Developing self-regulated learners at sixth form

Freya Ralph

A Research & Development Project

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Abstract:

The current research aimed to look at whether self-regulatory learning (SRL) could be taught to sixth form students through an intervention programme. Five-year twelves were selected to take part who showed low scores on the SRSI-SR scale. These students took part in a five-week course designed to teach them various skills associated with SRL by educating them on the cyclic model of SRL, as first described by Zimmerman (2002). Students were taught various strategies to support the use of the three stages process, including effective ways to plan, revise and reflect on their learning. Qualitative data was collected during the process of how students reacted to the sessions as well as through interviews post-intervention. The data were analysed using a thematic analysis which found that student's motivation generally increased over time, although this was meditated by closeness to the end of the school year. Equally, academic confidence increased as students felt they were better prepared for learning. Students also became more metacognitively and cognitively aware. However, future development of the intervention on the more explicit teaching of these last two concepts is important as students struggled to verbalise their understanding of learning. To conclude, the intervention did increase students' self-regulatory skills, however more long-term interventions within the classroom would be useful.

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Introduction:

SRLs' are more likely to engage in learning, more likely to volunteer answers to questions (Elstad & Turmo, 2010), more likely to seek out resources to master skills and knowledge (Clarebout, Horz & Schnotz, 2010) and ultimately, perform better on academic tests (Zimmerman, 2008). Nevertheless, as the culture of schools becomes more narrowly focused on passing exams whilst balancing the demands of ever-expanding curriculum content, it becomes increasingly difficult to provide students with the opportunity to develop these skills. Students often struggle with the transition to the sixth form as they have not been taught how to employ self-regulation strategies (newschoolsnetwork, 2018). This is something which has been discussed recently with our sixth form, as students were challenged by the transition to A-level, which was in part due to insecurities about how to manage their independent time effectively, with little guidance. In turn, this was having a negative impact on those wanting to go on to higher education as they have heard that there is a frustration at apparent lower levels of guidance and support (The Times, 2019). Schools need to provide students with self-regulation skills to prepare them for employment and future learning, so teachers must consider what makes an effective SRL and how we can facilitate students learning this skill.

There are several theories which outline the variables which make an effective self-regulatory learner (SRL). Early theories argued a socio-cognitive approach, suggesting that self-efficacy (the confidence in a domain) helps develop self-regulatory learners (Bandura, 1986, cited in Zimmerman, 2008). They recognised self-regulation as a skill which can be developed, meaning people have an opinion on whether they are good at it. This, in turn, determines motivation and therefore the amount of effort required to invest in a behaviour. More recent research has shown that those who

recognise self-regulation as a skill, are more likely to see the process as a cycle and attribute failures and successes to the strategies they used rather than to external uncontrollable factors (Newman, 1994, cited in Zimmerman, 2008). If students can recognise the importance of developing this skill in a similar way to developing subject knowledge, students may be able to have a positive outlook on learning.

A cycle of self-regulation was proposed by Zimmerman (2002) who argued that those who are effective SRLs use this cyclic model to improve their skills, whereas ineffective SRLs disregard the cyclic process altogether. There are three stages to developing and improving self-regulation, the first being forethought and planning, which involves students analysing the tasks and setting specific goals for completing that task. Next, the performance monitoring phase is where students employ strategies to make progress with the tasks and monitor the effectiveness of those strategies. Finally, the performance phase, students evaluate their performance during the learning task concerning the effectiveness of the strategies that they chose. During reflection, students also must manage their emotions about the outcomes of the learning experiences. These self-reflections then influence students future planning and goals, causing the cycle to start again. The original model does not suggest that this process can be taught.

With this in mind, the literature review discussed the current research on strategies used to develop self-regulatory learners using the cyclic model of self-regulation. It highlighted specific strategies different interventions have used and the relative success of these. The review also considered how best to measure this success objectively, so that a definitive difference in pre and post-test intervention scores can be identified to show an increase in self-regulatory learning.

Literature Review:

2.1. Defining Self-Regulated Learning:

There are several key terms associated with SRLs and so it is important to both recognise the differences between them and explain how these will be used within the literature review. One of the earliest references to SRL is self-regulation. *"Self-regulation refers to the exercise of control over oneself, especially with regard to bringing the self into line with preferred (thus, regular) standards"* (Vohs & Baumeister, 2005, pp.653). Their definition suggests that self-regulation is a process with which everyone engages and sits on a continuum. Other early researchers into self-regulation have concerned themselves with the individual's awareness of the strategies which they used and how this was developed through experience (Tabachnick, Miller & Relyea, 2008). Similarly, Bandura (1977), recognised self-regulation had a person-environment interaction. It was not until later, however, that this was applied to an academic context.

Zimmerman and Schunk (2001) and Sawyer, Graham and Harris (1992) applied these early definitions to an academic context. They suggest self-regulation is the awareness of one's learning, influenced by environmental factors. The self-regulation process can be seen through a social-cognitive lens, in that we gain feedback from our peers and teachers about our success as learners whilst also having an awareness of strategies we use to support our learning (Zimmerman & Cleary, 2009). They also recognise the role of metacognition in self-regulation; they note the mind of the individual has the greatest impact on the person's judgments and evaluations of their learning. This is clear in Zimmerman (2002) earlier research where he described students as active learners, rather than producing passive responses, as they react to what they have been taught. Students do not possess, or lack self-regulation but use it to varying degrees of success where some can effectively select and adapt the process to fit their learning needs, thus recognising the influence of metacognition on SRL. Finally, he suggests students must learn to be aware of themselves and their cognition to be successful learners, indicating it is possible to teach self-regulation. Further research

in this area provided evidence that interventions did indeed increase self-regulation (Butler, 1998; Harris & Graham, 2009; Baptist et al., 2012 and Cleary & Platten, 2013).

SRL, on the other hand, emerged from a classroom context. SRL, as defined by Zimmermann and Schunk (1986), see students as meta-cognitive, motivational and behaviourally active participants in their learning process. They recognise SRL as people who can employ strategies needed to develop their learning. With the person's focus not being on achieving academic success but engaging in an infinite cycle of learning. Cleary and Zimmerman (2004) later add that SRLs are proactive and incorporate various self-regulatory strategies, task strategies and self-motivational beliefs, which make them successful learners, highlighting the interplay between several factors in developing SRLs. More recently this idea has been adopted by the EEF (2018), who created a guide on these terms and define metacognition as follows: the ways learners monitor and actively direct their learning. This was developed from research which recognised that metacognition is essential to developing SRLs, as a person needs to be aware of the strategies they used to refine them effectively (Bandura, 1997).

The EEF (2018) defines cognition as the mental process involved in understanding, knowing and learning something. Boekaert, Zeidner & Pintrich (1999) take this further and argued that it refers to the cognitive strategies applied to learn something or perform a task. This definition recognises cognitive psychologist views that cognition refers to information processing, in this case, the processing of the most suitable strategy to use for a task. This suggests that cognition plays an active role in becoming an SRL. Cognitive psychologists would argue that it is possible to teach effective information processing by explaining the process of learning.

Finally, the EEF (2018) defines motivation as a willingness to engage in metacognition and cognition, Boekaerts et al. (1999) suggest an alternative view that motivation refers to the beliefs about oneself related to the task such as self-efficacy beliefs, interest in the subject or reactions to the task. This recognises the importance of emotion and prior experience, similar to Bandura's (1997)

earlier suggestion. The former definition focuses more on internal motivation to engage in the learning process, whereas the latter recognises the contributions of others as well as past experiences. This highlights the complexity of motivational research, therefore this literature review will focus on the EEF's (2018) interpretation of motivation concerning SRL, although acknowledging that other motivational forces will influence SRL.

Zimmerman and Schunk (1986) argue for the importance of recognising how intertwined self-regulation, metacognition, cognition and SRL are, as one needs the other so that it can be measured. Manion (2020) goes one step further and identifies the interplay between metacognition, cognition and SRL. He defines metacognition as the monitoring and controlling of the thought processes. He also recognises there is a lack of clarity on how these concepts are used in research. Dinsmore et al. (2008) found, only 49% of publications on SRL define the term itself, which makes it difficult to judge whether all research is measuring the same behaviour, which questions the validity of some conclusions. The research included was selected as it followed the cyclic model's view of self-regulated learning.

2.2. The Benefits of SRL

However, SRL and its associated terms are defined, it is worth recognising the importance of understanding them within a school context. It is cited in the literature that motivation often decreases at secondary school as students may feel there is competition between peers under a more controlling and narrowed curriculum (Grolnick & Raftery-Helmer, 2015). Additionally, students perceive greater expectations surrounding academic success and an expectancy that they should be better at dealing with academic demands (Grolnick & Raftery-Helmer, 2015). This may be due to schools being placed under pressure to achieve good grades to gain future pupils and league table places. Thus, a major focus in secondary school education is examinations and effectively preparing students for these. This means students are constantly monitored, reports generated, and feedback is given (Cleary, Velardi & Schnaidman, 2017). At the same time, the educational

demands of the curriculum give teachers little time to prepare students for more than the upcoming exams. Alongside this, students in secondary schools are often required to organise their time to deal with multiple assignments, homework and revision independently (Weinstein, Husman & Dierking, 2000 and Zimmerman, 2002). Most of the time without ever being taught self-regulated learning (Dembo & Eaton, 2000).

Early research by Zimmermann (2002) found SRLs are not only more likely to succeed academically, but also to view their futures more optimistically, suggesting that academic confidence may increase by becoming an SRL because students believe they are in control of their learning. Cleary and Patten (2013) support this theory by suggesting SRLs were more likely to succeed academically and have a higher motivation to study their subjects. Cleary and Zimmerman (2004) add that students who believe they can learn academic skills are more likely to be motivated both in and out of class and value the academic task they more, as they have confidence that they will bring success. In turn, students value class time more and preparing more effectively for examinations, (Zimmerman, 2002) indicating they are better at engaging in self-regulatory learning. These studies highlight the effect that SRL has on motivation and consequently, academic confidence, further supporting the connection between these concepts. On top of this, students who were able to develop these skills and so become better SRLs, were also more likely to succeed academically, suggesting their confidence was well placed (Dent & Koenka, 2016).

As the benefits of SRL result in an increase in both motivation and academic confidence are evident, this led to further research into interventions to improve self-regulated learning. For example, Zimmerman and Cleary (2009) summary of the study suggested it was possible to teach self-regulated learning and that doing so would increase student's academic motivation. Furthermore, Hadfield and Haw (2001) and Kane and Chimwayange (2014) suggest it is valuable for any intervention to teach the students to feel they have an influence in their education and become owners of their learning as they are more likely to adopt the beliefs and attitudes of an SRL. Intervention research from Cleary, Platten and Nelson (2008), found an average improvement of

70% between pre and post-test intervention scores on a self-regulated learning questionnaire Later research by Cleary and Platten (2013) also found increased academic attainment with an increase in biology test scores in a small intervention group of four students. These results provide evidence of both quantitative and qualitative changes to students' academic success as well as overall SRL abilities. They concluded that their interventions were successful in improving self-regulated learning. It is, therefore pertinent that any literature review identifies the most effective strategies used from each intervention to be able to see the same results in future research.

One of the main features of the interventions discussed so far is that they are often limited to measuring effectiveness within one subject. For example, Cleary, Platten and Nelson (2008) investigated biology students and Raajimaker et al. (2018) studied mathematics students. Raajimaker et al. (2018) and Cleary and Platten (2013) highlight this as problematic, as most reports, suggests students were not able to identify that the skills gained in the interventions were able to be applied across all subjects. This is a problem as SRLs can recognise that learning takes place across all domains (Zimmerman, 2002). Any future intervention needs to consider whether it is possible to teach SRL across several domains so that students can apply it no matter what the learning environment. This question is ever more important now that jobs which never existed before are being created, students need to see that the skill of learning can be applied to all subjects.

Another limitation of the interventions discussed so far is the lack of detail on processes and tasks carried out during the intervention (Dignath & Buttner, 2008). Until now, the research focussed on the effectiveness of the interventions. If teachers are to make use of these studies, the process needs identification and refinement. The next section of the literature review will identify individual strategies which have been shown to increase motivation, academic confidence, metacognition and cognition.

2.3. Feature of Good SRL Interventions:

The EEF (2018) guidance on metacognition and self-regulated learning suggest that teaching SRL skills is a high impact, low-cost strategy, indicating the importance of finding and refining an effective intervention strategy for students who struggle with this skill. A meta-analysis of SRL interventions has shown that there is still a need to clarify the effectiveness of the features. (Dignath & Buttner, 2006). This research led to the EEF (2018) outlining several specific skills which need additional teaching.

As discussed previously, metacognitive strategies are necessary for self-regulated learning. Older students and those in secondary level education show more strategic thinking than those in primary school (Dignath & Buttner, 2008). They define strategic thinking as being able to plan and reflect on learning, in this way is similar to the EEF's (2018) definition of metacognition. Their research indicates that students do develop metacognitive strategies; therefore, it is likely that teaching them will be beneficial. This is mediated in older students by whether they attribute success or failure to effort or ability (Dweck & Elliott, 1988) indicating that younger students might find an intervention more accessible as they attribute success and failure to effort rather than ability. Dweck and Elliot (1988) argue for teaching metacognitive strategies to those with more fixed mindsets. They may benefit more from having these types of interventions to increase their motivation, by teaching them that adopting new strategies will help them to succeed.

The EEF (2018) also highlighted that SRLs are likely to have higher levels of motivation accordingly, any intervention needs to consider how to increase this. Cleary and Kitsantas (2018) introduced a graph to help students monitor their academic achievement across a series of tests. Each time students completed a test they would mark their percentage on a graph and then engage in some micro-analytic questioning. Then they were asked to consider what they did to study and what necessary adjustments they would need to make to their plan or strategy to increase their chance of academic success next time. Within the intervention, students were encouraged to spend time considering the approaches they had used and constructing more effective plans or refining those

they had already tried. The result shows that students within this intervention increased their academic outcomes and their motivation within their secondary school setting. This indicates that an important part of the intervention is teaching students to attribute their success or failure to the strategies that they employed. Crucially, it demonstrates the importance of teaching monitoring and refining different approaches to the students in the intervention who were encouraged to reflect on the reasons for their progress and adjust their planning. The importance of metacognition in increasing motivation and thereby, self-regulated learning must be recognised.

Recognition that some students will struggle to evaluate the effectiveness of these strategies without the support of a teacher is essential. Interventions have included modelling the reflective process to help increase self-regulated learning (Zimmerman, 2002). Raajimaker et al. (2018) used a video of a teacher performing a task and then assessing his or her performance. They found that these students were able to apply the skills they gained beyond the questions they needed to answer. Although later studies suggest that verbal feedback and reflection was more effective than written comments as it gave students the ability to enquire further into the teachers thinking, for example, Van Meeuwen et al. (2018). This demonstrates the importance of teacher-student interaction when trying to explain complex mental processes, so any intervention should aim to model metacognitive techniques to develop SRLs.

The intervention should not solely focus on gaining information from the teacher, it is also crucial that students learn to become independent and take on responsibility for their learning (Kitsantas & Cleary, 2016). Kitsantas and Cleary suggest the intervention should, in part, focus on students taking responsibility for finding effective strategies to support their learning. This is especially significant in post-16 education, where students are allowed more time to study independently, away from the supervision of their teachers (Raaijmaker et al., 2018). Students who struggle with managing their time are going to benefit from structured and guided opportunities to practise and refine this skill. One-way Kitsantas and Cleary (2016) prepare the students for this, is by teaching them time management skills. They ask students to keep a numerical track of the hours they spent working on

different subjects as well as supporting the students to plan their learning through a calendar system. Students were required to organise their week to include time to complete homework and revise throughout the intervention. Students who used the tracker and calendars showed an increase in SRL scores at post-intervention. Once again, students were given time during the sessions to refine their strategy and discuss with the coach how it needs to be adapted to suit their needs, highlighting the importance of embedding metacognitive strategies into self-regulated learning interventions.

The strategies reviewed in this section all based their methodology on the self-regulation cyclic model (Figure 1). Zimmerman (2002), first described self-regulated learning in terms of a cyclic model, in that successful SRLs used this three-stage process consistently and unconsciously. The first stage of the model is the forethought phase, here students plan their learning and set goals for themselves, these may be short term (such as attaining a good grade in the next assignment) or longer-term (achieving a good set of GCSE or A-level results). Once a plan has been set students start to undertake their strategies to achieve these goals, for example making flashcards for their biology test. Students enter the performance phase, where students monitor their abilities by self-testing or self-questioning to check they are on track to achieve their goals. Finally, in the self-reflection phase, students evaluate the effectiveness of their plan and the strategies used to achieve their goal, e.g. were the revision strategies effective, did I get the grade I wanted to? This stage is known as the self-reflection phase.

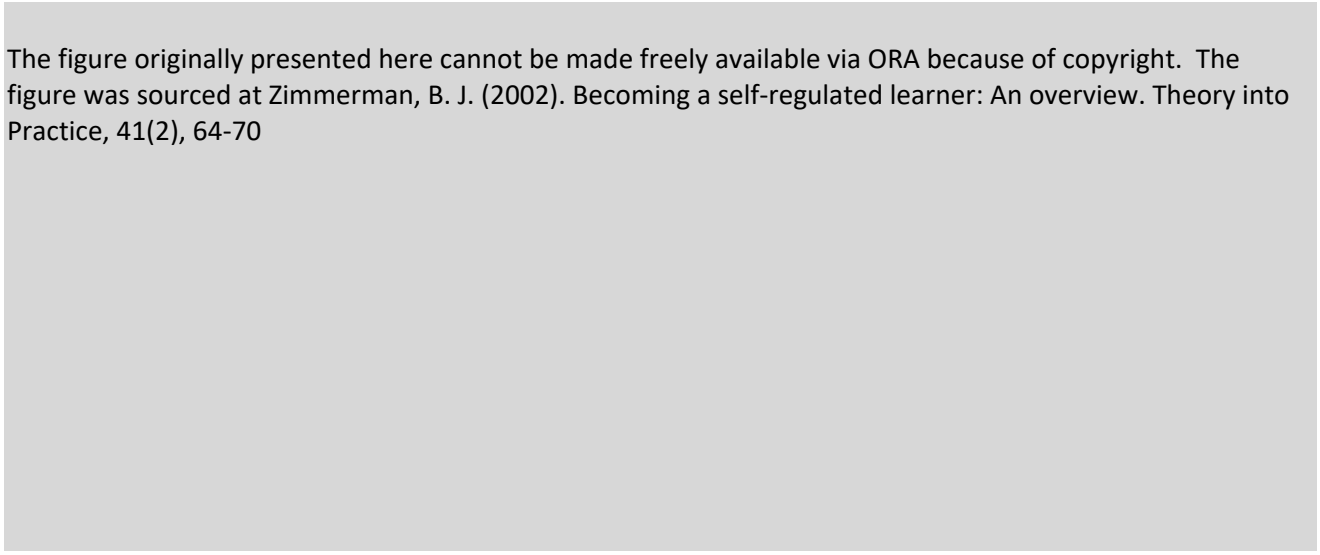

Figure 1: The Self-Regulation Cyclic Model

Research has shown that engaging students in all phases of the cyclic feedback loop can help students to become SRLs (Cleary & Platten, 2013; Labuhn, Zimmerman & Hasselhorn, 2008; and Kitsantas & Cleary, 2016). Additionally, research has shown there are many benefits to engaging in this cyclic feedback loop, including that students' academic confidence increases (Yildizli & Saban, 2016). Zimmerman (2000) argue that when students are taught to regulate their thoughts and their actions at all stages of the cyclic process, students become more motivated and achieve higher grades. Furthermore, studies have shown that students who understand how they learn are more metacognitively aware and consequently, are better SRLs (Follmer & Sperling, 2016). Intervention strategies should focus on allowing students to think about their behaviour and thought processes before, during and after a piece of learning. To do this, the interventions must take place over a long time, because changing thought processes is complex and needs to become a habit (Veenam et al., 2006). For this reason, students need as many opportunities and as much time as possible to practice. Equally, as tasks become more challenging, students need more support with engaging in the cyclic model. For example, preparing for an end of the topic test involves students being able to select appropriate strategies, such as self-quizzing (forethought), implementing these strategies (performance) and then evaluating the effectiveness of these strategies and their planning after they receive feedback on their test (self-reflection).

The next part of this literature review will discuss the different stages of the cyclic model in detail and how they have been used to support interventions to increase student's motivation, metacognition, cognition and academic confidence and subsequently become a better SRL.

2.4 Forethought Phase:

This phase suggests SRLs plan for future obstacles or goals. An SRL uses two strategies here: task analysis and self-motivation. Students who are good at task analysis and self-motivation tend to be more adaptive learners, they spend time planning and adjusting their strategies and spend an increased amount of time on independent tasks (Kitsantas & Zimmerman, 2009). They also found that these students are more likely to report being satisfied with their learning; they suggest those who are not self-regulated learners are more likely to report a lack of enjoyment with school and learning and so are most at risk of dropping out of education. This shows the significant impact that an intervention to teach forethought strategies could have on these types of students. It is important to understand how we can increase motivation and provide strategies to help students plan the learning better to reduce feeling overwhelmed.

Task analysis refers to setting appropriate goals and planning how they are going to achieve these goals. Within this theory, there are two sub-sections, goal setting and strategic planning, both of which need to be considered for any intervention. Evidence for goal-setting suggests those students who set SMART goals (specific, measurable, achievable, realistic and time-dependent) are more likely to experience academic success (Zimmerman, 2002). On the other hand, those who set generic goals such as "trying my best" are those whom teachers recognise as having a lack of motivation for their subject (Kitsantas & Cleary, 2016). Further research found SRLs use two variables to establish their goals: the assessment criteria that is, how they are going to be assessed; for example, long or short answer questions, verbally or written. The second is the performance level that they want to achieve namely the grade they're aiming for (Panadero & Alonso-Tapia, 2014). Students who are poor SRLs will find it challenging without help from a teacher to know how

to set appropriate goals. Interventions, however, have shown that students' academic confidence increases when given specific and measurable assessment criteria (Andrade & Valtcheva, 2009). In conclusion, effective intervention should explicitly teach goal setting as a skill.

It is not only academic confidence that increases through goal setting but also motivation. Research shows that encouraging students to set challenging goals for themselves can significantly raise their motivation and performance (Latham & Locke, 2002). This research recognises the two parts of the forethought phase as affecting each other, and therefore key to providing effective intervention but, motivation and task analysis are mediated by cognitive effort. As SRL is an effortful process as it requires conscious engagement with one's learning, it can be unpleasant to undertake (Errikson & Desimone, 1993). Importantly, intervention should highlight the necessity of putting this effort in, to become an SRL.

A second part of the effortful process of task analysis is strategic planning which can be defined as deciding on an action plan by selecting the most appropriate cognitive strategies to aid success (Zimmerman & Cleary, 2009). Those who take the time to consider an effective programme are more likely to achieve higher academic success (Zimmerman & Kitsantas, 2005). Those lacking in self-regulatory learning skills are more likely to choose more generic strategies, undertake less planning or apply no strategies at all to their learning task (Cleary & Chen, 2009). This has in turn been shown to affect student's motivation (Zimmerman & Kitsantas, 1997; Zimmerman & Kitsantas, 2005). They suggested that SRLs believe the strategies they use are causing them to either fail or succeed academically and are motivated to spend time refining these. This may be because students can attribute their success or failure to the strategies that they used rather than their self-efficacy for a subject (Zimmerman & Moylan, 2009), suggesting the importance of helping students to find an effective way of planning their learning and keeping track of their performance.

Many students struggle with being able to motivate themselves to complete work, especially in subjects they find challenging (Vanslambrouck et al., 2019). Task analysis strategies need to be

encouraging and simple to employ to increased self-motivational beliefs about self-regulated learning. The learner must not ignore the challenging nature of engaging in the self-regulated learning process, and the strategies given to planning are not overly complicated, because self-efficacy plays a vital role in personal achievement. Self-efficacy is one's belief in their capabilities of a specific skill such as a subject, but also on skills such as self-regulated learning (Bandura, 1999). If a student does not consider themselves capable of achieving in a subject, then their motivation will be less (Pajares, 2008). Equally, if a person has low self-efficacy for self-regulated learning, then they are also less likely to achieve academically as they are not motivated to attempt strategic planning or goal-setting behaviours, whereas, SRLs are more likely to believe they have agency over there learning, resulting in greater motivation (Zimmerman & Kitsantas, 2014). Any intervention into self-regulated learning must provide students with strategies which help them develop a personal sense of control over self-regulated learning.

Research has also shown that students who have strong self-efficacy beliefs are more likely to have higher outcome expectations (Andrade & Valtcheva, 2009). Outcome expectations are a person's belief about the probability that they will succeed on a task. In the case of schools, an outcome expectation might be a grade on a test, however, it can also be a career outcome for example, . 'being good in Maths means one day I can become an accountant'. These expectations have lifelong implications for students. Research has shown students who have higher positive outcome expectations showed increased academic confidence. (Schunk & Zimmerman, 2012). In turn, this led to them believing that they will become leaders in that career, supporting the evidence for their increased academic confidence (Nauta and Epperson, 2003, cited in Schunk & Zimmerman, 2012, p. 210). Not only this but they are more likely to be accurate predictors of their success or failure (Renwick, McCormick & McPherson, 2009). It is important to understand how outcome expectations are mediated, for an intervention to be successful. Research suggests students who received encouragement from their peers for a subject or skill were more likely to have higher expectations of their achievement (Zeldin & Pajeres, 2000 and Graham, Taylor & Hudley, 1998). Any subsequent intervention should consider the importance of small groups of students rather than

individual programmes. Additionally, McInerney (2008) found that outcome expectations are often moderated by the culture of the school, if a student believes a teacher has a high outcome expectation for them, then they are more likely to believe this themselves, so high outcome expectations should be modelled in any intervention on self-regulated learning both from peers and the teacher. Specific strategies for how to model this behaviour were not given in any of the papers discussed above.

A student's outcome expectations can be mediated by their belief in the task's value. If a student perceives the task to be useful in achieving their goal then they are more motivated to perform it and more likely to learn from it, as they engage actively in task analysis (Wigfield, Hoa and Lutz Klauda, 2008). Students who believe the task has value are more likely to employ the strategies used in this task more often (Battle & Muenks et al., 2017; Wolters, Benzon & Aroyo-Giner, 2011). This suggests that task value is key to motivating students, by increasing their outcome expectations. As an SRL Intervention is likely to provide students with several tasks it must consider the student's perceptions of these tasks. Students must be allowed to express their opinions on the tasks for the teacher to be able to help students adapt these to suit their needs or better reiterate the value behind them.

Although beliefs in the value of specific tasks are important, students must also value the process of learning, this is known as goal orientation. If a student believes the purpose of learning is to perform well during tests, then they are more likely to avoid challenging learning experiences (Zimmerman & Schunk, 2011). Whereas, if students believe that the purpose of learning is to become a competent learner, and gain skills in how to learn different skills and knowledge, then they are more likely to strive for a deeper understanding of concepts, are better at reflecting on their learning and recover faster from academic mistakes (Grant & Dweck, 2012; Harackiewicz, Barron & Elliot, 1998). This leads to the latter becoming better SRLs because they spend time refining their skills because they recognise learning as a process, thus showing increased academic motivation.

At this point it is worth recognising that although the cyclic model looks at SRL through a social-cognitive lens, the model does not discuss other types of motivation, such as emotions, affecting a students' ability to become an SRL. For example, students who do not enjoy the subject may be less motivated to engage in SRL skills. This may be explained by the fact that this type of motivation could not be directly challenged by engaging in SRL but it may be affected by doing so, that is, engaging in self-motivation beliefs such as self-efficacy may increase positive emotions towards the subject and therefore motivation. My research will therefore focus on discussing motivation within the context of the cyclic model, rather than looking at the wider picture of motivation.

2.5 Performance Phase:

Once students have identified strategies for success and set goals for their learning, SRLs will go on to perform their tasks and monitor the effectiveness of their selected strategies (Zimmerman, 2002). By, using the most effective strategies, I student's motivation will increase because it led to them feeling a sense of progress which will help them keep track towards achieving their goals. There are two parts to the performance phase which are: self-control and self-observation (Zimmerman, 2002). Self-control follows on from strategic planning, once students have selected the most appropriate strategy, they then must employ it effectively. In particular, the focus here is on metacognitive strategies that are used. It is key to becoming an SRL that the student focuses on monitoring and directing their learning. Leutwyler (2009) notes metacognition in high school students did not improve over time without significant intervention from teachers The above papers suggest it is important to identify the most effective strategies for increasing metacognition.

As maintaining concentration and engagement is a strategy that requires high levels of effort, a series of metacognitive strategies must be employed to keep attention on the task in hand (Andrade & Valtcheva, 2009). Reactive learners often find it difficult to focus their attention on a task, such as completing homework, because they have not appropriately planned their time or

considered their goals effectively (Zimmerman, 2002). It is, therefore, important to see SRL as a cycle, whereby strategic planning in the forethought phase can affect the student's self-control in the performance phase. Poor SRLs also struggle with monitoring their progress for a task or strategy they have selected to use (Zimmerman, 2002). Interventions should allow time for helping students to reflect on how successful strategies are at completing similar tasks. Research has also found that those who are focused on performance rather than the learning process, are more likely to be impulsive and inattentive (Zimmerman, 2008). Again, highlighting the need for any intervention to focus on engaging students in the learning process rather than focusing on the next deadline.

Metacognitive strategies are also useful in supporting revision and recall. For example, imagery, which could be in the form of a mind-map, diagram or flashcard allows the student to visualise the concept in their mind. This strategy has its roots in sports psychology. There is much evidence to suggest that visualisation of a skill was used by athletes who set more specific goals and performed at a high level in sport (Harwood, Cumming & Fletcher, 2004). However, Zimmerman (2011) also found that imagery has helped students to organise large amounts of information and focus attention on learning as well as increasing the quantity that someone can memorise. As this is a significant challenge at GCSE and A-level where there is much content to learn, any intervention must provide support to students struggling to retain this knowledge. Nevertheless, Dunolsky et al (2013) suggest that the use of imagery for text learning has low utility. He suggests while visualisation might be useful for some learning, it must be applied only when appropriate. Therefore, interventions should consider how this strategy might be best used, whilst explaining where it can most appropriately be employed in the learning process.

Another metacognitive revision strategy SRLs use is to verbally articulate how they are solving a problem as they do it or describe the task currently being performed, known as self-instruction (Zimmerman, 2002). For those students for whom this does not come naturally to it is important that the teacher models this self-talk. For example, if a student is struggling with working out a mathematical equation, the teacher might explain out loud how she worked out how to solve the

problem, breaking it down into clear steps. Modelling of this type is not something that teachers often do, because the reasoning behind decisions in their subject has become an automated process (EEF, 2018). Any intervention must use modelling to teach self-talk, but any good modelling should be appropriately scaffolded, in that it moves from the teacher guiding the experience to the student being able to practise the skills they have gained independently. It is also noted in the EEF (2018) report, that any scaffolding should not be overly specific to a question or piece of knowledge but instead allows the students to see beyond the current scenario and apply it to other later experiences. Therefore, any good intervention should highlight to the students how the strategies used may apply outside the subject area they are currently referring to. Effective interventions also give time for the students to practise self-talk with the support of the teacher, while also giving time for students to employ this in their everyday experiences.

Students can only employ self-talk if they fully understand the processes behind a task or skill they are trying to carry out. This suggests students have to be aware of their cognition to be SRLs. Students must be able to procedurally explain how to complete a task, this is known as task strategy (Zimmerman, 2002). At a school level, this may mean understanding how to divide two numbers and completing the steps to do this in a systematic order to achieve the correct answer. It has been found that students who employ task strategies have a higher level of self-efficacy (Schunk & Gunn, 2015). This again highlights the link between the forethought and performance phases. Furthermore, students who can employ tasks strategies effectively are more self-motivated and show higher levels of self-efficacy for academic learning (Cleary et al., 2013). Unfortunately, the above research was aimed at improving self-talk in a single subject. This is problematic for interventions as most of the research into task strategies does not discuss how to develop self-talk for skills: future interventions might usefully look at modelling tasks such as revising, which can be applied across domains.

For self-talk and task strategies to be used effectively, however, students must be aware of the process of learning (cognition), the mistakes that they make or the new strategies they try and how

successful these are. Part of the self-observation section of the performance phase is the ability to metacognitively monitor one's performance (Kitsantas & Cleary, 2016). Kitsantas and Cleary (2016) suggest that SRLs have a cognitive awareness of their current performance concerning past experiences in similar contexts, e.g. subjects or skills. Not only do they monitor the changes but also can analyse their success or failure in an unbiased manner, attributing success to a change or adaption of a strategy. During the performance phase, SRLs will implement the strategies they have chosen in the forethought phase and monitor the effectiveness of these strategies through techniques such as self-quizzing. Those who can metacognitively monitor their performance have been shown to report high levels of self-motivation (Kitsantas &Zimmerman, 2009). Metacognitive monitoring is not only important in the performance phase, but it also affects which strategies are chosen next time (forethought) and the evaluation of the performance (self-reflection phase). Any intervention should recognise the importance of teaching students this awareness. Cleary and Platten (2013) explicitly taught metacognitive monitoring during their intervention. They asked students to keep a record of their numerical feedback from tests and homework in a graph. Students were encouraged as they did their tests or homework to write down how they felt the work was going; did they feel like they prepared enough for the test? Had they organised their time carefully? How were they working out what to do next? They found that students' metacognitive awareness of their current abilities increased, and students became more confident in the subject.

Another strategy to teach meta-cognitive awareness is through time monitoring that is asking students to record what they did with their time and how long it took. Zimmerman and Paulsem (1995) argue that self-observation techniques are vital methods in helping to cultivate self-empowerment. Schmitz and Wise (2006) also advocate the use of these time diaries as a way of observing learning in a natural environment, as the students complete these alongside the work. It is also useful to minimise extraneous variables such as daily stress, as the diaries can be completed over a long time, giving more stability to the data. They found that the use of diary entries increased students' confidence in the subject. Cleary and Platten (2013) also found that the use of diary entries helped students to identify sources of error and inefficiency.

As students become aware of the sources of error and inefficiency, they are also more likely to adopt or refine the strategies they use to become successful learners (Cleary & Zimmerman, 2004). For example, a student may revise by self-quizzing their knowledge of flashcards; they can articulate how successful they have been during their revision, by recognising the number of flashcards they can answer without any assistance. Evidence suggests that self-quizzing is an effective metacognitive method for increasing academic achievement in a music class Waller (2020). Mountstevens (2020) also found there were quantifiable differences in A-level students' grades who participated in an intervention on the explicit teaching of various metacognitive strategies and the justifications behind using them, including self-quizzing. This effect was particularly prevalent in low attaining students. She also found that all students became better at accurately judging their confidence and ability in their knowledge of a chemistry topic. Additionally, Corry and Badger (2020) found secondary school students who were taught specific metacognitive strategies in class, including self-quizzing, were able to employ these strategies at appropriate times and felt more confident in the content of the lessons. This evidence suggests the importance of explicitly teaching metacognitive strategies and the cognitive explanation behind using them, to help increase student's confidence in the content covered.

2.6 Self-Reflection Phase:

Metacognitive and cognitive awareness is only useful if students use this knowledge to evaluate the strategies they have used at the end of a piece of work. At GCSE and A-level students must be able to evaluate the effectiveness of the strategies they employ to revise, as revision can often feel overwhelming, especially to students who are poor at identifying and employing effective strategies (Gettinger & Seibert, 2002). They suggest that opportunities for students to practice applying and refining these strategies are vital to developing SRLs, particularly when students are undertaking a new course. Highly effective SRLs, on the other hand, can reflect on the strategies they used to achieve specific goals and attribute their success or failure to these strategies rather than to their

ability (Zimmerman & Moylan, 2009). Any intervention should scaffold students into unbiasedly reflecting on their strategies, to help improve self-regulated learning.

Self-judgement is one half of this model and it involves students assessing their performance on a task, such as a test or a quiz (Panadero & Alonso-Tapia, 2014). This part of the model includes self-evaluation; the idea that effective SRLs assess their performance based on a series of assessment criteria and can modulate this that attributes success or failure of different aspects of the task to specific factors (Zimmerman, 2008). This links back to the forethought phase, where the same students would choose their goals and plans based on the same assessment criteria(Zimmerman, 2008). Alternatively, unsuccessful students will wait till they are given feedback on their test to understand what the assessment criteria were and they attribute success to luck and failure of external factors such as teachers. Effective intervention is one that allows students to familiarise themselves with the assessment criteria and reflect on how to achieve this before testing and allow them the opportunity to reflect on their mistakes (Andrade & Valtcheva, 2009).

The ability to reflect on how to achieve aims are known as causal attributions and refer to the explanation a student gives for their success or failure (Panadero, Alonso-Tapia & Huertas, 2014). Some students can attribute success or failure to support from others, ability or self-efficacy for the subject or luck whereas other students attribute it to the strategies used or the effort put in. Successful SRLs use the latter; they recognise their role in the outcomes of their learning. The EEF (2018) suggests that teachers should explicitly teach how to evaluate the effectiveness of one's learning as it will lead to students attributing their success to their strategies or behaviour. One way to do this is to ask students to engage in micro-analytic questioning as discussed earlier (Kitsantas & Cleary, 2017). Cleary and Platten (2013) used this as part of his intervention, asking students the following questions: 'what is the main reason you got this grade?', 'what do you need to do to improve your next test score?' and 'what strategies did you use to study?'. This intervention aimed to help increase strategic thinking in students by teaching them that success was under their

control. They found that students in the intervention did become better at self-evaluating where their learning was currently and were able to attribute this to their changes in strategies.

This attribution of success can lead to an increase in motivation, or self-reaction (Panadero & Alonso-Tapia, 2014). This can increase self-efficacy for academic achievement (that is academic confidence) and increase outcome expectations (Zimmerman & Schunk, 2011). Meaning that students recognise their learning as a controllable process (Schunk, 2008). Bandura (1999) suggests that SRLs are more likely to seek learning opportunities that lead to satisfaction the first time and avoid activities that did not. This, in turn, can affect the forethought phase of the model, as students will plan to use strategies which have made them feel positive previously (Zimmerman & Kitsantas, 1997). Where the cyclic model is used a student can be made to feel that they are successful at a strategy and learning, that student is more likely to engage in the cyclic process next time and over time it becomes a self-sustaining process as the feeling of self-satisfaction is sustained and subsequently, motivation increased. Zimmerman and Moylan (2009) argue that although meta-cognitive and cognitive strategies are important, they are always influenced by motivation and the satisfaction that one feels when performing a task or when a successful outcome has been achieved, so any intervention should always consider the emotional response of the learner.

As discussed earlier, some students have adaptive self-reactions, and some have defensive. Self-reactions are conclusions about refining or adapting an approach to learning (Zimmerman & Schunk, 2011). For example, when an adaptive student revises for many hours using flashcards and feel like they are not taking in the knowledge, they will reflect on the strategy and adapt it, maybe by trying to learn fewer flashcards at a time so they can revisit them more often, they may feel frustrated but can see that it is the strategy that is causing the issue and adapting this will lead to success. Conversely, a defensive learner might assume that they are just not capable of learning the information as there is too much information and consequently, feel frustrated and not continue with the strategy. This indicates successful SRLs are more likely to attribute their success or failure

to the strategies they use and make adaptions for these to be successful, whereas, students who display defence mechanisms are more likely to procrastinate and show cognitive disengagement(Zimmerman and Bandura, 1994). This may explain some students' disinterest at sixth form, and so it is important to allow students the opportunity to reflect on the strategies they use and recognise the true causes of their success or failure. This, in turn, helps students move towards setting SMART goals, using more effective strategies, reflecting more successfully on their learning, leading to engagement in the cyclic model of self-regulated learning.

This literature review has identified the most effective strategies used to develop an SRL. It has discussed the specific details of the cyclic model and how these can be taught. No previous intervention has explicitly attempted to use each of these strategies to create an effective, holistic intervention programme to test all parts of the cyclic model. Research has also yet to see how the combinations of these strategies lead to an increase in metacognition, motivation, cognition and academic confidence. As I am interested in seeing whether SRLs can be taught through this intervention. Thus, my research questions will be:

1. How far can self-regulated learners be developed through an intervention programme?
2. How far can an intervention help increase students' metacognitive awareness?
3. How far can an intervention help increase motivation in their sixth-form studies?
4. How far can an intervention help increase students' cognitive awareness?
5. How far can an intervention help develop students' academic confidence in their sixth form studies?

Methodology:

Action Research:

Action research is the process of reflecting on and learning from our practice. According to McAteer (2013), who argued that this is a continual, on-going process, occurring alongside teaching. The purpose of this action research is to generate knowledge about the complex practice of self-

regulated learning. Action research is an invaluable tool for educators as it helps teachers refine their educational practices to support the necessities of the prescribed curriculum and therefore the needs of their students to succeed in this world (McAteer, 2013). In this case the necessities of independently regulating one's learning to improve practice and gain skills needed to succeed in education. Some researchers would argue that the purpose of action research is to impart social change (Greenwood & Levin, 1988), this is particularly important within education, where the primary goal is to positively change beliefs and behaviours to support learning both in students and teachers. In this case, it was pertinent to highlight the importance of SRLs' at sixth form both within my school and a wider context. Action research was chosen to answer the research question 'can SRLs be developed through an intervention programme'.

My research took the form of a five-week intervention programme for a group of five students who were identified as struggling with self-regulated learning. Initially, these students were to be selected from the larger Year Twelve mixed sixth form population in which I worked. I would use data from their first and second reports, to select the students with the largest gaps between their predicted grades and their current grades across their A-level subjects. Unfortunately, due to Covid-19, my research moved to an online intervention and consequently, the sample was chosen from the forty-four A-level Psychology students I was teaching at that time. This was decided in collaboration with my Head of Sixth Form. We discussed the problems with students using unfamiliar technology as part of the intervention, potentially with someone who they had never interacted with, specifically the use of Zoom, which is a video communications platform. As a result, my psychology A-level classes were chosen as the population to draw a sample from. This narrowed population is problematic as all students were familiar with me and any sample was likely to show social desirability bias as they are not only aware that I was collecting data on them but may also have felt this intervention could impact on how I perceived them in Psychology lessons and potentially the way I treated them in class.

This population did, however, allow me to complete the intervention, so I decided to select my sample using two methods. The first was using the Self-Regulation Strategy Inventory (SRSI-SR) (Cleary et al., 2006, cited in Tise, Follmer & Sperling, 2019, p. 305) (Appendix 1). This questionnaire codes students' self-regulatory abilities using a 5-point Likert scale of 'almost never' to 'almost always'. This scale was developed using the cyclic model of self-regulatory learning (Zimmerman & Martinez-Pons, 1988) The scale was useful to identify not only a range of scores but also the students' ability to employ each part of the cycle. This was useful as it helped guide the intervention, by identifying the most appropriate strategies to support their weaker areas. Cleary et al's. (2006) original analysis on the effectiveness of this scale suggested it could reliably differentiate between high and low achieving students.

The initial questionnaire gained thirty-one responses from the population of forty-four, with students gaining a total score ranging from 84 to 121 (Appendix 2). The highest possible score is 145 points, with one point being awarded for 'almost never' and five points being awarded for 'almost always'. The next part of the sampling technique involved the Head of Sixth Form and I discussed the students with the ten lowest scores and selected students who we felt would most benefit from the intervention. This included students who, as far as we were aware, were not struggling too much psychologically or physically from Covid-19 and the lockdown and therefore would be open to participating in the intervention. This ethical consideration was made in conjunction with both the Head of Sixth Form and the Head of Year 12, as in such unprecedented times we needed to avoid disadvantaging students by adding to their workload or causing anxiety. Our next criteria were to select students who had been struggling with remote learning, in particular students whose teachers had reported they had fallen behind on classwork. From the bottom five students, who all had a score of 90 or below, we selected four using the above criteria. We then selected a fifth student who had achieved the mean score of 104, as her conversations with us suggested that she was struggling with the forethought phase of the model and was keen to be part of the intervention.

The need for the intervention to take place online due to Covid-19 presented the problem of students having to get used to meeting teachers in an electronically connected environment. Some students may have experienced anxiety around completing the intervention in this way and therefore it was important to ensure that we gave students the choice to participate as it was beyond the normal way of working. Students were also informed that they could take part in the intervention without having their data collected. All students asked agreed to take part in the intervention and signed a consent form to confirm this (Appendix 3).

Having identified the sample, action research could begin. The intervention included five sessions which explained the cyclic model, demonstrated practice applications of the model (including specific strategies detailed below) and provided research to support the effectiveness of these strategies. Each session lasted approximately 30-45 minutes every Friday and was held on Zoom, an online video conferencing platform. As it has been shown that cognitive effort is key to the success of teaching self-regulatory learning, all parts of the intervention required students to attempt strategies in their own time and reflect on their experiences (Erickson & Desimone, 1999).

All sessions were recorded so the data could be analysed to identify the changes in metacognition, motivation, cognition and academic confidence over time. Most of the data collected was qualitative. Qualitative methods allowed a deeper insight into human behaviour. It was, therefore, the most useful data to collect and it was used to explain the lived experiences of individuals, in this case, the students' complex changes in thinking and behaviour around SRL (Lincoln, 1992; Wuest, 1995). The sessions were designed as semi-structured, participant observations, in which the strategies were used as points of discussion and reflection. Observational data was collected as it recognised that people actively construct their meanings of the world and their behaviour as a result of these interpretations (Cohen, 2018). This was important in this investigation as students' perceived ability at self-regulated learning was likely to be affecting their behaviour towards it.

Procedure:

Session 1 - Introduction:

The first session asked students to discuss what an SRL is. The purpose of this was to gather data on the qualitative differences in responses pre- and post-intervention, to support answering the overall research question. The session then introduced students to the cyclic model and explained each stage, alongside supporting researcher. Students then reflected on their questionnaire, looking back at their answers and discussed what they felt they struggled with most as well as their strengths. Finally, students were introduced to the work tracker (Appendix 4) a quantitative measure for increasing metacognitive awareness (Kitsantas & Zimmerman, 2009). Students were asked to fill out this each week of the intervention as they completed each hour of work, to see if there were any quantitative changes in the amount of work completed and the type of work completed.

Session 2 – The Forethought Phase:

The start of this session focussed on reflecting on the work they completed in the last session, using the work tracker as guidance. This activity aimed to allow students to reflect on the effectiveness of the time spent on different types of work, for example, homework, revision and other independent learning tasks (Kitsantas & Zimmerman, 2009). Due to Covid-19, this work tracker changed slightly as I felt it was important to keep track of how long students took to complete the classwork and whether this was the only work they completed that week. This reflection on their work is an important part of the cyclic model as students who are time-aware are more likely to feel self-empowered and consequently, more motivated (Schmitz & Wise, 2006). This strategy helped to answer research question three.

A key part of the forethought phase is goal setting, for this part, students were introduced to setting SMART (specific, measurable, achievable, realistic and timely) goals. Students were asked to discuss how they might go about selecting, prioritising and creating goals. Students discussed the idea of setting goals which do not focus on the outcome (that is the grade or test score) but instead on achieving small learning outcomes such as finding an effective revision strategy or planning and

executing time to revise each week. Research has shown that students who believe the purpose of learning is to gain skills and knowledge, recover faster from academic mistakes (Grant & Dweck, 2012; Harachiewicz, Barron & Elliot, 1998). Additionally, Zimmerman (2002) advocated the use of SMART goals in increasing the chances of academic confidence, so this part of the intervention helped to answer the fourth research question.

The students were then introduced to several methods to support strategic planning, for example, creating effective lists, planning time for revision into their schedule, allocating break times etc (Appendix 5). Data was collected from discussions with the students on how well they thought their planning and execution went, as well as how effective I perceived their planning to be, as there is evidence to suggest that those lacking self-regulatory skills often choose more generic strategies and plan less (Zimmerman & Kitsantos, 1999). Students were given time to discuss which strategy they felt would be most beneficial to them. They were asked to create and provide a plan each week for the duration of the intervention.

Session 3 – Forethought Phase (Part 2) and Performance Phase:

At the beginning of this session, students discussed how they felt their planning and goal setting had been that week. This allowed for thematic analysis of the student's motivation to carry out the tasks, their ability to reflect on the strategies they used and therefore their metacognitive awareness and also how they felt generally about sixth form that week (measuring their academic confidence).

The main focus of session three was motivation. The students reflected on what motivates them at school, by discussing several questions including: ‘what motivates you to complete the work you have been set?’ And ‘what subjects were you more motivated to complete the work for and why?’. The discussion allowed for further data on their motivation levels, to see how these changed throughout the intervention.

As discussed previously, motivation is often mediated by using effective strategies to support learning (Zimmerman, 2002), because when students select an appropriate strategy, they experience success, and in turn, are more motivated. Most of this session focused on identifying effective strategies. Due to Covid-19 causing the change in date of examinations, I chose specifically to focus on revision strategies which prepared them for the upcoming tests. The session, focused on dual-coding by introducing the theory and supporting evidence, followed by examples of effective revision using this format e.g. pictorial representations on flashcards alongside written notes, and verbalising flash cards. Imagery is important in helping students to learn a vast amount of information (Zimmerman, 2008).

Additionally, students were provided with a revision process for completing effective revision, which encompassed several different strategies to help with consolidation and retrieval (Appendix 6). This is based on evidence that poor SRLs benefit from explicit modelling of strategies to supporting students complete the task (EEF, 2018). The modelling of this process was completed over two sessions and students were asked to attempt these during the week before reflecting on and refine them in discussion with each other and myself.

Session 4 – Performance Phase (Part 2) and the Self-Reflection Phase:

As suggested above, this process of modelling and discussing the effectiveness of the revision strategies they had used, also encompassed much of session four. During the session, students were asked to discuss what strategies they used to revise that week, how effective they were and how they knew they were or were not effective. The qualitative data collected from these discussions were used to identify student's ability to perform the task and reflect on it, to see if students developed the metacognitive skills of monitoring and directing learning, as well as whether they were motivated to revise, providing evidence for research questions two and three.

Students were given a questionnaire from Hartwig and Dunlosky (2017) to help produce a discussion on what strategies they used to revise and how effective these strategies are. Questions

included: ‘how do you decide what to study next?’ and ‘do you usually return to the course material after the course has ended?’ (Appendix 7). The questionnaire used multiple-choice questions which were used as a starting point for a discussion on revision strategies.

This was to help students recognise that the strategy they were using to revise may have needed adapting or refining, to teach adaptive self-reactions (Zimmerman & Schunk, 2011). Additionally, part of the session re-focused on the students understanding of success, asking them to reflect on their strategy and where they attributed the success or failure of it. Understanding that success is under our control can lead to an increase in motivation (Panadero & Alonso-Tapia, 2014). By increasing self-efficacy for academic achievement and outcome expectations (Zimmerman, 2008). The data was analysed to provide evidence for academic confidence and motivation, helping to answer these research questions.

The final part of the session focused on revisiting the strategies we used and discussing their effectiveness. The students discussed how they could refine their strategy to be more successful next time, with guidance from myself to help reduce any attribution errors (Kitsantas & Cleary, 2016). This part of the session allowed students to discuss their difficulties and successes with revision and they helped one another, alongside assistance from myself.

Session 5 – The Self-Reflection Phase (Part 2):

At the start of the session, time was given to reflect on the new strategies tried and how effective these were. Students were reminded to practice self-reflection by considering how they could refine the strategy next time. Qualitative responses to these questions were collected to see if a change in meta-cognitive thinking had been made. Students were then be asked to consider in more detail how they know they are successful and what makes an accurate judgement of success. As part of this process, students were exposed to microanalytic questions including: ‘what was the main reason I got this grade? Was this down to a. effort b. knowledge c. their organisation’, ‘What do I need to do next time to improve my test scores?’ and ‘What were the specific errors I made in

the test' while considering how similar they were to previous errors. These questions were taken from Cleary and Platten (2013) paper which uses these as a basis for discussion on success.

Post-Intervention:

Two weeks after the intervention takes place, students were asked to complete the SRSI-SR again, to see if there was a difference between their pre and post-intervention score. This helped to answer the main research question: can SRLs be developed through an intervention. A review by Tise, Follmer and Sperling (2019) found that the SRSI-SR was a sound measure for studying self-regulatory abilities. The internal reliability of the model was high (alpha =.92) suggesting that comparing the difference pre and post-intervention would be useful as a change in the results would be highly likely to be attributed to the intervention. Although cause and effect cannot be established through using a non-experimental design, it was valuable in providing correlation evidence for or against the intervention being successful.

Additionally, further qualitative data was collected through individual interviews with each of the students from the intervention. These took the format of a semi-structured interview with questions based on providing evidence to answer the four research questions. It asked students to discuss their thoughts on the intervention as well as how it had affected their motivation, academic confidence, metacognition and cognition. A semi-structured interview was chosen as it was appropriate for action research, and in particular, my intervention, as self-regulated learning has many facets and an overly prescribed questioning would lead to narrowed answers (McAteer, 2013). Similarly, a lack of structure may have lead to some of these aspects not being covered. Action research sits somewhere in between scientific and non-positivistic approaches, whereby it aims to study and theorise practices while also considering a moral epistemology (McAteer, 2013). The ability to have an in-depth analysis of students' cognitions is important in understanding and refining any intervention, so as not to rely solely on quantitative data which cannot account for all nuances of human behaviour.

Ethical Considerations:

To ensure that ethical practice in action research, ethical approval was sought before the study taking place. Following the British Educational Research Association (BERA) (2011) guidelines, a CUREC (1a) approval was needed (Appendix 8). Under the modus operandi covering educational research, this study followed the normal practice of teaching and as such did not require parental consent. Draft interview questions, a questionnaire and a consent form were given, as well as permission sought from the headteacher of the school (Appendix 9).

The process of the intervention was explained to all students who were selected to take part in the intervention, before gaining consent. Students were given detailed on the nature of the sessions, the length and content, as well as how their data would be used. Students were explained that they had the right to withdraw at any point and that their name would be kept anonymous when published. Students were also asked if they would like to volunteer to take part in the interview at the end of the intervention, again they were informed of their right to withdraw and the anonymity. The students were also asked for permission to record their responses to use as analysis later. Finally, students were asked for permission to use direct quotes from the sessions and interviews, whilst keeping their names anonymous.

Data Analysis:

A thematic analysis was undertaken to analyse the data, as it would avoid a reductionist analysis of students' ideas, keeping the analysis as true to the original meaning as possible (Cohen, 2018). As the topic of self-regulated learning has many facets, the analysis needed to allow analyses of each research question in detail.

As suggested previously, the data were analysed by myself and another teacher independently, followed by a discussion on the coding to create definitions for themes and sub-themes. The other teacher was not exposed to the specific research questions before coding to reduce social

desirability bias. Once we had individually coded the data, together we refined the themes by defining what they contained.

Results and Discussion:

The analysis identified four major themes in line with my research questions. The first was metacognition, which I defined as the way the students monitored and actively directed their learning. The second, motivation, which I defined as a willingness to engage in metacognitive strategies and cognitive skills. The third, cognition – an understanding of how mental process are involved in knowing or learning something. The final theme was academic confidence, a person's belief in their ability to achieve academically. These definitions follow similar conclusions made by the EEF (2018) and helped form the basis of my analysis. The discussion looks at how the students changed their understanding of these themes by engaging in each stage of the cyclic model intervention.

4.1 Quantitative Results:

I gathered quantitative data to find out whether the students relied more on effective self-regulated strategies than pre-intervention. As the group size is very small, I felt it was not useful to apply a statistical test as the range of results was large and thus any conclusions could not show reliable statistical significance. However, the results suggest the intervention caused a positive change in their self-regulated learning abilities (See Table 1). This is supported by Cleary, Platten and Nelson (2008) who found a quantitative improvement of 0.70 post-intervention. Although each student did show an increase in SRL it is important to note that students were aware they were taking the same questionnaire again and that I (as their teacher) would be interested in seeing a change, so due to sociability bias, there is likely to be an inflation of the results. Additionally, the questionnaire asked about specific behaviours/actions that are maybe not possible to know the answer to, due to the current situation and not being in school, for example 'I let my friends interrupt me when I study'. Although questions like this are not impossible to answer, it may be that they are of less relevance to the current remote learning that they have experienced due to

Covid-19. It was, however, interesting to see the changes in some behaviours such as planning, where all students reported that they spent more time deciding what they wanted to achieve before they started their work but quantitative data such as this is not able to provide extensive evidence for the students' changes in thinking pre- and post-intervention.

Student:	Gender:	Pre-Intervention:	Post-Intervention:	Difference:
(M)	M	89	109	+10
(A)	M	90	107	+17
(N)	F	84	96	+12
(K)	F	85	111	+26
(B)	F	104	124	+20

Table 1: A table to show the difference between pre and post-intervention scores on the questionnaire

4.2. Definitions of Independent Learning

Firstly, it is interesting to note how their definitions of SRL change over time. There were real disparities in how their thinking of self-regulated learning changed. While some showed a significant change in understanding, others showed little change at all. In session 1 most of the students referred to SRL as an ability to do something by themselves.

> ***Beginning of session 1:***
>
> *'Someone learning by themselves independently' – A*
>
> *'If there's something where you have to take more initiative about teaching yourself' – B*
>
> ***At Interview:***
>
> 'It's learning you have to organise, plan and then carry out yourself whilst setting yourself realistic goals you can achieve. You can learn and teach yourself something effectively.' – B
>
> *'Now I realize it's more complex and you have to really figure out what helps you learn, the best ways that you can do it, so then you've actually learned something effectively.' – B*
>
> *'Just being able to study and learn without too much outside help.' – A*

Student B has developed an understanding that planning and awareness of directing one's learning are important. Although initially, she could not articulate this, by the end of the intervention, she had an awareness that metacognition and forethought are important skills that SRLs poses. Her definition is now similar to that of Zimmerman and Schunk (1986), that SRLs have an active role in their learning process, whereas, A has not shown a change in his understanding of SRL since the start of the intervention. Nevertheless, later analysis shows that A has shown an improvement in his understanding of SRL, although he doesn't seem to associate it with being able to learn and revise effectively, which may explain his answer. This highlights the importance of the data and analysis not being considered alone but instead as part of a whole.

4.3 Metacognition

4.3.1 Weekly Planning and its Influence on Metacognition

The theme of weekly planning can be defined as being able to set goals which are effective in helping the student to complete their work. Being able to plan effectively is a meta-cognitive skill, as it means a person can direct their learning by selecting the most appropriate tasks and setting more achievable goals (Zimmerman and Cleary, 2009). Additionally, planning helps to monitor learning, by selecting appropriate strategies to check their understanding (Cleary and Chen, 2009). Although it was always an intended part of the intervention to help the students plan more effectively to be able to increase metacognitive awareness, this part of the process had particular significance during remote learning as students were more responsible for this than ever before. During the very first session we discussed the use of plans and timetables, it was apparent that the majority of students had no interest in using a timetable and felt that they were methods of procrastination. However, one student B had been using a timetable during the remote learning period.

Session 1:

'When I finish making [my plan] it is quite useful usually just do it in time slots so I might do one subject for an hour and then change it' – B

During the next four sessions, students were given strategies for planning and were encouraged to make one plan each week, reflecting on the outcome of their plans the following week. The majority of the students found planning was difficult at first, usually, because they had planned poorly for earlier weeks and this had led them to need to catch up on work or dedicate a significant time to revision to catch up on the lack of revision done thus far (Cleary & Chen, 2009).

Session 2:

'That's been quite stressful with like the maths exam, so I've probably done more revision this week than I have the rest of the year. It's been stressful and boring.' – M

'Impossible it was just me kind of trying to get stuff done but yeah it's not balanced at all.' – B

B was especially focused more on the outcome rather than the learning process. This caused her to not attend to the purpose of a plan which was to increase the monitoring and directing of learning so that in future she could select a more appropriate strategy (Zimmerman & Kitsantas, 1997). However, over time the students gained better meta-cognitive awareness, which helped them to plan more efficiently and effectively.

Session 4:

'It was mainly useful to do but I think I could have added more detail to them as I just put a subject for each day, maybe deciding what tasks I was going to do would be better, but it was motivational' – K

Gettinger and Seibert (2002) suggested having the opportunity to refine and evaluate the effectiveness of strategies is important when undertaking a new course. This was shown when, by session 4, K is monitoring her learning and objectively deciding what would be more useful next

time. It is also important to note here the connection between increased metacognitive awareness and heightened motivation (Zimmerman, 2011). K's planning led to her being more selective over the tasks she chose which caused her to feel more motivated to complete the work. The evidence above suggests that teaching students how to plan effectively by setting suitable goals and selecting appropriate tasks was at least partially effective in developing student's metacognitive awareness and lead to them becoming better SRLs by the end of the intervention.

4.3.2 Revision and its Role its Influence on Metacognition

Students are only able to select appropriate tasks if they know which revision strategies are effective and when to use them. Raajimaker et al. (2018) argued, with more onus being placed on students about how they should revise, it is important to teach them how to evaluate the effectiveness of their strategies; the theme of revision can be defined as being able to effectively plan and instigate appropriate revision strategies. The theme links to metacognition as students must be aware of how to direct their revision and unbiasedly monitor the success of it. The quotation below suggests that with guidance, students were able to effectively plan their revision.

> ***Session 3:***
>
> *'yeah we thought if we are going to do exam questions we would do them at the start of the week so we can get them done and then check it, finds out what ones we did wrong and what we struggled with and then go the next couple of days going over the flashcards and then Friday some more exam questions' – A*
>
> *'we felt like doing exam questions as it tests what you do and don't know as well as, sort of getting used to the exam-style' …. 'making flashcards then on the stuff that you don't know and then reattempting the questions afterwards or finding similar questions on the same topic' – M*

These quotations seem to suggest that students A and M had a degree of metacognitive awareness as they were able to reflect on past successes and failures, such as A creating mind-maps but not self-quizzing to monitor his understanding. Evidence suggests that being able to unbiasedly monitor your strategies, is a type of metacognitive awareness that leads to an SRL, So this could provide

evidence that SRLs were being developed through this intervention (Kitsantas & Cleary, 2016). Some students worked hard to employ these strategies over the following week and felt they benefited from the employment of these. They understood that self-quizzing was important in learning and also potentially understood how they learn. This understanding suggests that metacognitive awareness increased as a result of cognitive understanding supporting the ideas of Kitsantas and Cleary (2016).

The quotations below also demonstrated a change in metacognitive awareness as students started to become aware of how employing the revision strategies helped to monitor current understanding and thereby direct future learning. This led to an increase in self-efficacy for examination, as students felt more successful.

> ***Session 4:***
>
> *'…like multiple-choice questions, I like made a list of the subjects that I was weakest at and now I've got more of a starting point of where I should start my revision, so that was helpful' – A*
>
> *'I started doing some questions at the start of the week just to identify like what I needed to do, what I wanted to improve on and then look over my notes on the weaker topics' – M*

> ***Session 4:***
>
> *'I feel more calm about my upcoming mocks' – A*
>
> *'I am feeling sort of calmer now and less stressed about the exams and a few questions I couldn't get right before I've now corrected' – M*

Schunk and Gunn (2015) and Cleary et al. (2013) suggest that identifying and modelling effective revision strategies can lead to higher levels of self-efficacy. Some students were able to identify objective measures of success such as being able to answer more questions accurately. This suggests they were developing stronger metacognitive skills. However, the students above relied somewhat on feelings rather than unbiased measures of success. Pandero and Alonso-Tapia (2014) suggested self-evaluation throughout the learning process is critical to success. This suggests that

the intervention could have benefited from more time on teaching students to measure success objectively.

Post-mock examinations, the students were invited to again reflect on their revision, as part of the self-reflection phase of the cycle. Students were able to identify the sources of their failure and select appropriate goals for next time.

Session 5:

'I think that was because while I had to use the book, I was like looking through it, and it was taking the time…so I guess if you revise those chapters more…particularly the heart and circulatory system'- A

'planning for revision, for the exams, and just going in with a strategy that I know how to do and how it works for me…I started off doing the flashcard thing and I wasn't really sure how to make that work and that sort of flustered me' – M

Interview:

'I think I may have to be more efficient with my time rather than just doing work. Then just finishing it so that it's finished rather than actually making sure it's useful and I will be able to use it in the future.' – K

Participant A was able to select a specific goal which included identifying an area of study which he needed to revise more, and M was able to identify that the change in revision strategy caused him to struggle in the examination. He recognised that this was because he didn't fully understand the strategy and so he needed a better understanding to employ it effectively next time. Additionally, K shows she is aware that monitoring her learning will help her to be successful in the future. As Gettinger and Seibert (2002) suggest, the ability to monitor using self-evaluation is important in becoming an SRL. Overall, analysis of the theme suggests students were moving towards using metacognitive strategies more effectively, but the students would have benefited from more time to practice objectively reflecting on these.

4.3.3 Monitoring Success in the Role of Metacognition

As being able to select appropriate revision strategies is so heavily influenced by being able to monitor whether those strategies are successful, it is important to analyse how their attitudes on this topic changed. Monitoring success is as a result defined as students who can objectively and unbiasedly determine whether a strategy was successful or not and then adopt a process of refining their chosen technique. analysis of the data suggests that students developed some awareness of monitoring success, however, this was not always objective. Additionally, the students found it challenging to apply their understanding to real-life experiences. As a baseline measure, students were initially asked how they would usually measure success.

> ***Session 5:***
>
> *'I measure success just by like, how the exams go, which is probably a bit too late, but that just normally how I would do it' – A*
>
> *'I sort of judge how well revision has gone by how well I do on the test, but also like how much revision I do, like when I do a lot I think I've done good revision where it's really just mass over sort of quality of it' – M*
>
> *'I usually kind of tell if my revision is successful by my exam paper really, or like starters in class' – N*

The students were able at this point to recognise that monitoring success after a test is too late. SRLs continually monitor their success or failure throughout their engagement in the cyclic model (Zimmerman, 2002). Zimmerman also suggests students who struggle with planning their learning are less likely to monitor their progress. This supports the idea's found in this intervention as the students who didn't plan were the ones who didn't monitor their learning. Manion (2020) suggested giving students regular opportunities to monitor learning would help students to become better SRLs, therefore, throughout the intervention students were given time to discuss their thoughts on their revision strategies.

Session 4:

'I guess the score is pretty helpful to like know how well you have done, and the topics that have been covered, then you can say that, um, I should probably focus on that' – A

'I went through and had a look at what questions I got wrong and then thought it was all pretty much the same, I couldn't remember a lot from most of it, so I went back and did attachment first, cos it's the first topic we did, so I probably remembered that the least as it was longer ago' – B

Student A understands that although a score can give a rough idea of success, a deeper analysis of what he got right and wrong is more helpful which suggests a potential switch in thought processing from performing well on tests to becoming a competent learner (Schunk & Zimmerman, 2011). However, without further evidence, a definitive conclusion cannot be drawn. Schunk and Zimmerman (2011) also suggest SRLs are more likely to strive for a deeper understanding of concepts and are better at reflecting on their learning. A identified that having a better understanding of mistakes and successes will help him to direct his learning next time. Equally, B demonstrated that she can actively monitor and direct her learning by engaging in the self-reflection and strategic planning part of the model. These reflections suggest that the students have changed their thoughts on success to fit more in line with SRLs.

The students then engaged in refining their chosen techniques, once they had monitored the success of them.

Session 4:

'I think I'll keep the mind-maps, what I might do is I might pick a topic and then write down everything I can remember first and then go back and add everything else I forgot. I might try and put like smaller exam questions on to flashcards so I can sort of try and learn the answers' – B

'I'm going to carry on using mind-maps for history, but I am going to make it clearer because obviously history happens throughout time and I just didn't show this in my mind-maps, I didn't know what happens first' – K

The students could see their strategies helped summarise and condense the information needed for the exam, however, this was not helping to retain the information, which suggests that they were able to unbiasedly monitor learning. For example, B recognised self-quizzing was important to gain a more accurate understanding of what she did and didn't know. K also recognised that she had insufficient information on her mind-maps which prevented her from fully being able to answer the questions and so this needed to change. However, the students sometimes struggled to identify why their strategy was unsuccessful or were only able to identify a part of the problem by themselves.

> ***Session 5:***
>
> *'I wrote two paragraphs on the same thing' and how are you going to avoid this next time? – 'probably just reading the question, like to figure out what they are actually asking' – K*
>
> *'The stuff I revised obviously didn't come up…I need to revise more on how to read the extracts, cos we have got given quite a few long extracts and I read them and they don't really go into my head' – N*
>
> ***Interview:***
>
> *'I think I'm going to try the flashcard once again and give it like a good try. I think that would be quite helpful. It's just me being strict and actually doing them' – N*

Both students identified some flaws in their strategy but were not able to fully explain why they didn't succeed, which led to poor planning for next time. For example, K gave superficial goals for next time, rather than setting specific goals and did not consider that practising this before the next exam may be beneficial. This indicated that truly unbiased reflection had not yet been developed through the intervention, which in turn suggested that the intervention could have benefited from spending more time on modelling effective monitoring and developing an unbiased approach to measuring success, K recognised the need for this in her interview:

Interview:

'How to act on feedback, because I read the feedback and I do the easy corrections, but I don't take in what to do and I don't carry it on to the next mock to improve' – K

Nevertheless, the student did develop some progression to more unbiased methods of self-reflection and monitoring and recognised the importance of the need to continue developing it. It seems that students had developed a better metacognitive awareness of needing to monitor learning, but perhaps didn't yet have the skills to support this. For this reason, it appears that they had not yet become SRLs as Zimmerman (2002) notes that SRLs' can monitor and direct their learning. It did however appear that they are making significant progress towards becoming able to monitor their learning and consequently, the effectiveness of the intervention should not be discounted.

4.4 Motivation

4.4.1 Planning and its Influence on Motivation

Zimmerman and Kitsantas (2005) suggested that strategic planning led to increased motivation to complete academic work implying that the current investigation should demonstrate an increased motivation when successful planning was adopted. Thus, planning (within the theme of motivation) can be defined as a student who can effectively organise their time and selecting appropriate strategies would show increased engagement in learning. Overall, all students showed an increase in motivation during the intervention, which they attributed in part, to effective planning, but the long-term effects varied depending on whether or not they continued the planning process.

At the beginning of the intervention, students were asked to discuss the potential justifications for planning their learning. Most of the students struggled to verbalise why a plan might be important. This may be because they viewed plans as a tool for procrastinating from completing actual work and therefore, devalued them as an activity.

However, M discussed its impact on motivation: M suggested that knowing where to start helps to increase motivation, suggesting that having specific goals aided his engagement in the tasks. This is

supported by research which has shown that those who have specific goals are more likely to be motivated (Zimmerman & Kitsantas, 2005).

Session 1:

'I think having a plan about what I'm going to do when that sort of makes it easier to sit down and start doing it cos I know what I'm doing' – M

Nonetheless, M did not plan his learning, maybe suggesting that although he was able to explain the benefits of planning, he did not experience success with it, therefore was not motivated to continue planning. As shown previously, the students struggled at first with their planning and this meant they didn't experience success, causing them to feel demotivated. In particular, M who chose not to plan, experienced strong demotivation to complete his Chemistry. This suggests that maybe task interest may affect motivation leading to students being less likely to plan for subjects that they may not enjoy. Kitsantas and Zimmerman (2009) suggest enjoyment of learning is mediated by the ability to effectively analyse tasks to produce effective plans. This indicates M may have struggled with motivation due to his lack of enjoyment for the subject.

Session 2:

'I didn't do much in my chemistry sort of suppressed that as I don't really like it' – M

'Now I feel like this week I couldn't really stick to anything like I tried and then it went out my head' – N

'Yeah I'm doing media at the moment and the stuff you've got to do in it I'm really not enjoying. And I can't like, I'm struggling quite a bit with it, so I've not done any of that. I think it's just because I don't really enjoy it. – N

The students struggled to complete the work due to their lack of motivation. However, many of their plans lacked enough challenge which may have led to them struggling to feel they had been successful each day (See Image 1). Lock and Latham (2002) suggest that goals need to be challenging so that people feel the effort put into achieving the goal was worth it and thus

motivational. For example, the key focus in N's weekly plan was in completing certain numbers of pages of work rather than a focus on learning the material or consolidating knowledge. Equally, she has added in her fitness activities throughout the week, suggesting her interest is not on academics but physical activity. This suggests N was not challenging herself to become a better learner, nor enjoying the process of learning, her motivation instead came from non-academic activities.

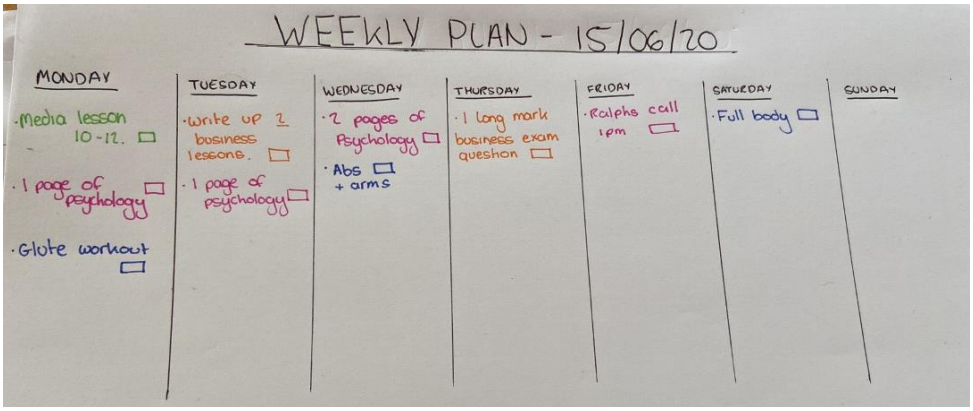

Image 1 - N's Weekly Plan

In particular, N's motivation did not change particularly throughout this intervention, in part this was due to a lack of guidance by me, on her planning. N often submitted her plans late and sometimes drawn up halfway through the week, in part they were post-event. This made it difficult to adapt her planning so that it was more effective. The situation was aggravated by my not being able to be in the presence of students and ask for their plan. If I was to do the intervention again, I would better encourage producing a plan at the start of the week and explain in more detail how the planning will increase students motivation and highlight the importance of completing it before starting the week. However, N was less motivated than the other students throughout the intervention and struggled to continue to complete work afterwards, thus offering support for the idea that planning affects motivation (Zimmerman & Kitsantas, 2005).

As previously indicated, most students became more adept at creating effective plans and as this happened an increase in motivation was shown.

Session 4:

'yeah it was quite good, it was the best this week, I was more motivated, I had more time for revision than I did last week'. – M

'I felt like I got a lot more um, meaningful work done this week. Like it was time well spent rather than just I'm kind of getting up and going' – A

'I think I used my time wiser and um, the plan I used a lot more strict this week than I did last week, so I think that helped me quite a lot' – A

These comments indicate that the intervention helped the students to plan their learning better, which increased their motivation to carry out the tasks. Schunk (2008) suggested that attributing success to a task helps increase motivation. In this case, the task was planning and the success of being able to follow through with the plan and complete the goals set, increased students' motivation to repeat the planning process, thereby engaging in the cyclic model. Participant M in particular recognised the tasks he selected were more meaningful due to the quality of his planning. This caused him to feel more confident in his planning and that the technique was having a positive effect on his academic success. Overall, this implies the students began to develop the skills of selecting appropriate and achievable goals which led to increased motivation (Kitsantas & Zimmerman, 2009). The planning had a significant effect on the student's motivation, as many of them chose to keep up this strategy post-intervention.

Interview:

'I think for me, the most important thing was making that list at the start of the week, to plan out what work I should do, so I've got almost a guide as to what I should be doing so that I don't get distracted as easily'. – A

'I think the sessions, like helping me plan my week is what motivated me'. – M

4.3.2 External Factors and their Influence on Motivation:

The cyclic model argues that SRL believe they have control over their learning (Zimmerman & Kitsantas (2014). Research has also shown that teaching students to recognise the cause of their success, increases their understand that learning is controllable and therefore seek learning

opportunities like this again (Zimmerman & Schunk, 2011). Cleary and Platten (2013) add that teaching students that success is under their control can increase motivation. Although there are several external factors which can affect motivation, the analysis below looks at deadlines and other participants in the intervention. First, many of the students reported that deadlines had an influence on what work they completed and when.

Session 1:

'I get a lot of self-motivation from my deadline for like something that I should do that I procrastinate and then need to get it done before a certain amount of time'. – A

Interview:

'I think the end of term is a factor and the fact that we've finished mocks now as well. Mocks was a big motivation for me, personally. Now that's finished so it's kind of slowed'. – A

A, in particular, was motivated by deadlines, this had an impact on how much work he completed. This suggests that external factors were the source of motivation rather than the willingness to become a more effective learner. Cleary and Platten (2013) found that students who focused on gaining better self-regulation skills were more motivated, in this case, the opposite was true for A. This was perhaps, in part, due to the intervention not being long enough to develop the ethos of a cyclic learner making this belief had not become a habit. Veenam et al. (2006) suggest that interventions need to happen over a long time for the processes learnt to become a habit, so future intervention may need to be longer to develop the cyclic model as a habit.

Another external factor is other participants in the intervention. Many of the previous interventions suggested that one to one mentoring was most effective because the mentor was able to personalise the intervention around the individual's needs (Cleary & Platten, 2013; Schmitz & Wise, 2006). However, in a state secondary school system, this is unlikely to be feasible as the number of students who need support is likely to be greater than the number of knowledgeable individuals.

My intervention, therefore, aimed to work in small groups to help students receive tailored support but alongside individuals who struggled with the same problems.

I presumed working in small groups may have adversely influenced the intervention, in that it may not be as personalised. However, one of the surprising findings from the intervention was the positive effect that talking to others who shared their problems had on increasing their motivation to become better SRLs. Although this was not obvious during the intervention, during the interviews, all students mentioned the positives of peer support.

> *'Yes, definitely because when we were able to talk about it in the sessions it was-- Everyone was saying similar things and saying "This week I wasn't feeling very productive," or, "This thing didn't work." Which made me realize that lots of people think the same thing and so I was more motivated to try learning in different ways. Also, I was more motivated because I knew other people were feeling the same thing and it wasn't just me'. – B*
>
> *'hearing other people in the same situation as you pushes you to work harder, rather than feel sorry for yourself because everyone is in the same boat.' – K*

This suggests that continuing with small groups of students would be beneficial in increasing motivation. As this was not something I was expecting, I asked the students whether they thought the intervention would have been successful in larger groups, for example integrating it into the classroom environment.

> *'I'd probably prefer the session because I tend to just zone out in class. It might not be taken on board as much whereas if you're taking the time out of your day to actually learn things you're more inclined to remember it.' – K*
>
> *'the small groups you sort of feel more involved, and then it obviously makes it more personal to you and you feel more like a part of the session.' – M*

This suggested that the small groups were beneficial in increasing motivation as students felt that they were involved in their learning and were able to voice concerns and opinions about the different tasks. Kitsantas and Cleary (2016) suggested that taking responsibility for their learning

increased self-regulation. Equally, Raajimaker et al. (2018) suggested that helping students to become involved in choosing their learning strategies will help increase motivation, thus showing the link between active participation in the intervention and motivation. This provided further logic to keeping the intervention to small groups.

4.3.3 Monitoring influencing Motivation

As monitoring is a part of metacognition, this theme recognises the complex relationship between this aspect of metacognition and its role in influencing the tasks we choose. In particular, the theme looks at the relationship between monitoring learning throughout the cyclic model by reflecting on current and previous strategies used. However, it also recognises the relationship between monitoring and motivation, in that motivation is increased when effective monitoring takes place; as such, the theme is about how a student who actively participates in reflection will be more motivated to refine their learning. The analysis suggested that the students particularly enjoyed being given the time to reflect on their strategies, which led to them identifying their errors in task strategies leading to increased motivation to complete the work. As previously suggested, students who can attribute success or failure to a strategy are more motivated to refine it (Alonso-Tapia, 2014).

> ***Session 4:***
>
> *'I did one subject per day…and I think I did more meaningful work, but probably less that I did last week, but it was more effective' - A*
>
> *'it will help me more than if I was doing it the same way as last week' – B*
>
> ***Session 5:***
>
> *'I've enjoyed like actually going to reflect because usually if you do nothing in the week, you can just ignore it and pretend it didn't happen like you're forced to, its motivation in itself' – K*

Those who were able to plan effectively attributed their success to this which led to feelings of self-satisfaction and subsequently, their motivation increased (Zimmerman & Kitsantas, 1997). These

students showed adaptive responses, such as refining their plans, suggesting they were becoming better SRLs (Zimmerman & Bandura, 1994). The students were then more likely to use this strategy in the future, for example, B has continued to plan post-intervention (Zimmerman & Kitsantas, 1997), which demonstrates the intervention was successful in increasing motivation when students developed effective monitoring strategies. Although, as previously explained, not all students were able to effectively employ metacognitive monitoring strategies by the end of the intervention, suggesting that a more specific focus on these would be needed to help all students become SRLs.

> ***Interview:***
>
> *'I think I'm a bit more optimistic now. I can see that it's [self-regulated learning] doable' – K*

The interview revealed that learning the skills of monitoring and the self-regulation cycle, helped K to feel more motivated, as they felt achievable skills. Pajares (2008) suggested that if a student perceives they can achieve in a subject, they are more motivated to try. In this instance, K perceived she was more capable of the skill of self-regulated learning and this gave her motivation to persist with refining her practice and becoming a better SRL. Additionally, K felt she had control over her learning as she was able to effectively monitor the tasks she completed and this made her more motivated to continue to engage in strategic planning in the future (Zimmerman & Kitsantas, 2014). Overall, the analysis suggests that motivation is meditated by several external factors, including monitoring and peer support and this had an impact on whether students engage in the self-regulatory cycle. Any new intervention, therefore, should include these factors when being designed.

4.4 Cognition

4.4.1 Revision and its Impact on Cognition

To become an SRL, a person must be aware of how they learn and understand concepts, so any intervention should consider how students' awareness of this can be changed over time.

Consequently, this section will highlight the thought processes behind selecting an appropriate revision strategy. Thus, the theme suggests that as SRLs' will have an awareness of how to revise they will select the most appropriate strategies to achieve success. The analysis found students were able to name effective strategies and, in some cases, justify their reasons for using them. Additionally, I was interested to see how far students could identify the benefits of applying the same strategies across different domains as the research seemed to suggest students would struggle with this (Raajimaker et al., 2018; and Donovan et al., 1999). Originally the students were able to name strategies that they used for revision and seemed to use the same strategies across domains.

Session 1:

'I have mind maps everywhere, like all over my house, that's what I did for GCSE, I just read over them wherever I am' – B

'I use app's like Quizlet because they are more interesting than making your own flashcards' – N

None of the students' were able to explain why this method worked for them. Most cited instead that it worked at GCSE. This suggests students weren't aware of the cognitive processes which underpin learning. During the session, students were taught several techniques for revising, including the importance of self-quizzing, in particular, the use of flashcards. After two weeks of students practising these exam techniques, they were not keen on using them and reverted to older techniques. This highlighted that the intervention could have spent more time exploring the cognitive processes of learning. Instead, I made the error of presuming they had some understanding of this, having taught them about memory and retrieval as part of the psychology course.

Session 4:

I tried making flashcards, but I just don't think they work…I don't know [why] I just didn't really feel like they were very meaningful to me' – A

'I started trying to make flashcards, I made three and then decided I hated them, so I started to make mindmaps and then I asked my dad to ask me questions about what was on the mindmaps, to see if I could remember it' – B

'I think I can't put enough information onto them, so I think if I am going to use this, I'll use it for like keywords rather than bigger topics' – B

'I mean I also struggled to make the flashcards…chemistry has a lot of sort of longer things and so it was hard to fit onto a flashcard' – M

On the other hand, we spent more time discussing self-quizzing and its benefits and this seemed to have more impact on them adopting this strategy, suggesting better explanation of cognition did improve self-regulated learning.

Session 4:

'I was going to write the questions on the back of the poster and then I could go through it and if I don't know I can flip over the poster and have a look' – A

'Doing exam questions at the start of the week and then reattempting them at the end to see if I have been successful, and I say I need to be more strict when I do it [revision] the first time round, like as I say, no sort of cheating, like looking at the answers beforehand' – M

At this point, students were introduced to a method of self-quizzing called the Leitner Flashcard System. During the session, they were given the evidence to support using this technique and explained how it helped aid learning. The students were encouraged to use the technique for one week and see how it went. Again, most of the students struggled to complete it as they felt they were unable to summarise all the information they needed on to flashcards. This suggests that the intervention would have benefited from modelling the skill of chunking information, to help the students, succeed at this task (Raajimaker, 2018).

Session 5:

'I felt I tried to do it in history, but there was so much information. Like it was quite hard to like learn it all in one go, but I tried to do it with the definition from memory this morning…and I think it was a lot more useful because its less information to take in, in one go' – K

'I mean I also struggled to make the flashcards…chemistry has a lot of sort of longer things and so it was hard to fit onto a flashcard' – M

Most of the students reported that this was easiest in Psychology, where we have spent the time reducing the content into manageable chunks. These students were able to access this task because the chunks were pre-decided for them. This also highlights the need for teaching the skill of chunking within the intervention. However, one of the students who did persevere with the strategy experienced great success with it, suggesting it is worth persisting with teaching the strategy.

Interview

'I tried the flashcard one for a week or so. It was quite good. I definitely revised more stuff. It stayed in my mind more, so I might pick that up again I think.' – M

M recognised that the strategy was effective for aiding revision, in that it helped him to retain the information and this led to him attributing this success to the strategy rather than to ability. Zimmerman and Moylan (2009) suggest that if students can experience success with a specific task, they are more likely to repeat it. M was more inclined to complete this strategy again, suggesting an effect on motivation as well as a change in the understanding of the learning process. Overall, the analysis suggested when the intervention focused on explaining how cognition and consequently, learning occurs, students were more motivated to use the strategy given; without specific guidance on how to use the strategy in their subjects, they did struggle to see how it could be used across domains (Raajimaker et al., 2018).

4.5 Academic Confidence

4.5.1 Planning and its Influence on Academic Confidence

An SRL can plan effectively, selecting appropriate strategies to achieve their goals (Zimmerman, 2002). They are also able to reflect on their plan, refining it where appropriate. Yildizli and Saban (2016) found that students who were supported in developing effective plans reported higher levels

of academic confidence. This suggests a link between the use of planning and students feeling academically successful. This theme explored how a student who can organise their time and select appropriate strategies to achieve their goals, whilst reflecting unbiasedly on these to make later refinements to achieve academic confidence. This part of the analysis focuses on one individual, B, who was chosen to be part of the project because her mother had reported how hard she was working at home, but with little progression in her grades and how this was making her lose confidence in her ability. I was interested to see if her planning and skills in reflecting on this, were the cause of the problem. Overall, the analysis seemed to show that her ability to create effective goals and plan more effectively, helped increase her academic confidence.

Session 1:

'um, I think I would maybe try and timetable it and then just say I'll do English for one hour, but then half of that would be, um, well it's been said and half of it could be revision…' – B

Initially, B's plans were heavily time-dependent, leaving little room for running into difficulties, for example, while waiting on an email response from a teacher, she often didn't achieve her goals within the time she had set, meaning she felt behind (See Image 2). The realities of this meant that she found the plan frustrating and wanted to discard it.

Image 2: B's Week 2 Plan

Session 3:

'I hated it, I just didn't use it, I think instead I am going to create a revision timetable for next week like I did for my GCSE exams' – B

After the first attempt at planning, B did not have the skills to unbiasedly reflect on her planning; instead, she chose to revert to a familiar plan of a revision timetable, separate to her normal timetable. Although previously she had suggested that this also caused her lots of stress and lost confidence in it suggesting that students do need help with selecting appropriate strategies as they are not always objective when reflecting on their past mistakes (Kitsantas & Cleary, 2016; Gettinger & Seibert, 2002). Week three's plan gave more flexibility in terms of time; however, the plan was still time-dependent for each section of the day (See Image 3). With further encouragement to focus less on such specific time-dependent plans, B was able to produce a more flexible timetable (See Image 4).

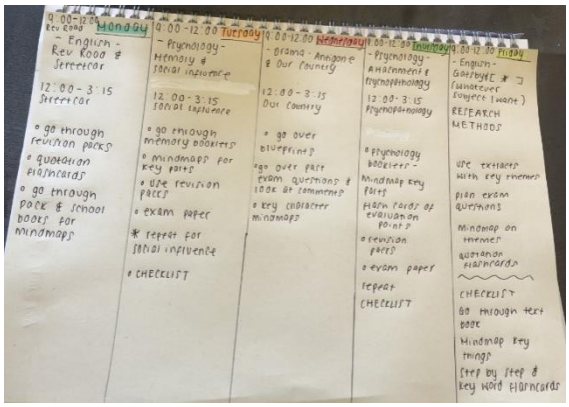

Image 3: B's Week 3 Plan

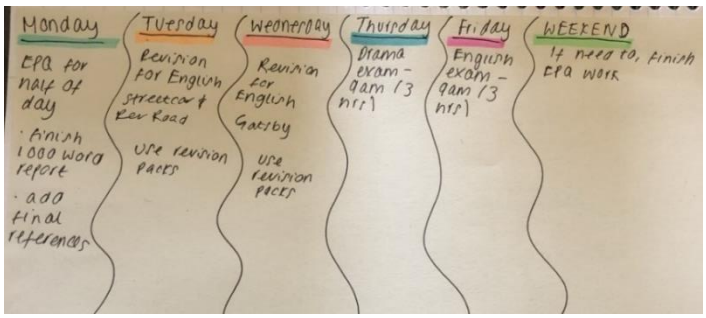

Image 4: B's Week 4 Plan

Session 5:

'figuring out how or what way worked best for me and figure out how to layout my time and how best to plan what I'm going to do, cos I think when I've done that I have been a lot less stressed' – B

Interview:

'I think it [planning] would have been the most important because usually I panic, sit down and then just try to work through everything.' – B

'I liked using the list and then-- Because that made all the work seem less overwhelming and more achievable' – B

'I am actually working hard and able to do my best which I think I wouldn't have felt as confident with that had I not done the sessions and then gone through all the different ways of learning' – B

The comments B made, suggest her academic confidence increased dramatically by finding a way of planning smarter goals. As her goals became more achievable so too did her perception of the work and this helped her to feel more confident that she was working hard and making progress which reflects the ideas of Yildizli and Saban (2016) that planning helped to increase academic confidence. This process allowed B to immerse herself in the cyclic model, which led to her developing better self-reflection skills, thus increasing the chance that she will engage in the cyclic model again (Zimmerman & Kitsantas, 1997). Not only did B feel more academically confident as a result of the planning, but all students also reported that they felt work was more achievable, suggesting it was a real strength of the intervention.

4.5.2 Revision and its Influence on Academic Confidence

Students who are taught effective revision techniques are more likely to succeed academically (Waller, 2020). Additionally, they are more likely to feel confident in their academic ability (Corry & Badger, 2020). This leads to students being better able to refine and adapt their techniques to be successful and therefore engaging in the cyclic model. The theme is about how students who can select appropriate revision strategies as well as reflect and refining these, will show increased confidence in their academic studies. Overall, the analysis suggests students were able to select the most appropriate strategies to help them revise and this made them feel more confident in achieving their goals.

As suggested in the metacognitive theme, students discussed what revision techniques they were going to use each week. Students were able to recognise that selecting appropriate revision techniques would lead to success. The students were then encouraged to discuss how successful they felt their revision was the following week and during the interview process:

> ***Session 4:***
>
> *'…it was more like revision based and that was helpful [having time to revise]' – M*

Session 5:

'I think it's improved my confidence in them. The main reason being, I tried one of the techniques for the chemistry mock and I got an improved score on it.' – M

'Yes, I think when I was able to pick parts of it that I liked and I was able to choose my own new revision technique, it meant I was able to get a better understanding of what worked and what didn't which then made me feel more motivated and confident so I was able to be more productive and work more effectively.' – B

The above comments show that confidence grew when students were able to attribute success to a strategy. Zimmerman and Moylan (2009) suggest students who can attribute success to a strategy rather than to their ability are more likely to show academic confidence. Furthermore, they recognised that refining their strategy led to success, for example, B's quote suggested the process of refining a revision technique led her to feel more confident in it, as she was able to understand what makes effective learning. This implies that an understanding of cognition, as well as metacognition, helped students to gain more confidence. Overall, the analysis suggests that students' academic confidence in their sixth form studies did increase, however, it would be interesting for future research to look at whether this translates into improved academic scores.

Conclusion:

To summarise, my research aimed to discover whether SRLs could be developed through an intervention programme. Specifically, whether an increase in metacognition, motivation, cognition and academic confidence could lead to students becoming better SRLs.

First, metacognition was shown to increase across all students; they became more aware of needing to reflect on their learning and accordingly direct future activities. Unfortunately, students were not as strong at monitoring their learning in an unbiased way, thus, suggesting that future cycles of the intervention could give more time to teaching self-reflection techniques, such as the micro-analytic questions suggested by Cleary and Kitsantas (2018).

Second, the motivation of all students increased throughout the intervention, as students gained belief in the success of the strategies suggested. However, some students did report that their motivation had decreased again after the intervention. This may be attributed to the fact that it was the end of the school year or that the feeling of being monitored was an external motivating source. The motivation, however, to continue to learn and improve did not decrease, it was simply the motivation to continue working as hard as they had done previously.

Third, student cognition did seem to change: they recognised the importance of self-quizzing in being able to monitor their learning and so understood how learning happens, although this was limited to specific strategies rather than a holistic understanding of cognition. Future interventions should consider spending more time discussing the general processes of learning. The quantitative results also highlight that students did show a change in the understanding of what effective learning was, which offers evidence for increased cognitive awareness.

Finally, academic confidence increased across all students in the intervention, students felt they were better able to make progress in their studies, as they had gained the skills to accurately monitor and reflection on learning. The confidence in the strategies they used helped them to feel confident in their ability. However, it would be interesting to see the long-term effects of academic confidence, which unfortunately was not possible in the current intervention.

Overall, analysis suggests students became more engaged in the cyclic model and started to develop the traits of an SRL This suggests the intervention was successful in helping students gain the skills needed to become SRLs; in that, the students became better at planning their time effectively and monitoring their learning. Although, further support with reflecting on their progress would be beneficial to helping students continue refining their SRL.

The literature review highlighted that a lot was known about the skills needed to become an SRL but less was known about the specific activities which were effective in teaching these skills. It is,

therefore, worth highlighting the successes and improvements in the intervention: Metacognition was taught both through encouraging reflection on planning and revision techniques. Students were encouraged to discuss their success and any refinements needed for future success. This part of the intervention was successful when modelling and guidance took place. For example, when students were given exemplars on plans and a demonstration of how to plan. Equally, some students becoming more meta-cognitively aware after being taught novel revision techniques, nevertheless this needs to be explored further to see if more explicit teaching would help students to understand the process of learning better. Their motivation was increased through the experience of successful outcomes, for example, effective planning led to them completing all the work in time and to a good standard, effective revision techniques led to more successful recall. Cognition was increased through awareness of the research behind the revision strategies which led students to have confidence in the strategies and they were more likely to experience success and thus increasing academic confidence.

The research has helped to identify the effectiveness of individual strategies used within the intervention and helped to identify how to refine the process for next time. It has highlighted the importance of explicitly teaching the skills and the research behind self-regulated learning to A-level students. For this reason, I plan to keep the programme running next year, whilst adapting it to resolve the problems previously identified. For those looking to undertake a similar project in the future, the small-group nature of the intervention was a real strength of the programme, as it allowed students to discuss their struggles with peers and provide support for one another. This was an unexpected bonus of the research but was of clear value to the students and I highly recommended it.

Additionally, I felt the project highlighted my previous gap in knowledge in this area, as well as the lack of CPD opportunities to understand this skill. I will, therefore, spend some time presenting my findings as well as the current research in this area to help other teachers support students with their independent learning.

Future research would consider consolidating the findings to create a standardised intervention which can be used by schools. This is not to say that the programme wouldn't need to be tailored to the students, but a collection of successful strategies and information to support teachers in understanding the cyclic model would help to implement this support within schools.

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Appendices:

Appendix 1 - Self-Regulation Strategy Inventory (SRSI-SR):

Questionnaire on Self-Regulating Learning

The following questionnaire is collecting data on how you complete your independent work for your sixth form studies.

The questionnaire is part of Miss Ralph's MSc in Teaching and Learning at Oxford University and any data submitted will be used confidentially as part of her research. Participation in this study is completely voluntary. If you decide not to participate there are no negative consequence. Please be aware that you may stop participating in the questionnaire at any point.

Miss Ralph will keep all your details confidential, your name will only be shared with Miss Ralph and all data will be anonymised when presented.

By submitting this form, you are indicating that you have read the description above and agree to the terms described.

If you have any questions, or would like a copy of this consent letter, please contact me at fralph@didcotgirls.oxon.sch.uk

Thank you in advance for your participation
Miss Ralph

2. How often do you do these things when you are doing school work? *

	Almost Never	Not Very Often	Somewhat Often	Very Often	Almost Always
I tell myself to keep trying hard when I get confused					
I give up or quit when I do not understand something					
I try to study in a quite place					
I ask my teachers about the topics that will be on upcoming tests					
I use my class notes to study					

. How often do you do these things when you are doing school work? *

	Almost Never	Not Very Often	Somewhat	Very Often	Almost Always
I study hard even when there are more fun things to do at home					
I quiz myself to see how much I am learning during studying					
I loose important worksheets that I need to study					
I make a schedule to help me organise my study time					
I use folders to organise my study materials					
I think about the types of questions that might be on my tests					

4. How often do you do these things when you are doing school work?

	Almost Never	Not Very Often	Somewhat	Very Often	Almost Always
I try to see how my notes from class relate to the things I already know	○	○	○	○	○
I try to identify the format of the upcoming tests (e.g. multiple choice, short answer questions)	○	○	○	○	○
I try to study in a place that has no distractions (e.g. noise, people talking)	○	○	○	○	○
I forget to ask my teacher questions about things that confuse me	○	○	○	○	○
I wait to the last minute to start studying for upcoming maths tests	○	○	○	○	○

5. How often do you do these things when you are doing school work? *

	Almost Never	Not Very Often	Somewhat	Very Often	Almost Always
I wait to the last minute to start studying for upcoming maths tests	○	○	○	○	○
I try to forget about the topics that I have trouble learning	○	○	○	○	○
I ask my teachers questions when I do not understand something	○	○	○	○	○
I make pictures or diagrams to help me learn	○	○	○	○	○
I make sure that no one disturbs me when I study	○	○	○	○	○

6. How often do you do these things when you are doing school work? *

	Almost Never	Not very often	Somewhat	Very Often	Almost Always
I tell myself exactly what I want to accomplish before studying	○	○	○	○	○
I let my friends interrupt me when I study	○	○	○	○	○
I look over my homework assignments if I don't understand something	○	○	○	○	○
I carefully organise my study materials so I don't loose them	○	○	○	○	○
I think about the best way to study for each test	○	○	○	○	○
I avoid asking questions in class about things I don't understand	○	○	○	○	○
I finish all my studying before i play video games or play with my friends	○	○	○	○	○
I forget to bring home my study materials when I need to study for my tests	○	○	○	○	○

Appendix 2 - Self-Regulation Strategy Inventory (SRSI-SR) Results:

P's No.	Total Score
1	84
2	85
3	87
4	89
5	90
6	90
7	96
8	98
9	98
10	99
11	99
12	100
13	100
14	102
15	103
16	103
17	103
18	104
19	104
20	105
21	106
22	106
23	110
24	112
25	113
26	114
27	115
28	115
29	117
30	121
31	121

Appendix 3 – Consent Form:

Education Department Contact Details:

Freya Ralph
Head of Psychology and Studying for an MSc in Learning and Teaching
Oxford University telephone number: 01865 [illegible]
Oxford University e-mail: freya.ralph@[illegible].ox.ac.uk

PARTICIPANT CONSENT FORM

Developing Self-Regulated Learners at Sixth Form: A cyclical intervention

Purpose of Study: The aim of the study is to improve your independent learning skills in order to help you achieve your best in your sixth form studies. It will involve around 6 group sessions where you will be given a presentation and asked to discuss your thoughts on independent learning in groups.

I will be collecting data throughout this is as part of my university project. Included in this data collection may be: a questionnaire on your independent learning, small group or individual interviews on how you found the group and information on what independent learning are undertaking outside of the sessions in the form of a short diary entry. The short diary entry may be photographed as part of evidence for the research project.

All information will be annonymised so that you are not identifiable, and you are free to withdraw your data from the study at any point. However, if you agree for your data to be used, this may be included in my written report which will be shown to my university tutors.

Please feel free to ask any questions at this point.

		Please initial each box
1	I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	☐
2	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and without any adverse consequences or penalty.	☐
3	I understand that research data collected during the study may be looked at by authorised people outside the research team. I give permission for these individuals to access my data.	☐
4	I understand that this project has been reviewed by, and received ethics clearance through, the University of Oxford Central University Research Ethics Committee.	☐
5	I understand who will have access to personal data provided, how the data will be stored and what will happen to the data at the end of the project.	☐
6	I understand how this research will be written up and published.	☐

7	I understand how to raise a concern or make a complaint.	☐
8	I consent to being audio recorded	☐
10	I understand how audio recordings / photos will be used in research outputs	☐
11	I agree to the use of pseudonymised quotes in research outputs	☐
12	I do not wish to be directly quoted	☐
13	I agree to take part in the study[1]	☐

_____	dd / mm / yyyy	_____
Name of Participant	Date	Signature
_____	dd / mm / yyyy	_____
Name of person taking consent	Date	Signature

Appendix 4 – Example of Work Tracker:

Work Tracker

Instructions: after completing any task fill out the table with the work you have done. You must do this straight after completing the task or lesson. See my example below:

I watch a video about psychopathology for psychology and then I complete the page in the booklet for it, this takes approximately an **hour**, so I shade in one hour. I later do **two hours** of geography classwork on rivers, so I shade in a hour for that. I come back to my Psychology work the next day and I do **two hours** of class work, on the evaluation and exam questions, so I now shade in two more columns.

Hours:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Psych																									
Bio																									
Geog																									
Spanish																									

Week Commencing:

Class Work:

Hours:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Subject 1:																									
Subject 2:																									
Subject 3:																									
Subject 4:																									

Revision:

Hours:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Subject 1:																									
Subject 2:																									
Subject 3:																									
Subject 4:																									

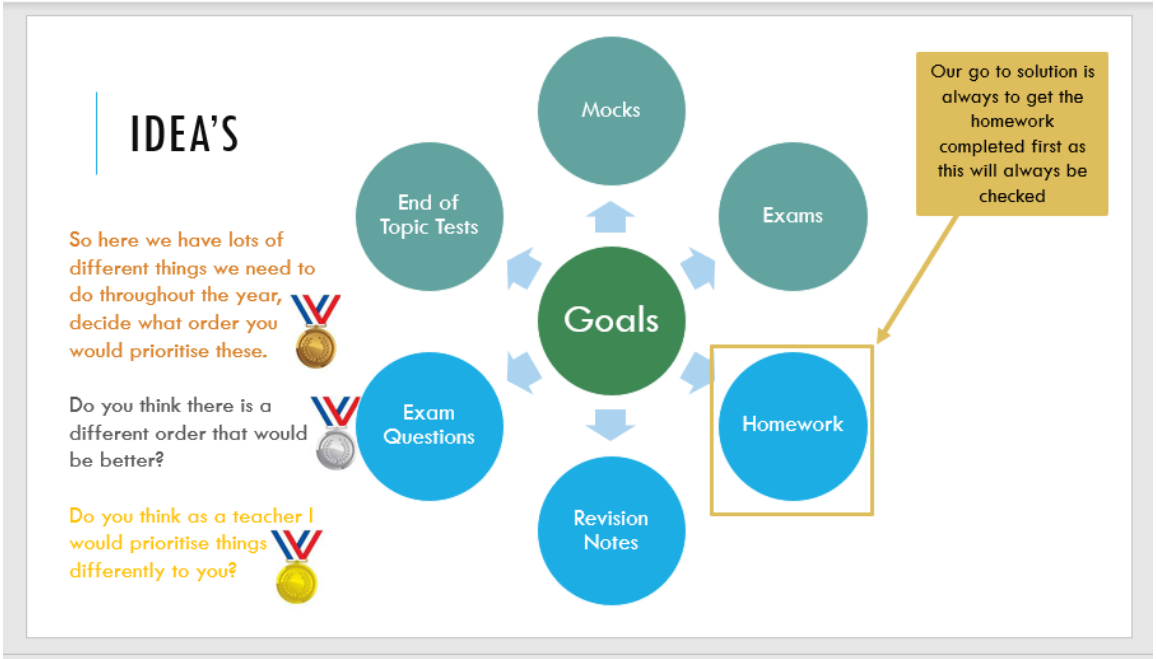
Other Subject Related Work:

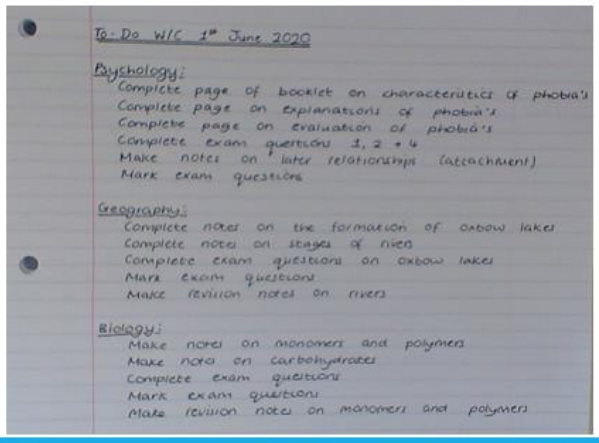
Hours:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Subject 1:																									
Subject 2:																									
Subject 3:																									
Subject 4:																									

Appendix 5 – Planning and Goal Setting Examples:

SMART goals have been around for a while. How can we make these into something which is quick and useful to us?

We need to do think about which tasks we are going to do quickly and efficiently. Brainstorm with the person next to you



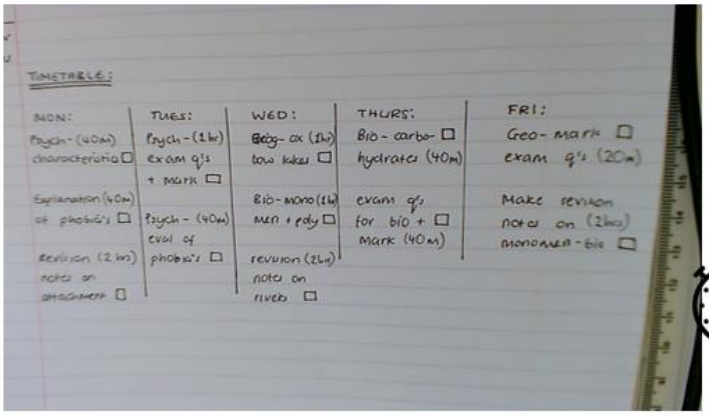


MAKING EFFECTIVE LISTS:

Why is a list helpful?

What are the strengths and weaknesses of this list?

How could it be improved?



TIMETABLES

From this I make a timetable. The key to this timetable is:

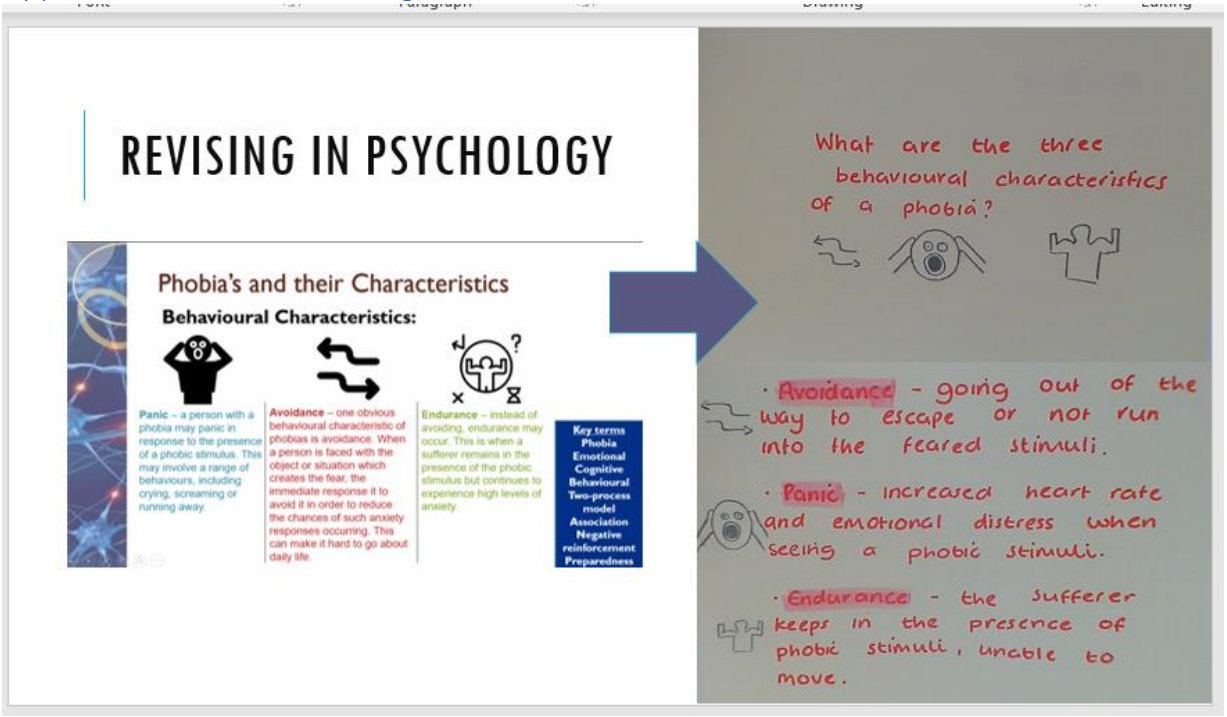
1. There is **not to much** on each day

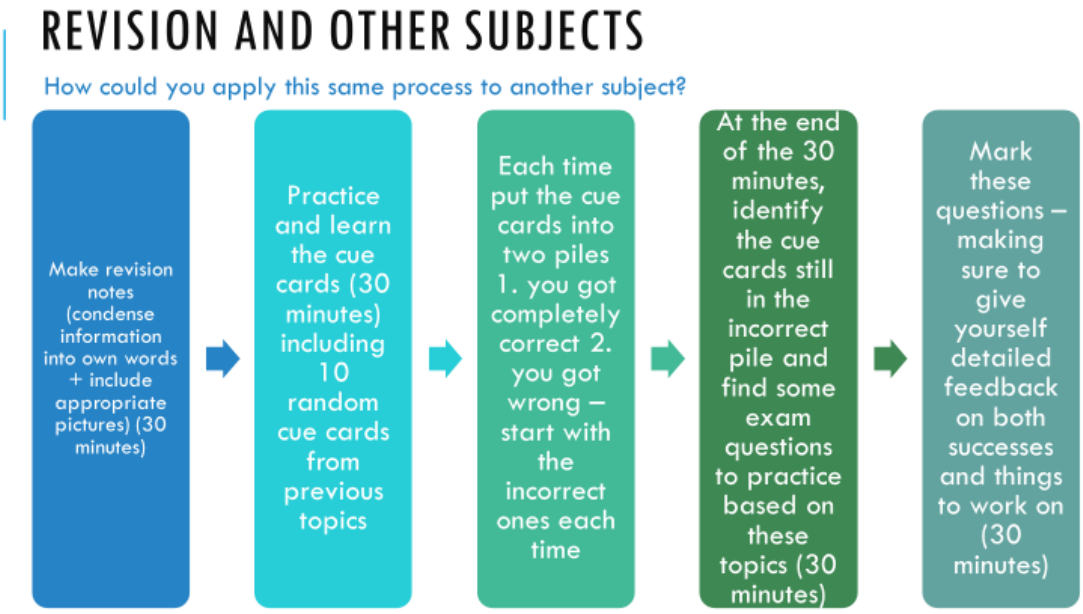
2. There is **no set time,** so if you wake up later or you have to walk the dog etc… you have time to fit that into your day without feeling you can't achieve everything

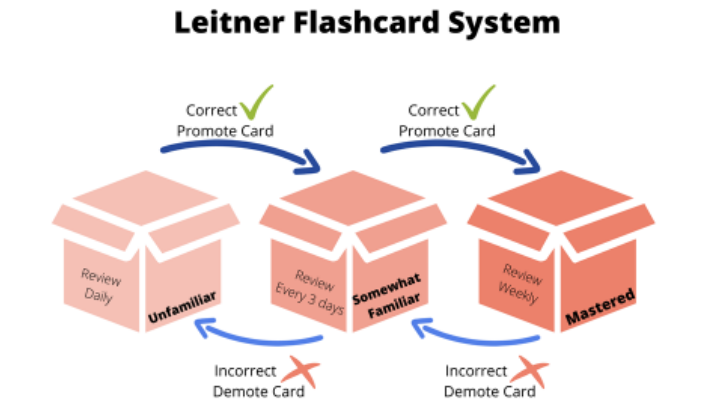
3. There is a **tick box,** so you can keep track of what you do each day.

This took about 20 minutes to complete.

Appendix 6 – Revision Strategies:







LEITNER FLASHCARD SYSTEM

Why might this be helpful?

What type of revision is this encouraging?

How can you adapt it so that it suits your learning needs?

What are your thoughts about this system?

REVISION AND RESEARCH

What do you remember about schema's?

A mental framework of concepts and thoughts learnt through experience.

How might this be useful for our revision?

Revision should be 'dual-coded' i.e. have words with pictures OR you have it written and you say the answer allowed.

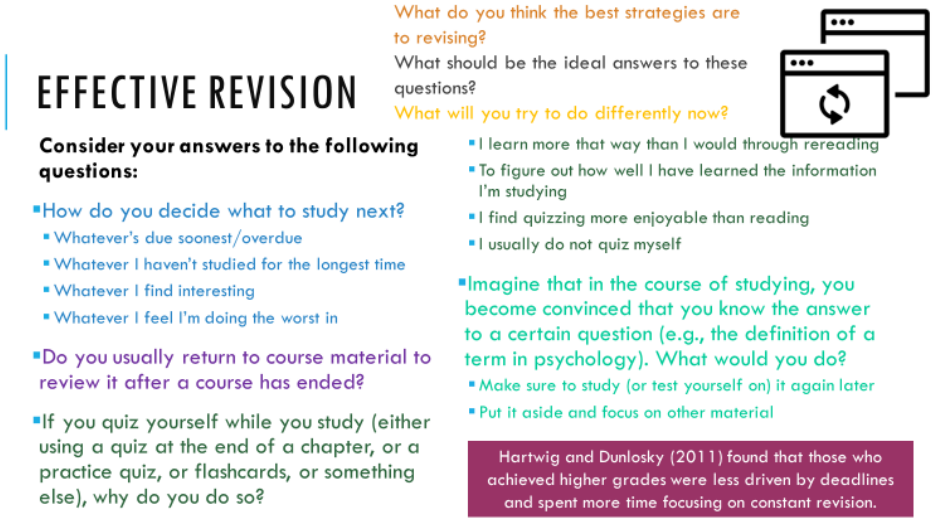
Schema's mean having multiple pathways to the same memory, it makes it easier to access

Why do we quiz ourselves?

Quizzes are used to self-test – it is a way of making you aware of what you know and what you are unsure of.

Quizzing helps to strengthen our recall pathways, increasing the amount of myelin sheath on a neuron, making for quicker transmission and therefore quicker recall

Appendix 7- Hartwig and Dunolsky (2011) Revision Strategies Questionnaire:



Appendix 8 - CUREC Approval:

Dear -------,

Developing Self-Regulated Learners at Sixth Form: A cyclical intervention

I have just been asked by the research office for an update on this – in case this was not approved here is a note of approval; if not, please do follow up after 30 days.

The above application has been considered on behalf of the Departmental Research Ethics Committee (DREC) in accordance with the procedures laid down by the University for ethical approval of all research involving human participants.

I am pleased to inform you that, on the basis of the information provided to DREC, the proposed research has been judged as meeting appropriate ethical standards, and accordingly, approval has been granted.

If your research involves participants whose ability to give free and informed consent is in question (this includes those under 18 and vulnerable adults), then it is advisable to read the following NSPCC professional reporting requirements for cases of suspected abuse
http://www.nspcc.org.uk/globalassets/documents/information-service/factsheet-child-abuse-reporting-requirements-professionals.pdf

Should there be any subsequent changes to the project which raise ethical issues not covered in the original application you should submit details to research.office@education.ox.ac.uk for consideration.

Good luck with your research study.

Sincerely,

With kind regards,

Liam
Dr LF Gearon
Chair DREC
Department of Education
University of Oxford

Appendix 9 – Draft Interview Questions and Head Teacher Letter:

Potential Interview Questions:
I am hoping that the interview will follow a semi-structured format, in which these questions may lead on to other questions about the whole process. Each interview will last around 10 minutes and will be conducted either in pairs or individually depending on what students feel most comfortable with.

1. Can you explain to me the purpose of the sessions we have completed over the past couple of months?
2. Can you talk through the most important takeaways from the sessions?
3. Can you define independent learning for me?
4. How has your motivation been affected by this intervention, if at all?
5. How has your confidence in your sixth form studies been affected by this intervention, if at all?

The first two questions are asking them to consider what they have learnt. This is mostly to check that they can coherently and fluently explain the full aims of the intervention. Additionally, this will hopefully be a good opener to start the conversation with something they are confident on.

6. What have you found most useful about the sessions? Why?
7. What have you found the most challenging about the sessions? Why?
8. What have you found the most interesting about the sessions? Why?
9. What else would you have liked to have seen in these sessions?

The next four questions are asking them to reflect on what they perceive to be potential strengths and limitations so that it can be improved for the next time we run the intervention. Additionally, it may reveal what parts of the cycle they found the most helpful/challenging, so that this can be improved. Finally, it will also show which part of the cycle the students find most tricky to keep too.

10. Has this intervention changed the way in which you approach your independent learning? Why?
11. Do you think the work tracker was a good way of keeping track of your independent learning? Why?
12. Do you think you will carry on the use of the work tracker in some format?
13. How has your revision changed or how will it change as a result of the sessions?

The last three questions are there to see if there may be any long-term benefits to the intervention. Especially if the work tracker as a form of monitoring independent learning is an effective tool.
Feelings about the sessions?
Anything else you want to say?

Dear --------,

As you are aware, I will be undertaking my MSc Learning and Teaching this year and as part of this I need to undertake a project. I am therefore writing to you to explain the aims and intentions of my project.

My project aims to look at undertaking an intervention with a small group of sixth form students into improving their independent learning. Within this the group of students will be required to spend 30-45 minutes of P4 on a Wednesday afternoon with me, learning about different aspects of effective independent learners. This will take the form of a small group discussion as well as presentations.

I will be collecting some data on these students, including how their independent learning progresses (through the use of short diary entries) as well as their pre and post independent

learning scores. Finally, some information will be collected from interviews about how beneficial the processes was an what they have learnt.

If you do have any questions, please feel to ask me.

If you are happy for me to undertake this project, please could you reply to this letter confirming this.
Kind Regards,
