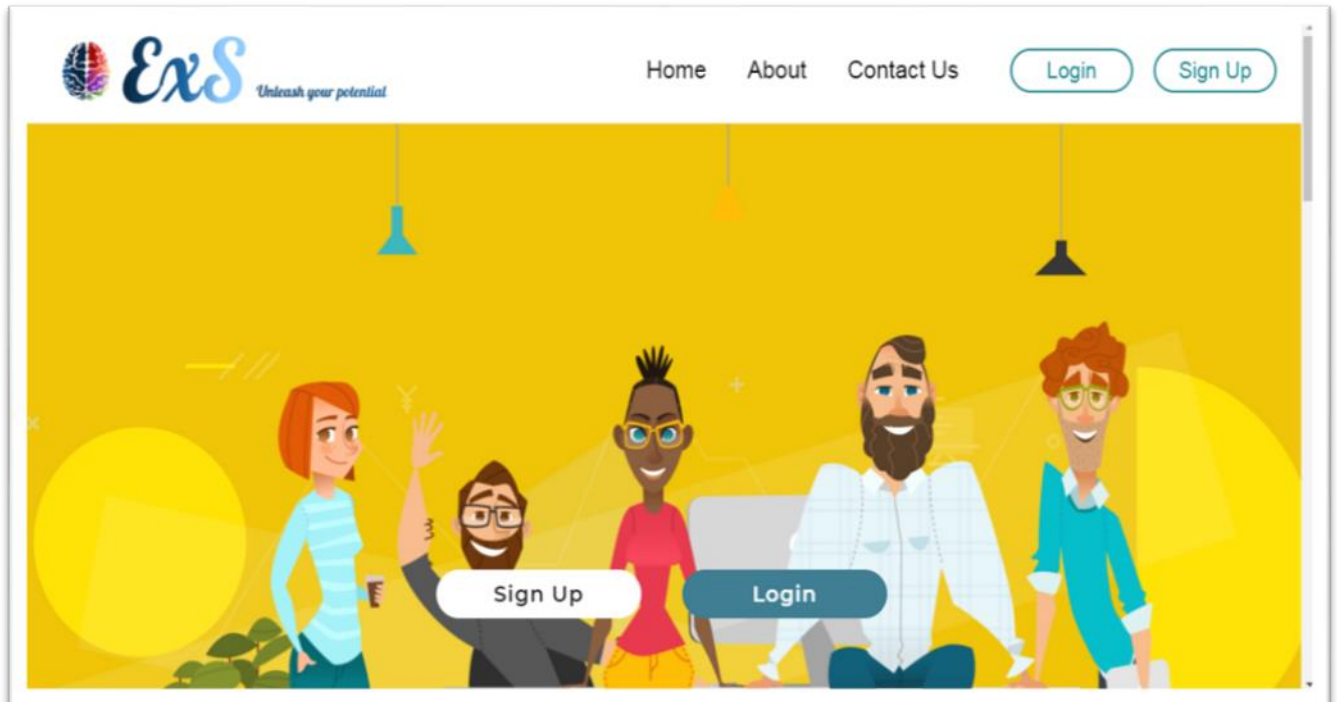
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