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I. Introduction

In the Educational Context there has been an increasing interest in self-regulated learning (SRL) as it is seen as an important necessity in various aspects in the educational field (e.g. Dresel et al, 2015; Pintrich & Garcia, 2012; Sitzmann & Ely, 2011; Zimmermann, 1990). Especially in higher education, students are expected to adapt to an unguided educational environment compared to that of their school career (Foerst, Klug, Jöstl, Spiel & Schober, 2017) and are typically confronted with complex achievement tasks, a considerable amount of autonomy regarding learning organisation, materials, collaboration, learning goals, content and procedures as well as having rather limited opportunities to receive external feedback (Dresel et al, 2015). Students in addition, have to deal with diverse challenges (Streblov & Schiefele, 2006) such as planning and organising their own learning, self-motivation and dealing with emotions (Foerst et al, 2017). These demands signify, that it is of utmost importance that students develop the skill of SRL. According to Zimmermann (2000) SRL refers to “self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals” (p.14). This makes SRL crucial, as higher education provides opportunities and a necessity for students to self-regulate their own learning and to obtain competencies in SRL so they can succeed in their academic studies (Dresel et al, 2015). In addition, many researchers on the one hand, consider competencies in SRL as an important prerequisite for success in academic studies (e.g. Cassidy, 2011; Dresel et al, 2015; Wirth & Leutner, 2008) and on the other hand, some researchers perceive it crucial for lifelong learning (e.g. Lüftenegger et al, 2012.). It is therefore, that Institutes of Higher Education increasingly strive for students to apply the concept of SRL in that they should actively self-regulate their learning process. This could then further enable students to master lifelong learning skills for them to use and manage once they are working in their field of expertise (Van Eekelen, Boshuizen & Vermunt, 2005).

Seeing that there is a large body of literature regarding the benefit of SRL on academic success attesting to the relevance of students having to apply SRL to attain academic success (e.g. Cassidy, 2011, Dresel, 2015 & Zimmermann, 1990), the question arises, to why there are still inconsistent results when analysing SRL and academic achievement (Schober et al, 2015). Several studies analysing SRL and academic success show that SRL and performance do not always correlate highly (e.g. Alkharusi, Aldhafri & Alnabhani, 2013; Foerst et al, 2017; Ho, 2004). One such factor that could explain this, is that

there seems to be a discrepancy of students' knowledge and their actual use of SRL strategies (Foerst et al 2017). In addition, there are still uncertainties as to which factors in combination with SRL are crucial for success in higher education (Schober et al, 2015). This shows that there seems to be substantial knowledge deficits which consequently lead to these inconsistent results (Schober et al, 2015). It is this reason, why additional factors must be analysed in conjunction with SRL when trying to understand how SRL influences academic achievement. As there seems to be a lack of motivation in utilising SRL strategies (Foerst et al, 2017), the current study investigated the influence of SRL on academic achievement by considering personal factors such as motivation and emotions. Furthermore, several research approaches which utilise different models in conceptualising SRL, also contribute to varying results (Schober, 2015). It is this reason, that various models are presented in the study, in trying to ascertain a holistic view on how SRL is conceptualised and how it could act as a widespread concept that could be used to measure SRL in all domains.

II. Theoretical Part

1. Self-Regulated Learning

SRL is a multidimensional construct that accentuates the active role of the learner to learn independently (Zimmermann, 2008). A variety of models have been produced regarding the conceptualisation of SRL which place emphasis on different aspects on how students become responsible learners by regulating their own learning and performance. (e.g. Dresel et al, 2015, Roth, Ogrin & Schmitz, 2015; Wirth & Leutner, 2008, Zimmermann, 2000). These models however do share a common view, in that self-regulated learners are continuously actively acquiring knowledge and use several cognitive and metacognitive strategies to control and regulate their academic learning (Zimmermann, 2000). Self-regulated learners are characterised as students that are aware of not only the task requirements but also of their own needs with regards to creating an optimal learning experience. They know the strategies that are required for learning to occur and understand when and how to make use of these strategies to increase their perseverance and performance (Mega, Ronconi & De Beni, 2014). Self-regulated learners plan, organise, set goals, self-monitor and self-evaluate at various points during the process of knowledge acquisition. These processes enable them to be self-aware, knowledgeable and have the effect that students become more decisive in their approach to learning. They do not only show remarkable effort and persistence during learning but also select, structure and create surroundings that enhance their learning

(Zimmermann, 1990). In sum, they set their standards or goals which they would like to achieve in their learning process, they then monitor their progress towards these goals thereby regulating and if necessary, adapting their cognition, motivation and behaviour in order for them to reach their goals or standards (Mega et al, 2014). This indicates, that SRL has a profound influence on academic achievement and has to be taken into account when trying to understand what influences students' academic achievement and what has to be fostered in higher education to increase students' academic achievement. As Zimmermann (1990) explains, students that show initiative, have intrinsic motivation and take on personal responsibility will achieve distinct academic success.

As mentioned above, although all models tend to agree that in order to be academically successful, students' have to take on an active role and engage in activities that foster SRL, they do however place different emphasis on various components on how students become responsible learners (Dresel et al, 2015; Mega et al, 2014; Zimmermann, 2000). Winne and Perry (2000) created an overview of these models, to clarify which models tend to focus on specific components or processes that are related to becoming a self-regulated learner. These models of SRL can be categorized as component models or as process models.

1.1 Process and Component Models. Process models focus on the “coordination and regulation of cognitive, meta-cognitive, motivational and emotional processes in all phases of learning” (Dresel et al, 2015, p. 455). These models portray SRL as a cyclical process that comprises three phases. In what Dresel et al (2015) calls the pre-action phase (forethought phase in Zimmermann, 2000), the learner analyses situational and task demands, sets goals and plans their undertaking. In the action phase (performance or volitional control phase) the learner engages in the task and executes specific learning strategies to reach those goals. They also monitor their effectiveness of learning and adapt when necessary, thereby also maintaining their motivation and positive emotions. Lastly, in the post-action phase (self-reflection phase) the learner reflects on their learning outcomes and may also regulate their thoughts and feelings which in turn influences the following pre-action phase to similar tasks in the future (see Dresel et al, 2015; Roth et al, 2015; Zimmermann, 2000). Subsequently students' learning can be understood as a repeated learning cycle. This means, that process models describe requirements that have to be met in different phases of the cyclic learning process and this unfolds sequentially over time. In this sense, planning has to occur before learning, monitoring one's learning occurs before one evaluates the effectiveness of one's learning approach (Goetz, Nett & Hall, 2013; Wirth & Leutner, 2008). However, these

models do not stipulate the competencies needed to meet these requirements (Wirth & Leutner, 2008).

This is where the component models compliment the process models, as the component models aim to “identify the types of strategies which are involved in SRL” (Dresel et al, 2015, p. 455). These strategies can be categorised into three groups. The first group is comprised of cognitive learning strategies, which the learner uses to regulate the process of knowledge acquisition. These, for example, include elaboration or rehearsal. The second group involves metacognitive strategies, which assists the regulation of learning. These include monitoring and adapting learning activities. The final group consists of resource management strategies that manage internal and external learning resources. These include, for the internal resource for example, the regulation of motivation, emotions, maintaining concentration and time management. For external resources it includes the organisation of the learning environment and setting up social support for learning such as help-seeking or collaboration (Dresel et al, 2015; Pintrich & Gracia, 2012; Roth et al, 2015). Component models in contrast to process models, describe the competence of SRL without stipulating in which phase of the learning process the different components of competence are needed and are thereby considered as relatively stable attributes of the person (Wirth & Leutner, 2008). It is therefore that component models aim to illustrate that SRL competence are mandatory for learners to become competent at self-regulation.

1.2 SRL as a competence. It is due to this, that recent conceptualisation of SRL has addressed SRL as a competence (Foerst et al, 2017). Zimmermann (2000) already declared that SRL is neither a mental ability, an academic performance skill, a personal trait nor a characteristic. If this would be the case, it would be complicated to change or to train it and it probably would be stable across situations and domains (Foerst et al, 2017). However, Wirth and Leutner (2008) defined SRL competence as a “learner’s competence to autonomously plan, execute, and evaluate learning processes, which involves continuous decisions on cognitive, motivational, and behavioural aspects of the cyclic process of learning” (p. 103). Thus, learners’ SRL competencies can be understood as their knowledge about SRL strategies in relation to the task and the self. This means that different learning situations typically produce varying self-regulation demands and therefore different SRL strategies may be suitable to varying degrees in different learning situations and for each individual field of study (Dresel et al, 2015). On that account, it is considered that the better an individual’s SRL strategies are met with the specific SRL demands of a learning situation, the better their SRL competencies are believed to be. Rather than the view, of the more the merrier, in that,

individuals who apply numerous SRL strategies on a learning demand, the better their SRL competencies are believed to be (Dresel et al, 2015).

A recent review on competence, Blömeke, Gustafsson and Shavelson (2015) consider competence on a continuum between knowledge and performance, in which performance functions as the manifestation of competence. It is therefore, that competencies in SRL go beyond having the mere knowledge of SRL strategies but are also required to incorporate the application of these strategies in a way that is beneficial for performance and fits the learning demands that are relevant in a specific domain (Foerst et al, 2017). Due to this, the current research will be focusing on the SRL strategies, as they can be determined at any stage of the learning process, are not domain specific and are measurable, to establish whether these strategies are being utilised within the learning process. It is however to note, that SRL competencies alone, are not sufficient for learners to use SRL strategies. This was made clear by Foerst et al (2017) who have demonstrated that student's knowledge about SRL strategies were profound and were detected across different study programs. However, across all studies, the researchers noticed, that students did not manage to transfer their knowledge into action, which is an absolute necessity for one to benefit from this knowledge. One of the reasons considered for this discrepancy according to the researchers was, the lack of willingness to learn when to use a specific SRL strategy on a specific learning demand. This reasoning is based on a motivational variable which indicates that a variety of internal and external variables can prevent learners from amassing their full potential, and consequently hindering to effectively self-regulate their learning (Dresel et al, 2015). Thus, it is apparent that one such variable that has a contributing factor on whether or not students utilise SRL strategies is motivation.

2. Motivation

As mentioned above, the mere knowledge of SRL strategies, does not necessarily mean that students apply these strategies to get ahead in their academic achievements (Foerst et al, 2017). Students must be motivated to actively engage in using SRL strategies and also be able to regulate their cognition and effort so that students' academic achievement can be recognised (Pintrich & De Groot, 1990) Self-regulatory strategies become of little value if students cannot motivate themselves to use them (Zimmermann, 2000; Zimmermann, 2008; Schunk & Zimmermann, 2008, as cited in Schunk & Greene, 2018). Various research has found that a variety of motivational constructs have been connected to SRL and play an essential role in understanding student commitment and achievement (e.g. Cho & Heron, 2015; Mega et al, 2014; Pintrich & De Groot, 1990; Pintrich & Gracia, 1993; Schunk &

Greene, 2018). It is therefore of importance to examine how the SRL strategies are linked to individual differences in student motivation in order to gain more insight and understanding of how personal characteristics are related to the use of SRL strategies and how it relates to academic achievement (Pintrich & De Groot, 1990; Schunk & Greene, 2018).

2.1 Expectancy-Value Model. A well-established model of motivation in the context of learning and achievement behaviour is the expectancy-value model developed by Eccles (1983) as cited in Wigfield and Eccles (2000). Theorists working within this model postulate that individual's choice, persistence and performance can be explained by firstly, their beliefs about how well they will do on a task and secondly, by the extent to which they value the given task. These are also known as the expectancy and value components of this model (Eccles, 1983 as cited in Wigfield & Eccles, 2000). In addition, this model brings to the forth, that the expectancy and value components are assumed to be influenced by task-specific beliefs such as, the perceived difficulty of a task, individuals goals and their affective memories (Eccles, 1983 as cited in Wigfield & Eccles, 2000). Consequently, the expectancy value model purposes that there are three motivational concepts that have to be taken into account when examining motivation in an academic setting (Pintrich & De Groot, 1990). These three components are identified in the “expectancy component, which includes students’ beliefs about their ability to perform a task, a value component, which includes students’ goals and beliefs about the importance and interest of a task, and an affective component, which includes students’ emotional reactions to the task” (Pintrich & De Groot, 1990, p.33). In this sense, in order for students to engage in SRL strategies, students should have the confidence in their ability to learn (e.g., self-efficacy) and there has to be a good reason or purpose to do so (e.g. task value) (Wondimu, 2017). Students who belief that they are able to perform the task and that they are responsible for their own performance are much more likely to be motivated in terms of effort and perseverance, compared to those who belief they are less likely to do well and do not expect to succeed (Mega et al, 2014). Thus, self-efficacy is closely related to SRL, as students who belief they are capable are more likely to be self-regulating and engage in more cognitive and metacognitive strategies and are more likely to persist at a task than students who do not belief they can perform well (Mega et al, 2014; Pintrich & De Groot, 1990). In addition, self-efficacious students participate more eagerly and are more willing to take on challenging tasks, work harder and have fewer unfavourable emotional reactions when they are confronted with difficulties compared to students that do not consider themselves capable (Zimmermann, 2000). Moreover, studies have shown that self-efficacy has a profound impact on academic achievement (Dresel &

Hall, 2013; Multon, Brown & Lent, 1991; Pintrich & Gracia, 1993; Wigfield & Eccles, 2000; Zimmermann, 2000) and is therefore an important factor that has to be taken into account when analysing students' motivation and SRL and how these factors influence academic achievement.

The expectancy component is closely related to the task value component and therefore the value component also has to be taken into account when analysing students' motivation. The task value entails "students' goals for the task and their beliefs about the importance and interest of the task" (Pintrich & De Groot, 1990, p. 34). In other words, it examines students' reason for doing a task. A students' perception on how important, interesting, and useful a task is to them, will result in students engaging in an academic task. The reason for this is that students are likely to carry out tasks that they value and avoid those, that are no value to them (Wigfield & Eccles, 1992). According to Garcia and Pintrich (1994), our self-concept is made up of multitudes of self-schemas and the value component provides a mechanism that ensures that certain self-schemas are more central and important to us than others. In this sense, the values are a type of motive that leads an individual to perform tasks that he or she perceives are important and should be done (Feather & Newton, 1982, Feather, 1988). Furthermore, individuals' values influence the appeal of different goal settings and consequently the motivation to attain these goals (Feather & Newton, 1982). Students who have a motivational orientation that involves the belief that a task is interesting and important, will engage in more cognitive and metacognitive strategy use and are more effective in effort management (Eccles, 1983 as cited in Pintrich & De Groot, 1990). Likewise, when a task is highly valued, students are much more likely to engage in SRL strategies than if the task is not valued, as there would be no motive to self-regulate (Zimmermann, 2000). This indicates that the motivational power of ability self-concepts which influence task choice, are also partially determined by the value that an individual attaches to engaging in a task (Eccles, 2009). In this sense, self-efficacy is affected by the perception a student has on the importance, utility and value of an academic task. If the student perceives the academic task as important or useful to them, they are likely to develop strong self-efficacy in this domain (Wigfield & Eccles, 1992). On the other hand, if the perceived goal is highly valued but the expectancy on achieving this goal is very low, then this will likely result in an individual to not pursue to attain the goal (Feather & Newton 1982). This clearly shows that task value and self-efficacy are both key components in gaining insight and understanding of students' choice of academic tasks, their persistence and their performance (Wigfield & Eccles, 2000). Bearing in mind that motivation has an

influence on students' engaging in SRL strategies, it must also be understood that SRL and motivation work interdependently, in which both have an influence on how academic achievement is attained and should be considered together (Zimmermann 1990).

The third component of this model concerns the emotional and affective reactions students' have on a task. Although various research has shown, that emotions have great influence in the educational environment, especially in the academic setting concerning learning, motivation, performance and on academic achievement (e.g. Cho & Heron, 2015; Mega et al, 2014; Pekrun, Goetz, Titz & Perry, 2002; Pekrun, 2006; Pekrun, Goetz, Frenzel, Barchfeld & Perry, 2010; Pintrich & De Groot, 1990; Valinasab & Zeinali, 2019; Wigfield & Eccles, 2000), research underpinning academic achievement and research on factors that influence academic achievement, have however neglected to include the component of emotions to a vast extent (Pekrun et al, 2002). In addition, majority of research that did include the affective component, have only focused, to a large extent, on test anxiety or have addressed no more than one or two emotions. This signifies that there exists a paucity of current research of a broader perspective on a wider range of emotions and other achievement related emotions (Pekrun et al, 2002). It is thus, that the present study will integrate positive and negative achievement emotions to gain a more holistic view on how emotions have effect on motivation, SRL and on academic achievement.

3. Achievement Emotions

Emotions appear everywhere and are very common not only in our day-to-day life, but also in the learning context. This makes emotions an important factor in numerous aspects in the academic context, as they have great impact on individuals' thoughts, feelings and behaviour. They guide and capture attention, influence thoughts, and they dictate if and how individuals react (Frenzel & Stephens, 2013). This clearly shows that emotions are a multidimensional construct that comprise of affective, expressive, cognitive, motivational and physiological components. In this sense, emotions can be seen as the motivating force behind individuals' thoughts and actions (Frenzel & Stephens, 2013).

In the educational context, students are confronted with various emotions that are elicited through the learning environment and impact student's behaviour in the academic setting (Frenzel & Stephens, 2013; Pekrun et al, 2002). More specifically, research on emotion have established that there are emotions that are directly linked to academic learning and achievement (Pekrun et al, 2002). Pekrun (2006) defined these emotions as achievement emotions which are emotions that are "tied directly to achievement activities or achievement outcomes (p. 317). In this sense, two types of achievement emotions can be distinguished,

and both can be categorised into positive and negative emotions. The first one is activity emotions, which involves emotions that are experienced in ongoing achievement related activities and the second one, being outcome emotions, which relate to emotions that are experienced to the outcomes of these activities (Pekrun, 2006).

3.1 Control Value Theory. These achievement emotions are integrated in the control value theory which attempts to explain the prior and effects of these diverse emotions which are experienced in the academic achievement context (Pekrun, 2006). According to this theory, these achievement emotions arise based on student's interpretation of achievement activities and outcomes. Moreover, among the many interpretations and evaluations that can take place, for example, self- or other- related and situational judgements, the central assumption of this theory is, that there are two types of evaluations that stand out in being the most important on how these evaluations effect student's achievement emotions. These are the perceived controllability of achievement activities, which involves learning- and performance- related activities and their outcomes and secondly, the subjective value that is attached to these achievement activities and their outcomes. This means, that the control and value judgement that a student attributes to the activity or outcome, influences their emotions. More specifically, on the one hand the degree to which one believes one is in control or in command of a situation or of its end results and is able to control these factors, and on the other hand, how important or personally meaningful an individual perceives an activity or an outcome, will have an effect on how the activity or outcome will be evaluated, this being either positive or negative, and therefore has an effect on how the activity or outcome is emotionally experienced (Frenzel & Stephens, 2013; Pekrun, 2006). In this sense, with regards to the value aspect, the more a student places personal meaning to a situation or outcome, will affect how intense both, positive and negative emotions are experienced. With regards to the control aspect, the more a student believes and perceives to have personal control in or of a situation and its outcomes the more likely they will have the effect of enhancing the experience of positive emotions and alleviating the experience of negative emotions. However, it is also of importance to know, that a reciprocal effect between emotions and the evaluations of control and value exists (Pekrun, 2006). As stated, the way in which a student evaluates their controllability of an activity or outcome and the amount of value they attribute towards these, will influence their emotions in either a positive or negative way. On the other hand, emotions that are experienced on an activity or outcome may however also affect future evaluations of control and value appraisals on similar tasks in the future. Thus, the feelings of anxiety and frustration for example, may have a negative

effect on self-efficacy, as stated in this case, on the evaluation of having control over an activity or outcome (Artino & Jones, 2012). This also affects the value aspect. If anxiety, for example, is experienced to a certain degree towards an activity and the student feels anxious, they might try and devalue the activity to combat and reduce their anxiety, as the view on failure of an unimportant activity should produce less, in this case, anxiety, than the view on failure of a highly valued activity (Wigfield & Eccles, 1992).

In addition to the control and value aspect of this theory, the control-value theory identifies two dimensions, valence (positive or negative emotions) and activation (activating or deactivating emotions). These also have an important effect on achievement emotions as they appear to be basic determinants of many effects of these emotions (Pekrun et al, 2002; Pekrun, 2006). Taking all these aspects together and, which the control-value theory states, are the most frequently mentioned emotions that arise in the academic and achievement context, the resulting set of emotions comprise of positive emotions such as enjoyment, hope and pride (positive activating emotions) as well as relief (positive deactivating emotion). Negative emotions include, for example, anger, anxiety and shame (negative activating emotions) as well as hopelessness and boredom (negative deactivating emotions) (Pekrun et al, 2002). As mentioned, these dimensions of valence and activation seem to be basic determinants of the effects that achievement emotions have on learning, motivation and performance. For example, research shows that positive activating emotions (enjoyment, hope and pride) are predicted to facilitate the use of metacognitive strategies, such as deep processing strategies like elaboration. On the other hand, negative activating emotions (anger, anxiety and shame) are hypothesised to result in shallow processing strategies such as rehearsal. Negative deactivating emotions (hopelessness and boredom) are hypothesised to likewise, result in the usage of shallow processing strategies, as well as resulting in reducing and minimising attention (Pekrun et al, 2002; Pekrun, 2006). Moreover, positive activating emotions (enjoyment, hope and pride) seem to promote motivation and SRL and thus positively influencing academic achievement (Pekrun et al, 2010). Conversely, negative deactivating emotions (hopelessness and boredom) seem to reduce motivation and metacognitive strategy use, which in turn suggests negative effects on academic achievement. The other two categories, which are positive deactivating and negative activating emotions, seem to have a more complex relationship in regard to their effect on academic achievement (Pekrun et al, 2002; Pekrun et al, 2010). Positive deactivating emotions such as relaxation and relief, can deactivate any immediate motivation that influence academic work, thereby having the negative effect of disengaging a student from a task. On the other hand, they may

reinforce motivation in students to engage in following learning tasks. Similarly, negative activating emotions (anger, anxiety and shame) seem to weaken intrinsic motivation, as negative emotions tend to conflict with enjoyment, which is an integral part of interest and intrinsic motivation. On the other hand, they seem to generate strong motivation to manage the negative events that caused them, thereby having the effect of strengthening extrinsic motivation. For example, when an upcoming exam elicits anxiety, with its feelings of uneasiness and worry in a student, the anxiety may have the effect of motivating a student to engage and increase their effort of learning to overcome the feared outcome, which may be failing the test (extrinsic motivation) (Frenzel & Stephens, 2013). In this sense, a negative activating emotion has facilitated motivation, which could have a positive effect on future learning and achievement (Pekrun et al, 2002). However, even though discrete achievement emotions may show complex effects on learning, motivation and achievement, one can expect that negative activating emotions show negative effects on academic achievement (Artino & Jones, 2012; Pekrun, 2006; Pekrun et al, 2010) as in the long run, academic success is unlikely when it is externally driven or failure oriented (Frenzel & Stephens, 2013).

In summary, SRL is seen to be an important factor in academic achievement (e.g. Zimmermann, 1990) and why higher education need to focus on students becoming more self-regulated (Dresel et al, 2015; Pintrich & Garcia, 2012). The reason for this is, that higher education brings a considerable amount of autonomy and therefore it becomes a necessity for students to become self-regulated to excel in their studies (Dresel et al, 2015). Self-regulated learners not only set their standards or goals which they would like to achieve in their learning process, they also monitor their progress towards these goals, thereby regulating, and if necessary, adapting their cognition, motivation and behaviour so they are able to reach their goals or standards (Mega et al, 2014). Thus, having a positive effect and influence on academic achievement (Zimmermann, 1990). Having the mere knowledge of SRL does not however mean that students engage and utilise SRL strategies to get ahead in their studies (Dresel et al, 2015; Foerst et al, 2017). Other factors, such as motivation, have a profound impact on why some students utilise SRL strategies while others do not (Mega et al, 2014; Pintrich & De Groot, 1990). Self-efficacy, or the belief a student has of being able to perform on a task and the value aspect, and how valuable the task seems to be for a student, will influence their choice, persistence and performance (Eccles 1983 as cited in Wgfield & Eccles, 2000). Seeing that motivation has an influence on students' engaging and utilising SRL strategies, these two factors have to be treated as interdependent processes to gain a

more holistic view on students' academic achievement (Zimmermann 1990). In addition, analysing students' discrepancies between their usage of SRL strategies and their reasons for not engaging in SRL strategies continually would also contribute to understanding students' challenges on why SRL strategies are not constantly used to their fullest potential. Another factor that influences the use of SRL strategies is emotion. Emotions seem to be the motivating force behind thoughts and actions (Frenzel & Stephens, 2013; Pekrun 2006). Again, the control and value a student attributes towards an activity, in other words, the control one perceives about having on a situation or outcome and how personally meaningful the task is to a student, will influence how the activity or its' outcome are emotionally experienced (Pekrun, 2006). If positive emotions are enhanced, this will have the effect of students becoming more motivated and engaging in SRL strategies which will positively affect academic achievement. On the other hand, should negative emotions be experienced, this could have the effect on students control evaluation on a task, and might even lead to the devaluing of a task, thereby affecting their motivation which could negatively affect academic achievement (Artino & Jones, 2012; Pekrun, 2006). In this sense, the underlying assumptions is that emotions influence academic achievement via their effects on motivation and SRL (Artino & Jones, 2012; Frenzel & Stephens, 2013; Mega et al, 2014; Pekrun et al, 2002; Pekrun, 2006). However, as already mentioned, the reverse seems to also be true, in that a task may become more enjoyable when more cognitive resources and, in that sense, SRL strategies are available, or having a high motivation before going into a task (Frenzel & Stephens, 2013). It is therefore relatively difficult to establish a directional relationship between emotion and motivation, as many emotion definitions entail a motivational component and conversely, many emotional experiences seem to be the core of several motivation theories (Frenzel & Stephens, 2013). However, as research is still scarce, this research will analyse, on the basis of current results that have been established, how emotions seem to have the greatest influence on academic achievement.

4. Rationale and aims

It is on this basis, that the current research will investigate how SRL influences academic achievement by considering both motivation and emotion in the analysis. As mentioned, SRL is seen as an important construct in the academic context and a reason why some students achieve academic success while others do not (Mega et al, 2014; Pintrich & De Groot, 1990). It is therefore of importance, to examine to what extent and how SRL contributes to the academic success, so that these aspects can be fostered and made a priority. This can then be taught to students so that students entering higher education have the

necessary skills to excel in their studies. However, as described above, it is already known that the mere knowledge of SRL is not adequate for students to engage and utilise SRL strategies and to consequently excel in their studies (Dresel et al, 2015; Foerst et al, 2017; Zimmermann, 2008). It is this reason, why other constructs have to be considered in accordance with SRL, to gain a better understanding of what factors influence SRL and academic achievement and therefore gain a better view on what has to be fostered, so that students in higher education not only get ahead in their studies, but also succeed in their studies. Research has shown, that all three variables (SRL, motivation and emotion) seem to be important and have an effect on academic achievement (e.g. Artino & Jones, 2012; Cho & Heron, 2015; Dresel et al, 2015; Pekrun, 2006; Pintrich & De Groot, 1990; Zimmermann, 1990, Zimmermann, 2000), however, there is little research that has combined all three variables together, to gain an understanding on how these variables influence each other and therefore how they directly or indirectly affect academic achievement (Mega et al, 2014; Valinasab & Zeinali, 2019). This also holds true, that these three variables in combination have also only been examined to an extreme minimal extent in higher education. Although it has already been observed that there is a necessity in higher education that students have to self-regulate, there seems to be little research, on how motivation and emotions influence SRL, subsequently affecting academic achievement, nor how different emotions may have a direct effect on academic achievement. Furthermore, students reasoning from preventing them in utilising SRL strategies constantly, even though possessing the knowledge and knowing the benefits when utilising these, could help in understanding what factors have to be taught and fostered so that students entering higher education do not only understand the positive effects of SRL strategies but actually also utilise them to their fullest potential constantly. To diminish this research gap, the current study will integrate all three variables and examine how these variables directly or indirectly influence academic achievement in a higher educational setting.

4.1 Motivation. Furthermore, it is essential that when analysing SRL, motivation has to be taken into consideration. Research on this field have shown repeatedly, that SRL and motivation are interrelated (Cho & Heron, 2015; Mega et al, 2014; Pintrich & De Groot, 1990; Pintrich & Garcia, 1993; Wigfield & Eccles, 2000; Zimmermann, 1990). By only examining one of these variables when trying to understand academic achievement, one will never gain a holistic view on how different motivation variables are linked to the use of SRL strategies and how these two variables interact and influence academic achievement. This will result in having imprecise estimates on whether the one or the other variable plays the

fundamental role in academic success, as the understanding on how academic achievement is attained, can only occur by treating these two aspects as interdependent as these processes cannot be fully understood as two separate entities (Zimmermann, 1990). Motivational aspects, such as self-efficacy and the value aspect, show that they have a great impact on task choice, perseverance and performance (Wigfield & Eccles, 2000). These outcomes are also linked to SRL (Pintrich & De Groot, 1990), which is why the current study will examine how these motivational variables are linked to SRL strategy use and academic achievement.

4.2 Emotion. Furthermore, current research has neglected to a vast extent the variable of emotion when analysing academic achievement, as well as analysing it with other factors that are believed to have a great influence towards academic achievement. This has the result, that analysis of how emotions influence aspects in the academic setting are insufficient and if emotions are considered, it is usually based on test anxiety (Pekrun, 2006). Test anxiety and academic achievement have however shown a weak correlation according to Ma (1999) and have found that test anxiety could only explain 10% of variance in the achievement scores. Another research that was performed by Pekrun et al (2002), have integrated other emotions (e.g. anger, anxiety and shame) into their analysis and ascertained that negative emotions could show negative, as well as positive influences on academic achievement, as was stipulated above. They also determined that other negative emotions, such as boredom and hopelessness were more detrimental to academic achievement than anxiety is believed to be. This clearly shows that analysis beyond test anxiety has to be conducted, to gain a more holistic view on how emotions influence academic achievement. In addition, despite the frequency of reports on anxiety, positive emotions have been mentioned almost as often as negative emotions when analysing and focusing on in the academic context. Enjoyment of learning, for example, as well as relief, anger and boredom were emotions that were mentioned even more frequently in the academic context than others. (e.g. social emotions such as gratitude and contempt) (Pekrun et al, 2002). It is thus, that the current research will include positive, as well as negative emotions, to gain a better understanding on how emotions influence academic achievement.

Considering that the focus of recent studies has been on how academic achievement is influenced through either one of the mentioned variables and that anxiety was mostly analysed when emotions were considered, the current study investigated the relationship of motivation, emotions, and the use of SRL strategies, as well as their discrepancies preventing them utilising SRL strategies on academic achievement. This was done in a threefold way. Firstly, based to the findings to date, the study included an analysis of motivational and

emotional components in relation to SRL strategy use, in turn that SRL strategy use, and motivation relate to academic achievement, in which specific hypotheses were addressed (Part one). A further investigation on the one hand, was carried out, to reveal how students' motivation and emotions related to their discrepancies preventing them from utilising SRL strategies, and in turn how this influences their academic achievement. In addition, on the other hand, it was revealed, how the emotional components correlate to academic achievement (Part two). Based on the results of part one and two a further explorative investigation was carried out, to reveal how these variables (motivation, emotion and SRL strategy use/ SRL discrepancies) that show significant correlations, would also be significant predictors of academic achievement. In addition, the significant correlations of the emotional components to academic achievement are further analysed to explore if these would also be significant predictors on academic achievement (Part three).

5. Research Questions Part one

Therefore, the research questions for part one of the study are:

Question 1: How are the motivational components related to the usage of SRL strategies?

Question 2: How are emotions related to the motivational components and to the usage of SRL strategies?

Question 3: How are motivation, emotions and SRL strategy use related to academic achievement?

5.1 Hypothesis Part one. Resulting from these questions the below mentioned hypotheses were formulated.

H1: Higher levels of self-efficacy correlate with increased SRL strategy use

H1.1: Higher levels of task value correlate with increased SRL strategy use

H2: Positive activating emotions have a positive effect on motivation and on SRL strategy use

H2.1: Negative deactivating emotions have a negative effect on motivation and on SRL strategy use

H2.2 Positive deactivating emotions have a positive effect on motivation and SRL strategy use

H2.3 Negative activating emotions have a negative effect on motivation and SRL strategy use

H3: Higher scores in motivation, positive emotions and increased SRL strategy use are related to higher academic achievement

H3.1 Lower scores in motivation, negative emotions and decreased usage of SRL strategies are negatively related to academic achievement.

5.2 Research Questions Part two. Questions for part two of the study are:

Question 4: How do students' motivation and emotions relate to their reasonings of preventing them to utilise SRL strategies and in turn influence their academic achievement?

Question 5: How are emotions directly linked to academic achievement?

5.2.1 Hypothesis Part two. As question four is an explorative investigation, no hypotheses were formulated. As for question five, the hypotheses were formulated below.

H5: Positive emotions have a positive effect on academic achievement

H5.1: Negative emotions have a negative effect on academic achievement

5.3 Research Questions Part three. Questions for part three of the study are:

Question 6: Can motivation, emotions and SRL strategy use, as well as students' SRL discrepancies, showing significant correlations in part one and two, be significant predictors of academic achievement?

Question 7: Can the emotional components showing significant correlation in the first and second part of the study, also be significant predictors of academic achievement?

5.3.1 Hypothesis Part three. As part three is an explorative investigation, no hypotheses were formulated.

III. Empirical Part

6. Method

6.1 Design

The study used a correlational design, and the data were collected by online questionnaires. The study has three parts. In the first part, a confirmatory correlational analysis of the motivational and emotional components in regard to SRL strategy use and academic achievement were analysed. These correlational analyses served to confirm, that motivation and emotions relate to SRL strategy use and in turn influence academic achievement. In the second part, explorative correlation analysis was carried out to reveal how students' reasoning from preventing them utilising SRL strategies, correlate to students' motivation and emotions and therefore influencing their academic achievement. In addition, it has been demonstrated how the emotional components correlate to academic achievement. The correlational analyses of part one and two, served as the basis in the third part of the

study for further explorative analyses using multiple regression. It was explored, whether the joint contribution of motivation, emotions, and the use of SRL strategies showing significant correlations with academic achievement, will predict academic achievement. In addition, it was also explored whether the joint contribution of motivation, emotions, and students' discrepancies of not utilising SRL strategies showing significant correlations with academic achievement, will predict low academic achievement. Furthermore, emotions that correlated significantly to academic achievement were used jointly to distinguish if these emotions could also predict academic achievement. Thus, the three components (emotion, motivation and SRL strategy use/ SRL discrepancy) were the predictor variables and the academic achievement was the outcome variable. Likewise, the emotional components were used as predictor variables and the academic achievement as the outcome variable.

6.2 Participants

Analysis on students' use of SRL strategies have shown, that there are similarities across different study domains and that there are mostly no statistically significant group differences, between student's use of SRL strategies in regard to their field of study (Foerst et al, 2017). Due to this, the participants were a diverse range of students from various countries and in different stages of progress within their course of studies. Half of the participants (48%) originated from Germany, 19% from South Africa, 11% from England and 6% from Austria. The remaining 16% originate from several other European countries. Majority of the participants (48%) were completing their master's degree, while just under a half (44%), were conducting their bachelor's degree. The remaining eight percent were accomplishing a Diploma, PhD or other form of educational degree. Two hundred and seventy-four participants randomly responded to partake in this research project. Fifty-eight participants (21%) were excluded from analysis because they had data missing on at least one of the questionnaire scales. Data analysis was therefore performed on a sample of 216 participants of whom 153 (71%) were female and 58 (27%) were male. The remaining five participants (2%) did not state their gender. The sample therefore represents a random and representative sample. One percent of the participants were 18 years or younger, 16% were 19 to 21 years old, a half (48%) were 22 to 25 years old, just over a quarter (27%) were 26 to 30 years old and the remaining eight percent were 31 years or older. The area of study of the participants ranged from psychology studies (22%), business studies (10%), chiropractic studies (10%), media and communication studies (8%), management studies (6%), economic studies (5%),

marketing studies (5%), to law studies (4%). The remaining 30% contained of various other study areas in which 5% have not stated the exact area.

6.3 Materials

6.3.1 Motivated Strategies for Learning Questionnaire (MSLQ). Online questionnaires were used to conduct this study. The questionnaire comprised a demographic section, in which information on the age, gender, course of study and study progress were collected. To identify students' motivational orientations the Motivated Strategies for Learning Questionnaire (MSLQ) was used, which was developed by Pintrich, Smith, Garcia & McKeachie (1991). The two motivational scales, namely, "Value Component: Task Value and Expectancy Component: Self-efficacy for Learning and Performance" were utilised to assess students' value beliefs for a course and their beliefs about their skill to succeed in a course. Some items were slightly changed (i.e., 4, 5, 10, 21, 23, 29, 31) to best represent varsity students' understanding. For example, the original wording "I think the course material in this class is useful for me to learn" and "I expect to do well in this class" was changed to "I think the course material in my studies are useful for me to learn" and "I expect to do well in this course." The combination of these two scales, made up a 14 item-scale which was rated by each participant on a 7-point Likert-type scale, from 1 (*Not at all true of me*) to 7 (*Very true of me*). These questions varied from "Understanding the subject matter of this course is very important to me" to "I'm certain I can master the skills being taught in this course". To ascertain students' motivation orientation, the mean of the items of each dimension were calculated. The score on each dimension indicated the dominant motivation orientation of the student – the higher score being the more dominant, the lower the score, the less dominant.

6.3.1.1 Reliability analysis. Reliability analysis was then performed on the Task Value and Self-efficacy scale. Although Cronbach's α is the most common measure of scale reliability, it must be considered, that the value of α depends on the number of items on the scale (Field, 2013). Thus, a higher number of items will increase the value of α and therefore, the scale might have a high Cronbach value indicating reliability, even though this might not be the case (Field, 2013). To overcome this limitation, the average item-total correlation was also considered when analysing the reliability. The reliability scores are presented in Table 1.

Table 1***Item-Total and Cronbach's α Coefficients for the Motivated Strategies for Learning Questionnaire***

Scale	Subscale	Nr of items	Cronbach α	Average item total correlation
Motivated Strategies for Learning	Self-efficacy	8	.91	.72
	Task Value	6	.91	.75

As shown, Cronbach's α values for both subscales are .9, indicating a good overall reliability of the scale. These findings are in agreement with those of Pintrich et al (1991) who determined the value of Cronbach's α as follows: Self-efficacy for Learning and Performance $\alpha = .93$ and Task Value $\alpha = .90$. In addition, when taking a closer look at the mean item-total correlation of the reliability analysis, the values also show satisfactory values as the Cronbach's α . According to Field (2013), a satisfactory value of the item-total correlation is the same or higher than .3. A value below .3 indicates that the items within the subscales do not correlate very well with the overall scale. Seeing that the values are at .7 for both the motivational subscale's, a good reliability of the measurement is provided.

6.3.1.2 Validity. The validity of the MSLQ shows reasonably good validity, as it has been utilised in a variety of applications as well as on a range of college and secondary school students (Pintrich & De Groot, 1990; Pintrich & Garcia, 1993).

6.3.2 Academic Emotions Questionnaire (AEQ). The AEQ was used to assess students' emotions experienced in academic achievement situations and was developed by Pekrun, Goetz and Perry (2005). The subscales, "during learning related emotions" and "after taking test/exam related emotions" were utilised, to assess four different academic achievement emotions; one of each emotion group (i.e., positive activating -, positive deactivating-, negative activating- and negative deactivating emotion). The resulting 26-item-scale was rated by each participant on a 5-point Likert-type scale, from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Questions varied from "I enjoy the challenge of learning the material", "I get annoyed about having to study" to "I can finally breathe easy again". To identify which emotions were experienced the mean of each dimension was computed by summing the items of each dimension and taking the average (e.g. learning related enjoyment = mean of items

110, 117, 124, 131, 136, 139). Higher scores on each dimension indicated which emotion was experienced more often.

6.3.2.1 Reliability analysis. The measures of the reliability analysis of the AEQ are presented in Table 2.

Table 2

Item-Total and Cronbach's α Coefficients for the Academic Emotions Questionnaire

Scale	Subscale	Nr of items	Cronbach α	Average item-total correlation
Academic Emotions	Enjoyment	6	.70	.44
	Boredom	9	.91	.69
	Anger	5	.82	.62
	Relief	6	.85	.64

As shown, Cronbach's α values are all between the value of .7 and .9, indicating a good overall reliability of the scale. These findings are in parallel with those found by Pekrun et al (2005) who reported Cronbach's α values as follows: enjoyment α = .78, boredom α = .92, anger α = .86; and relief α = .77. In addition, all values for the mean item-total correlation are above .3, demonstrating that the items correlate to the overall scale and signifying good reliability of the scale (Field, 2013).

6.3.2.2 Validity. The questionnaire was utilised in various other studies, denoting good validity (e.g. Cho & Heron, 2015; Pekrun et al, 2002; Pekrun et al 2005; Valinasab & Zeinali, 2019). Additionally, Pekrun et al (2002, 2005) concluded the validity of the construct of the instrument.

6.3.3 Self-Regulated Learning Questionnaire: Action and Knowledge (SRL-QuAK). The Self-Regulated Learning Questionnaire for Action and Knowledge -short version (SRL-QuAK) was used, to determine students' action in applying these SRL strategies in relevant learning situations. In addition, it was also used to determine what challenges students are confronted with in applying SRL strategies. This 35-item-scale was developed by Foerst et al, (2017) in which cognitive-, metacognitive- and resource management strategies (boredom & frustration) are examined. To ascertain whether students use these SRL strategies, all items were rated on a 7-point Likert-type scale, from 1 (*Never*)

to 7 (*Always*). These questions varied from “I actively participate in the lecture” to “I think about what exactly I need to do in order to achieve my goals”. To determine a students’ actual use of the SRL strategy, the mean of each of these aspects for each SRL strategy was calculated (e.g. cognitive strategies = mean of items 1, 2, 3, 4). Higher scores on each of the scales, specify students’ actual use of SRL strategies. To discern which challenges students are confronted with in preventing them to apply SRL strategies, participants rated each item on a 7-point Likert-type scale, from 1 (*Do not apply at all*) to 7 (*Apply completely*). These questions varied from “I lack the time to use this strategy” to “I don’t see the benefit of this strategy, considering the situation/task”. To determine the challenges students are met with when applying SRL strategies, the mean of each SRL strategy was computed (e.g., frustration discrepancies = mean of items 1, 2, 3, 4). Higher scores on each SRL strategy, indicate which challenges are mostly preventing students in applying SRL strategies.

6.3.3.1 Reliability analysis. The measures of the reliability analysis of the QaAK are presented in Table 3. As shown, Cronbach’s α values are all between the value of .5 and .8, indicating a good overall reliability of the scale (Field, 2013). In addition, all values for the item-total correlation, are above .3 except cognitive strategy use, which has a value of .3. According to Field (2013) a value of .3 and higher indicates that items correlate with the overall scale. Therefore, the values demonstrated for the mean item-total correlation, denote a good reliability of the scale. As it is still a very new scale, reliability as well as validity analysis should be performed more thoroughly. However, the development of the scale has undergone various statistical analysis, in which reliability was also indicated (see Foerst et al, 2017). Seeing that the performed reliability analysis indicated good overall reliability of the scale, it was utilised for further analysis.

6.3.3.2 Validity. Even though this questionnaire was used in other studies, the validity still has to be examined more thoroughly as it is still a very new scale. It has however demonstrated a construct validity and was therefore used for further analysis (Foerst et al, 2017).

6.3.4 Academic achievements. Students’ average grades of their last three written exams were considered a parameter for academic achievement.

Table 3***Item-Total and Cronbach's α Coefficients for the Self-Regulated Learning Questionnaire***

Scale	Subscale	Nr of items	Cronbach α	Average item-total correlation
Self-Regulated Learning	Boredom Regulation use	4	.66	.44
	Boredom Regulation Discrepancy	4	.71	.50
	Cognitive Strategy use	4	.48	.28
	Cognitive Strategy Discrepancy	4	.73	.52
	Frustration Regulation use	3	.66	.48
	Frustration Regulation Discrepancy	4	.76	.57
	Metacognitive Strategy use	8	.82	.54
	Metacognitive Discrepancy	4	.80	.62

6.4 Procedure

After producing the survey via SurveyMonkey (<https://www.surveymonkey.com>), participants were asked to participate in this research study. This was executed by means of a link which was provided on various online platforms, such as varsity platforms, SurveyCircle (<https://www.surveycircle.com>), Pollpool (<https://www.poll-pool.com>) and Facebook (<https://www.facebook.com>) and an invitation text that was connected to the link asking participants to join the study. The link directed participants to the online questionnaires. Their involvement in the study was voluntary and anonymous. The questionnaires were available online for four weeks, during which the participants could complete them at their own time. They were able to discontinue the questionnaire at any time. However, after submitting the questionnaire, withdrawal of the data was not possible. As the participation was anonymous

the consent was implied by the participants' submission of the questionnaires. Completed questionnaires were then accessed on and downloaded from SurveyMonkey for further analyses.

7. Results

7.1 Preliminary Analysis

Data analysis was conducted using the IBM SPSS Statistic 21. Analysis of the assumptions was performed to determine that no assumptions were violated in order to support the validity of the findings and the generalisability of the results. Thus, the assumptions of normality, linearity and homoscedasticity were examined.

Normality was examined as it is important when conducting tests for statistical significance and for confidence intervals around a parameter estimate that ultimately defines the significance test (Field, 2013). For this to be accurate the sampling distribution has to be normally distributed.

Linearity was examined to ensure that the outcome variable is linearly related to the predictors in the model. Linearity analysis determines the relationship between the predictors so that their combined effects are best described by adding all their effects together in a linear model (Field, 2013).

Homoscedasticity was examined to ensure that the residuals of the predictor variables have the same variance throughout each level so that the accuracy of the confidence intervals and significance tests are met (Field, 2013). In addition, the assumption of independence of the residuals was examined in all the regression analyses. This was done to determine that there is no correlation between the residuals, again establishing that the confidence intervals and significance tests are accurate (Field, 2013).

7.1.1 Analysis of the normality of the distributions. The two motivational subscales show that the data is not normally distributed. This was determined by conducting the Shapiro-Wilk test which showed significant results, Self-Efficacy $W(216) = 0.98, p = .001$ and Task Value $W(216) = 0.95, p = <.001$. However, an alternative way to test the assumption of normality was utilised by analysing the Q-Q Plots. As the data points were clustered close to the ideal diagonal line, normal distribution was suggested (Field, 2013). In addition, due to the large sample size given, there seemed to be no concern regarding normality as per the central limit theorem (Field, 2013).

The scores on the four academic emotion subscales also show that the data is not normally distributed across the emotion variables. The results of the Shapiro-Wilk test were significant, Enjoyment $W(216) = 0.98, p = .01$, Boredom $W(216) = 0.98, p = .004$, Anger $W(216) = 0.97, p = <.001$ and Relief $W(216) = 0.95, p = <.001$. However, the Q-Q Plots show that there is normality, as the data points are clustered close along the diagonal line. Likewise, due to the sample size, normality was not a concern as per the central limit theorem (Field, 2013).

Similarly, the Shapiro-Wilk test indicated, that the data is not normally distributed across the eight SRL variables, except for the subscale of Boredom Regulation use $W(216) = 0.99, p = .11$. All other results were significant, Boredom Discrepancy $W(216) = 0.98, p = .01$, Cognitive Strategy use $W(216) = 0.99, p = .05$, Cognitive Discrepancy $W(216) = 0.98, p = .004$, Frustration Regulation use $W(216) = 0.98, p = .003$, Frustration Discrepancy $W(216) = 0.96, p = <.001$, Metacognitive Strategy use $W(216) = 0.98, p = .005$ and Metacognitive Discrepancy $W(216) = 0.97, p = .001$. The Q-Q Plots, however show, that there is normality as the points fall close to the diagonal line. In addition, due to the central limit theorem, normality is not seen as a barrier. The graphs are presented in Appendix A.

7.1.2 Linearity and homoscedasticity. Scatterplots were conducted to establish whether the assumptions of homogeneity of variance and linearity were met. All scatterplots of each variable (motivation, emotion and SRL) with Academic Achievement show that the assumption of homoscedasticity and linearity were met. This was determined by observation of the graphs which showed a reasonably similar spread of scores on the Y-axis across the values of the X-axis. The spread of the scores did not show any funnels or curves indicating that homoscedasticity and linearity hold true (Field, 2013). These can be viewed in Appendix B.

7.2 Correlational analysis

7.2.1 Part one. To analyse the first part of the study, a bivariate correlation analysis was conducted to ascertain the relationship between the motivational, emotional and SRL strategy use variables in connection to the academic achievement variable. Due to some skewness in the distribution of the scores of the MSLQ, SRL-QuAK and AEQ both Spearman's and Pearson's correlation coefficients were calculated to determine whether there is a difference between the two correlation coefficients. As both correlations showed the same significant results and the values of the correlations were similar, Pearson's correlation coefficient was utilised for further interpretation. The Pearson's correlation coefficients are presented in Table 4.

Self-efficacy had a significant positive correlation with most of the SRL strategy uses namely Boredom Regulation use $r = .315, p = <.001$, Cognitive Strategy use $r = .298, p = <.001$ and Metacognitive Strategy use $r = .402, p = <.001$. However, Self-efficacy negatively correlated with Academic achievement $r = -.247, p = <.001$. Task Value had a significant positive correlation with all SRL strategy uses and like self-efficacy, also negatively correlated with Academic achievement $r = -.145, p = .03$.

Positive activating emotions (Enjoyment) had a significant positive correlation to all SRL strategy uses as can be viewed in the table below. In addition, Enjoyment had a significant positive correlation to Self-efficacy $r = .472, p = <.001$ and Task Value $r = .638, p = <.001$. It did however not correlate with Academic achievement, $p = >.05$.

Negative deactivating emotions (Boredom) had a significant negative correlation with all SRL strategy uses and in addition, it also negatively correlated to Self-efficacy $r = -.304, p = <.001$ and Task Value $r = -.418, p = <.001$. Boredom did not correlate with Academic achievement.

Positive deactivating emotions (Relief) had a significant positive correlation with two of the SRL strategy uses which were Cognitive Strategy use $r = .155, p = .02$ and Metacognitive Strategy use $r = .166, p = .01$. It did not significantly correlate with the other two SRL strategy uses, as well as with Self-efficacy, Task Value and Academic achievement, as all p -values were above .05.

Negative activating emotions (Anger) had a significant negative correlation with most of the SRL strategy uses (see table 4) and additionally, negatively correlated to Self-efficacy $r = -.331, p = <.001$ and Task Value $r = -.327, p = <.001$. However, anger had a significant positive correlation with Academic achievement $r = .159, p = .02$.

Academic achievement did not correlate with any positive emotions neither with Enjoyment $r = -.066, p = .34$ nor Relief $r = -.001, p = .99$. In addition, it also did not correlate to the negative emotion Boredom, nor with any of the SRL strategy uses (see table 4). However, it did positively correlate to Anger $r = .159, p = .02$ and additionally, Academic achievement negatively correlated with Self-efficacy $r = -.247, p = <.001$ and Task Value $r = -.145, p = .03$.

Table 4

Correlation Coefficients of the SRL strategy use-, motivational- and emotional variables in regards to academic achievement

		Boredom Regulation use	Cognitive Strategy use	Frustration Regulation use	Metacognitive Strategy use	Self- efficacy	Task Value	Enjoyment	Boredom	Anger	Relief
Cognitive Strategy use	Pearson Correlation	.456**									
	Sig. (2- tailed)	.000									
	N	216									
Frustration Regulation use	Pearson Correlation	.349**	.406**								
	Sig. (2- tailed)	.000	.000								
	N	216	216								
Metacognitive Strategy use	Pearson Correlation	.377**	.522**	.423**							
	Sig. (2- tailed)	.000	.000	.000							
	N	216	216	216							
Self-efficacy	Pearson Correlation	.315**	.298**	.102	.402**						
	Sig. (2- tailed)	.000	.000	.137	.000						
	N	216	216	216	216						

		Boredom Regulation use	Cognitive Strategy use	Frustration Regulation use	Metacognitive Strategy use	Self- efficacy	Task Value	Enjoyment	Boredom	Anger	Relief
Task Value	Pearson Correlation	.288**	.392**	.176**	.285**	.565**					
	Sig. (2- tailed)	.000	.000	.010	.000	.000					
	N	216	216	216	216	216					
Enjoyment	Pearson Correlation	.384**	.421**	.320**	.380**	.472**	.638**				
	Sig. (2- tailed)	.000	.000	.000	.000	.000	.000				
	N	216	216	216	216	216	216				
Boredom	Pearson Correlation	-.183**	-.189**	-.152*	-.150*	-.304**	-.418**	-.441**			
	Sig. (2- tailed)	.007	.005	.026	.027	.000	.000	.000			
	N	216	216	216	216	216	216	216			
Anger	Pearson Correlation	-.164*	-.138*	-.0062	-.141*	-.331**	-.327**	-.282**	.761**		
	Sig. (2- tailed)	.016	.043	.364	.038	.000	.000	.000	.000		
	N	216	216	216	216	216	216	216	216		
Relief	Pearson Correlation	-.002	.155*	.030	.166*	-.007	.079	.051	.164*	.118	
	Sig. (2- tailed)	.972	.023	.656	.014	.914	.249	.459	.016	.083	
	N	216	216	216	216	216	216	216	216	216	
Academic Achievement	Pearson Correlation	.002	-.027	.034	-.041	-.247**	-.145*	-.066	.122	.159*	-.001
	Sig. (2- tailed)	.977	.689	.619	.547	.000	.033	.335	.074	.019	.992
	N	216	216	216	216	216	216	216	216	216	216

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

7.2.2 Part two. A second correlation analysis was then performed for the explorative part of the study, part two, to get a better understanding how students' motivation and emotions influences their reasoning from preventing them utilising SRL strategies and thereby creating a discrepancy between wanting to use SRL strategies but having to deal with reasons preventing them on utilising these. This in turn could affect their academic achievement. This is presented as the discrepancy variable in the table below. A further bivariate correlation analysis was undertaken, to determine the relationship between students' motivation, emotions and their reasons not utilising SRL strategies in regard to their academic achievement. Again, due to some skewness in the distribution of the scores of the MSLQ, SRL-QuAK and AEQ, both Spearman's and Pearson's correlation coefficients were calculated to determine whether there is a difference between the two correlation coefficients. As both correlations showed the same significant results and the values of the correlations were similar, Pearson's correlation coefficient was utilised for further interpretation. The Pearson's correlation coefficients are presented in Table 5.

Self-efficacy had a significant negative correlation with Boredom Discrepancy $r = -.221, p = .001$, Frustration Discrepancy $r = -.171, p = .01$, Cognitive Discrepancy $r = -.158, p = .02$, and Metacognitive Discrepancy $r = -.298, p < .001$. In addition, it showed a significant positive correlation with only one of the two positive emotions, namely enjoyment $r = .472, p < .001$ however, it had a significant negative correlation with both negative emotions, boredom $r = -.304, p < .001$ and anger $r = -.331, p < .001$. Furthermore, it significantly negatively correlated with academic achievement $r = -.247, p < .001$.

Likewise, task value had a significant negative correlation with all SRL Discrepancies which can be viewed in table 5. In addition, it also only had a significant positive correlation with enjoyment $r = .638, p < .001$ and had a significant negative correlation with both boredom $r = -.418, p < .001$ and anger $r = -.327, p < .001$. Task Value also negatively correlated to academic achievement $r = -.145, p = .03$.

With regards to emotions, Enjoyment did not correlate to any SRL Discrepancies, but had a significant positive correlation with Self-efficacy $r = .472, p < .001$ and Task Value $r = .638, p < .001$. It did not show any correlation with academic achievement. Boredom positively correlated with Boredom Discrepancy $r = .344, p < .001$, Cognitive Discrepancy $r = .387, p < .001$, Frustration Discrepancy $r = .458, p < .001$ and Metacognitive Discrepancy $r = .412, p < .001$. In addition, it negatively correlated to Self-efficacy $r = -.304, p < .001$ and Task Value $r = -.418, p < .001$.

Table 5

Correlation Coefficient for the SRL discrepancy-, motivational- and emotional variables, in regard to academic achievement

		Boredom Discrepancy	Cognitive Discrepancy	Frustration Discrepancy	Metacognitive Discrepancy	Self- efficacy	Task Value	Enjoyment	Boredom	Anger	Relief
Cognitive Discrepancy	Pearson Correlation	.487**									
	Sig. (2- tailed)	.000									
	N	216									
Frustration Discrepancy	Pearson Correlation	.410**	.551**								
	Sig. (2- tailed)	.000	.000								
	N	216	216								
Metacognitive Discrepancy	Pearson Correlation	.460**	.595**	.626**							
	Sig. (2- tailed)	.000	.000	.000							
	N	216	216	216							
Self-efficacy	Pearson Correlation	-.221**	-.158*	-.171*	-.298**						
	Sig. (2- tailed)	.001	.020	.012	.000						
	N	216	216	216	216						
Task Value	Pearson Correlation	-.177**	-.163*	-.190**	-.161*	.565**					
	Sig. (2- tailed)	.009	.016	.005	.018	.000					
	N	216	216	216	216	216					

		Boredom Discrepancy	Cognitive Discrepancy	Frustration Discrepancy	Metacognitive Discrepancy	Self- efficacy	Task Value	Enjoyment	Boredom	Anger	Relief
Enjoyment	Pearson Correlation	-.081	-.109	-.038	-.064	.472**	.638**				
	Sig. (2- tailed)	.238	.109	.579	.348	.000	.000				
	N	216	216	216	216	216	216				
Boredom	Pearson Correlation	.344**	.387**	.458**	.412**	-.304**	-.418**	-.441**			
	Sig. (2- tailed)	.000	.000	.000	.000	.000	.000	.000			
	N	216	216	216	216	216	216	216			
Anger	Pearson Correlation	.325**	.403**	.418**	.475**	-.331**	-.327**	-.282**	.761**		
	Sig. (2- tailed)	.000	.000	.000	.000	.000	.000	.000	.000		
	N	216	216	216	216	216	216	216	216		
Relief	Pearson Correlation	-.040	-.087	-.016	-.052	-.007	.079	.051	.164*	.118	
	Sig. (2- tailed)	.563	.203	.815	.443	.914	.249	.459	.016	.083	
	N	216	216	216	216	216	216	216	216	216	
Academic Achievement	Pearson Correlation	.157*	.169*	.216**	.249**	-.247**	-.145*	-.066	.122	.159*	-.001
	Sig. (2- tailed)	.021	.013	.001	.000	.000	.033	.335	.074	.019	.992
	N	216	216	216	216	216	216	216	216	216	216

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Boredom did not show any significant correlation with academic achievement. Furthermore, as with boredom, Anger positively correlated to Boredom Discrepancy $r = .325$, $p < .001$, Cognitive Discrepancy $r = .403$, $p < .001$, Frustration Discrepancy $r = .418$, $p < .001$ and Metacognitive Discrepancy $r = .475$, $p < .001$. It also negatively correlated to Self-efficacy $r = -.331$, $p < .001$ and Task Value $r = -.327$, $p < .001$. In addition, however, anger positively correlated to academic achievement $r = .159$, $p = .02$. Relief did not correlate with any of the SRL Discrepancies and motivational components nor with academic achievement as all $p > .05$. Lastly, Academic Achievement had a significant positive correlation with Boredom Discrepancy $r = .157$, $p = .02$, Cognitive Discrepancy $r = .169$, $p = .01$, Frustration Discrepancy $r = .216$, $p = .001$ and Metacognitive Discrepancy $r = .249$, $p < .001$. In addition, it negatively correlated with Self-efficacy $r = -.247$, $p < .001$ and Task Value $r = -.145$, $p = .03$. With regards to emotions, Academic achievement only had a significant positive correlation with Anger $r = .159$, $p = .01$.

In a further explorative part of the study, part three, the motivational, emotional, SRL strategies and academic achievement variables, that showed significant correlations, were used to perform further multiple regression analysis. Furthermore, the motivational, emotional and SRL discrepancies preventing students utilising SRL strategies and academic achievement variables, that showed significant correlation, were also analysed using a further multiple regression analysis. In addition, the investigation on emotional components as predictors of academic achievement was also conducted using simple regression. Those motivational, emotional and SRL strategy use variables, that showed significant correlations with academic achievement, were entered as the predictors and academic achievement as the outcome variable in the multiple regression analysis. Likewise, the motivational, emotional and students' SRL discrepancy variables, showing significant correlation with academic achievement, were entered as the predictor variables and academic achievement as the outcome variable. In addition, the emotional variables, that showed significant correlation with academic achievement, were entered as the predictor variable and academic achievement again as the outcome variable. This was done to determine the extent to which these variables can jointly predict students' academic achievement. The predictors were entered simultaneously in the regression analysis rather than hierarchically. Hierarchical regression is utilised if it is known from the literature which predictors can be expected to have a greater contribution. These predictors are then entered into the model first, in order of their importance in predicting the outcome (Field, 2013). Due to the explorative nature of the analysis, the predictors were entered simultaneously, thereby giving no importance to a

specific predictor variable (Field, 2013). In addition, this method, of simultaneously entering the predictor variables, allows for the replication of the results if the model is retested. Since stepwise techniques, such as hierarchical regression, are influenced by random variation in the data, it is less common that these results are replicable when the model is retested (Field, 2013).

7.3 Regression analysis

7.3.1 Assumption of independence. The Durban-Watson option was selected to determine whether the residuals are uncorrelated. All values were between 1 and 3 showing that the residuals are uncorrelated (Field, 2013). Additionally, to verify no multicollinearity between the predictor variables the VIF and tolerance scores were observed. There are no issues with collinearity as depicted by the VIF being below 10 and tolerance scores being above 0.2 (Field, 2013).

In addition, the assumption of normality distribution, linearity and homoscedasticity have been met, which has been stated at the beginning of the result section under preliminary analysis. Having met all assumptions, multiple regression analysis was conducted.

7.3.2 Multiple regression analysis Part three

The first multiple linear regression was conducted to ascertain the extent to which motivation, emotions and SRL strategy use predicted academic achievement. Seeing that only self-efficacy, task value and anger had a significant correlation with academic achievement, these three variables were selected as predictor variables to see if they could jointly predict academic achievement. A significant regression analysis was found ($F(3,212) = 5.15, p = .002, R^2 = .068$). The multivariate analysis showed that self-efficacy significantly predicted academic achievement ($\beta = -.15, t(212) = -2.73, p = .007$) however, task value ($\beta = .01, t(212) = 0.12, p = .90$) and anger ($\beta = .07, t(212) = 1.23, p = .22$) showed no significant additional prediction of academic achievement.

The second multiple linear regression was performed to establish to what extent motivation, emotion and student's SRL discrepancies, which are their reasons preventing them utilising SRL strategies, predicted academic achievement. All four SRL discrepancies (Boredom Discrepancy, Cognitive Discrepancy, Frustration Discrepancy and Metacognitive Discrepancy), as well as both motivational components (Self-efficacy and Task Value) and anger were entered as predictor variables as these showed significant correlations with academic achievement. As the other emotional variables did not show any significant

correlation with academic achievement, it remained with the above mentioned seven variables as predictor variables to see if they jointly could predict academic achievement. A significant regression analysis was found ($F(7,208) = 3.37, p = .002, R^2 = .102$). The multivariate analysis showed that self-efficacy significantly predicted academic achievement ($\beta = -.13, t(208) = -2.33, p = .02$) however, task value ($\beta = .002, t(208) = 0.47, p = .96$), anger ($\beta = -.01, t(208) = -0.17, p = .87$) and all four discrepancies (Boredom Discrepancy: $\beta = .01, t(208) = 0.22, p = .83$; Cognitive Discrepancy: $\beta = .004, t(208) = 0.08, p = .94$; Frustration Discrepancy: $\beta = .05, t(208) = 1.13, p = .26$ and Metacognitive Discrepancy: $\beta = .06, t(208) = 1.25, p = .21$) showed no significant additional prediction of academic achievement.

The last multiple regression analysis was conducted to verify whether emotions predict academic achievement. As anger was the only emotion that had a significant correlation with academic achievement, a simple regression was utilised to establish if anger predicted academic achievement. A significant regression analysis was found ($F(1,214) = 5.55, p = .02, R^2 = .025$) indicating that anger predicted academic achievement ($\beta = .12, t(214) = 2.34, p = .02$).

In summary, the results in the first part of the study, indicated a significant positive relationship between both motivational components (Self-efficacy and Task Value) and all four SRL strategy use variables (Boredom Regulation use, Cognitive strategy use, Frustration Regulation use and Metacognitive Strategy use) except that self-efficacy did not significantly correlate with frustration regulation use. In addition, both motivational variables had a significant negative correlation with academic achievement. Regarding the emotions, both positive emotions, enjoyment, and relief, showed a significant positive relation between cognitive strategy use and metacognitive strategy use. However, even though there are no other significant correlations between relief and the other SRL strategy use- and motivational variables, there was a significant positive relation depicted between enjoyment and boredom regulation use, frustration regulation use as well as with self-efficacy and task value. In regard to the negative emotions, boredom and anger both negatively correlated to all four SRL strategy use (Boredom Regulation use, Cognitive Strategy use, Frustration Regulation use, Metacognitive Strategy use) and the motivational variables (Self-efficacy, Task Value), except for anger that did not show any significant correlation with frustration regulation use. Furthermore, a positive relationship was detected between anger and academic achievement.

In summary, for the explorative and second part of the study, the results indicated a significant negative relationship between both motivational variables (Self-efficacy, Task

Value) and the four SRL discrepancies (Boredom Discrepancy, Cognitive Discrepancy, Frustration Discrepancy, Metacognitive Discrepancy). In addition, both motivational variables negatively correlated to academic achievement. Regarding the positive emotions (enjoyment, relief) only enjoyment depicted a positive relation with self-efficacy and task value. The negative emotions, boredom and anger, positively correlated to all four SRL discrepancies and in addition, significantly negatively correlated to self-efficacy and task value. Moreover, anger was the only emotion that also significantly positively correlated to academic achievement. Furthermore, there was a positive relationship depicted between academic achievement and all four SRL discrepancies.

In summary in these subsequent explorative analyses undertaken to examine to what extent motivation, emotion, SRL strategy use and further SRL discrepancies would jointly predict academic achievement, the findings of the multiple regression analyses indicated the following: Self-efficacy taken together with task value and anger predicted academic achievement. Furthermore, self-efficacy taken jointly with task value, the four SRL discrepancies (Boredom Discrepancy, Cognitive Discrepancy, Frustration Discrepancy, Metacognitive Discrepancy) and anger predicted academic achievement. Moreover, regarding the prediction value of emotions, anger on its own, predicted academic achievement.

8. Discussion

The aim of the present study was to investigate how SRL influences academic achievement by considering both motivation and emotion and their contributing factors towards SRL strategy use and in turn on academic achievement. The theoretical framework informing the study was the Self-Regulated Learning principal in which the questionnaire for Action and Knowledge was adopted due to recognising that on the one hand, students actual use in applying these SRL strategies in relevant learning situations, as well as the challenges students are confronted with in applying these SRL strategies could be determined. This contributes to making adequate measures to understand the reason that keep students from using SRL strategies against their better judgement and thereby influencing their academic success (Foerst et al, 2017). Moreover, the motivational and emotional components were integrated, as it was recognised on the one hand, that SRL and motivation have to be treated as interdependent processes as they are mutually related in influencing academic achievement (Zimmermann, 2000) and on the other hand, that emotions are a multidimensional construct

that comprise, amongst others, of motivational components which influences individuals' thoughts and behaviours (Frenzel & Stephans, 2013). This again indicating that no directional relationship between motivation and emotion can be established, thereby having to integrate these two variables to get a better and holistic understanding on how they relate to one another and influence academic success (Frenzel & Stephans, 2013).

To analyse how these three variables operate in conjunction, the study consisted of three parts. The first part included a confirmatory correlation analysis of the relationship between SRL strategy use, motivation, emotion, and academic achievement.

Part two of the study focused on SRL discrepancies on students' reasons preventing them utilising SRL strategies against their better judgement and consequently, an explorative investigation was undertaken to determine the relationship between SRL discrepancies, motivation, emotion and academic achievement. In addition, the relationship between emotions and academic achievement was explored.

Given the insufficiency of the extent findings, the consequent analysis in part three were further explorative and investigated whether selected SRL strategy utilisations, as well as SRL discrepancies in conjunction with motivation and emotion predicted academic achievement.

Majority of the hypotheses in part one, regarding the relationship between SRL strategy use, motivation and emotion were supported. However, when looking at academic achievement and the relation between the three variables (SRL strategy use, motivation, emotion), the hypotheses formulated were not supported, in fact, regarding motivation and academic achievement, the opposite of what was hypothesised transpired. In addition, the explorative analysis in part three revealed that, among the SRL strategy use, motivation and emotions, self-efficacy was the only significant predictor of academic achievement.

In the explorative part two of the study, the relationship between SRL discrepancies, motivation and emotions showed significant relationships. However, further analysis in part three revealed that among the SRL discrepancies, motivation and emotions, self-efficacy was the only significant predictor of academic achievement. Furthermore, the relationship between emotions and academic achievement showed a significant correlation and with further analysis in part three, it was determined that only anger was a significant predictor of academic achievement.

8.1 Motivation

8.1.1 Part one; H1 & H1.1. The hypotheses stating that individuals scoring higher on the motivational variables, self-efficacy and task value, utilise SRL strategies more frequently, than those scoring low on the motivational variables was supported. Self-efficacy and task value had a positive relationship with boredom regulation use, cognitive strategy use and metacognitive strategy use. The results are in accordance with previous findings (e.g. Pintrich & De Groot 1990; Pintrich & Garcia, 2012; Wondimu, 2017; Zimmermann 1990), in which these researchers agree, that motivation contributes in students engaging in SRL strategies. In addition, task value however also had a positive relationship with frustration regulation use which was not the case for self-efficacy. Reasons for this could be explained by the findings of Wondimu (2017), who analysed different value and expectancy motivational variables with regards to their influences on SRL strategies. He concluded that various motivational variables could show differences regarding their influences on students engaging in diverse SRL strategies. He further noticed that value components had a stronger effect of predicting SRL strategy use than the expectancy variables, which could be an indication on why task value related to increased SRL strategy use compared to self-efficacy and could indicate that student's selection and use of strategies may depend more on their purpose of completing a task rather than their belief in their competence to succeed in a given task (Wondimu, 2017). In general, however, even though motivational variables may show slight changes in influencing SRL strategy use, it has been shown frequently, that students' involvement in SRL strategies are closely linked to their self-efficacy believes how capable they perceive themselves to be to perform on a given task and the belief that these tasks are interesting and worth learning (Pintrich & De Groot, 1990; Pintrich & Gracia, 1993). Furthermore, even though different motivational variables influence different SRL strategy use, motivation in general has shown to influence students to be more cognitively engaged in the daily tasks arising from the educational field (Pintrich & De Groot, 1990). This implies, that students' self- efficacy, as well as task value should be fostered and improved, as it may lead students' becoming more cognitively engaged in the daily activities arising from higher education, thereby also influencing students' engaging in increased SRL strategies benefitting performance (Pintrich & De Groot, 1990).

8.1.2 Motivational aspect of Part two This is also supported by the results in the second part of the study, in which students' reasons for not utilising SRL strategies in relation to their emotions and motivation was analysed. This part of the study showed that self-efficacy, as well as task value had a significant negative correlation to all four SRL

discrepancies. This suggests that the more students were motivated, the less reasons for not utilising SRL strategies were employed. This implies again, that the believes how capable students perceive themselves to be to perform on a given task and the belief that these tasks are interesting and worth learning contributes to students involving and engaging in SRL strategies more often, compared to low or minimal motivation (Pintrich & De Groot, 1990; Pintrich & Gracia, 1993). For students to become more cognitively active and to engage in their daily academic activities successfully, motivation has to be fostered throughout an individual's academic career. Schools and higher educational institutions should help students improve their belief and confidence in their knowledge, therefore contributing to students' positive perceptions of themselves of being capable in the academic domain and thereby eliciting greater academic success (Mega et al, 2014).

8.2 Emotions

8.2.1 Enjoyment aspect of Part one; H2. Furthermore, the hypothesis relating to the emotions have been partially supported. With regards to positive activating emotions, the hypothesis that individuals scoring high on enjoyment are more motivated and utilise SRL strategies more frequently than those who score low on enjoyment, has been supported. Enjoyment had positive relation with all four SRL strategy uses and had a positive relationship with both motivational variables. This is in accordance with other findings (e.g. Artino & Jones, 2012; Cho & Heron, 2015; Mega et al, 2014; Pekrun et al, 2002; Pekrun, 2006) in which it was established that positive emotions facilitate SRL strategy use and strengthen motivation. Enjoyment in the academic context is assumed to be elicited, if the learning material relates positively to the learning activity (e.g. studying) and the activity is perceived by being controllable by the self (Pekrun, 2006). The enjoyment experienced through this, is crucial for flow experiences, as it fosters engagement and contributes to creative problem solving (Pekrun, 2006). In this sense, students' positive emotions experienced on a task, enhances their belief and confidence in their knowledge, therefore contributing to students' positive perceptions of themselves of being capable in the academic domain (Mega et al, 2014). This effect of students gaining more confidence in their capabilities when experiencing enjoyment while performing on a task, also encourages students to utilise SRL strategies more often. This is due to the fact, that the enjoyment of learning the materiel and the experience of the learning flow, shifts students' focus on the task at hand (Pekrun, 2006; Pekrun et al, 2002). A reason why students focus more on the task while experiencing enjoyment is because enjoyment may have the effect of students

experiencing excitement at challenging tasks and should even generate more relaxed states when completing pleasurable activities (Pekrun, 2006). This has the effect, that students flow is enhanced, and they become more engaged in the learning activity, thereby resulting in students shifting their focus on the activity rather than focusing on the outcomes (Pekrun, 2006). In this sense, when students experience enjoyment while performing a task, they become more cognitively engaged, utilising their full cognitive resources which leads them to also use flexible and creative learning strategies to complete the task at hand (Pekrun, 2006). This indicates that emotions influence motivation and impacts how students engage in various tasks. As it was made clear above, enjoyment has a positive relation to motivation and has an influence of students utilising SRL strategies to get ahead in their studies. Enjoyment is therefore a crucial element which would foster student's engagement in their studies.

8.2.2 Enjoyment aspect of Part two. In addition, in part two of the study, enjoyment did not correlate to any of the SRL discrepancies. This supports the previous findings, that enjoyment elicits SRL strategy use and why it is important that positive emotions have to be taken into account when trying to understand the academic success of students, as these contribute to understanding students' motivation and behaviour as well as their potential engagement in SRL strategy use.

8.2.3 Boredom aspect of Part one; H2.1. Moreover, the opposite also holds true, in that emotions may not only trigger and sustain motivation but that emotions could also reduce motivation (Pekrun et al, 2002). The hypothesis stating that negative deactivating emotions have a negative effect on motivation and SRL strategy use has been supported. Boredom negatively correlated with all four SRL strategy uses and both motivational variables. This is in accordance with other research, in which it was concluded, that negative emotions usually reduce motivation and has a negative effect on SRL strategy use and may even be detrimental to academic performance (Cho & Heron, 2015; Mega et al, 2014; Pekrun et al, 2002; Pekrun, 2006; Pekrun, Goetz, Daniels, Stupnisky & Perry, 2010; Valinasab & Zeinali, 2019). Boredom can come about in two different ways. On the one hand, if it is perceived that there is a lack of control over a learning activity and the demands exceed the capabilities, students may experience boredom as they are not able to follow the workload or task. On the other hand, boredom can result from a "high control/low- demands conditions" (Pekrun, 2006, p. 324). In this sense, students are under challenged and are not stimulated enough. In the academic context however, and especially in higher education, the tasks are often complex

which also brings challenges that have to be conquered so that academic success can be attained. In this environment, it is mostly unlikely that task demands, and individual capabilities are perceived to be highly controllable so that boredom results of being under challenged. It is much more the case, that in these settings, students experience low or moderate control in relation to task demands, thereby resulting to negative observed levels of control and consequently boredom follows (Pekrun et al, 2010). This suggests that boredom may rely on how students perceive their controllability. Students who underestimate their abilities, self-generate the perception of having a lack of control over task demands, thereby inflicting boredom to themselves. One way counter acting against this problem, would be to help students modify their control appraisals through cognitive treatments (Pekrun et al, 2010). Even if these measures are taken however, it seems that boredom cannot be prevented completely in these terms as boredom is also experienced when the learning activity lacks any motivational value which can be both, positive and or negative (Pekrun, 2006). In this sense, if there are no values that can be attributed towards an activity, boredom usually results, which functions by withdrawing the attention of the activity at hand towards more satisfying activities or stimuli (Pekrun et al, 2010). Consequently, if boredom is experienced during an academic activity, cognitive resources are reduced for the impending task as it generates attention problems. Boredom therefore increases distractibility and reduces task-related attention, resulting in shifting the focus towards other contents (Pekrun et al, 2010). This indicates, that SRL strategies are not utilised if boredom is experienced. Seeing that cognitive resources are impended as the focus is shifted towards task-irrelevant thinking, students will not engage in creative problem-solving skills including utilising SRL strategies. In this case, another way to counter act against boredom is, to help students understand this emotion and try and help them to cope and regulate boredom (Pekrun et al, 2010). Not only does boredom hinder students to engage in SRL strategy use, but it also has other motivational consequences. As boredom is categorised as a negative deactivating emotion, it has the effect of reducing physiological activation. In this sense, it reduces motivation to engage in achievement tasks and functions so aversive, that it even induces motivation avoiding the activity as a whole (Pekrun et al, 2010). Boredom is therefore more aversive, compared to having a lack of interest or enjoyment when engaged in a task. This is because, having a lack of interest or enjoyment when confronted with a task, implies that there is neither a wish to engage- nor the wish to avoid the task. In other words, there is a lack of approach motivation. Contrary to boredom, boredom triggers impulses that result in wanting to escape the situation and therefore promotes avoidance motivation (Pekrun et al, 2010).

Seeing that boredom is avoidance orientated, it therefore conflicts with the emotions of situational interest and enjoyment and therefore, appears to impair intrinsic motivation, which again is one of the factors contributing towards academic success (Pekrun et al, 2010). Consequently, boredom shows to be a negative emotion with regards to motivation, SRL strategy use and on performance. It seems to be denoted with negative control related views of individuals, who seem to have a lack of control of the activity at hand and that demands exceed their capabilities (Pekrun et al, 2010). It is this reason why students' academic self-concepts, as well as their perceived control must be reinforced. It is shown that high competencies and perceived control can protect individuals against boredom (Pekrun et al, 2010). In addition, before students enter higher education, they should be taught how to realise and cope with boredom in order to prevent or reduce boredom which is experienced frequently in higher education and may contribute negatively to academic achievement (Pekrun et al, 2010).

8.2.4 Boredom aspect of Part two. Contributing to these findings, are the results found in part two of the study. Boredom significantly positively correlated to all SRL discrepancies. This shows that students experiencing boredom, are more frequently confronted with not applying SRL strategies. These students score higher in giving reasons not being able to apply SRL strategies. This indicates that students' cognitive resources are reduced for the task ahead resulting in shifting the focus towards other content (Pekrun et al, 2010). Boredom therefore increases distractibility and instead of students trying to overcome the difficulty of a task by engaging and utilising problem-solving skills including utilising SRL strategies, they shift their focus towards task irrelevant thinking and may therefore also engage in identifying reasons for not being able to utilise SRL strategies (Pekrun et al, 2010).

8.2.5 Relief aspect of Part one; H2.2. The remaining two emotional categories, namely positive deactivating emotions and negative activating emotions may show more complex effects compared to the other emotional categories mentioned above (Pekrun et al, 2002). The hypothesis stating that positive deactivating emotions have a positive effect on motivation and SRL strategy use have been partially supported. Relief positively correlated with cognitive strategy use and metacognitive strategy use, however, it did not correlate significantly with the other two SRL strategy uses and additionally, it did not significantly correlate with any of the two motivational variables. This indicates that relief on the one hand, has a positive effect on SRL strategy use, specifically those involving cognitive strategies. On the other hand, however, seeing that relief does not relate to any of the motivational variables, it contradicts the hypothesis, as it was believed that positive emotions

had a positive effect on motivation. In line with these findings, Pekrun et al (2002) also observed that there were inconsistent and minimal correlations between relief and motivational variables. They claimed that this phenomenon could be explained through the deactivating effects that are proclaimed to be in the emotion of relief. They describe that positive deactivating emotions, under which relief is classified, may have the effect of deactivating any direct motivation related to pursuing academic work, therefore facilitating disengagement. In this sense, even though these emotions are categorised as positive emotions, which in general should enhance motivation, they seem to have the opposite effect and elicit negative consequences related to academic work by disengaging individuals from the task at hand. This may explain why relief, in this case, did not correlate to the motivational variables. As already mentioned, positive deactivating emotions are still however considered as a positive emotion and may therefore also show positive effects related to academic work. In this sense, positive deactivating emotions can act as reinforces strengthening motivation for the next task at hand, thereby facilitating individuals engaging and succeeding in upcoming tasks (Pekrun et al 2002).

8.2.6 Relief aspect of Part two. This proposition may be strengthened when analysing the outcomes in part two of the study. Relief did not correlate to any of the SRL discrepancies. This shows again, that even though relief did not show a positive reinforcement concerning motivation it also, on the other hand, did not correlate to any SRL discrepancies indicating that it also does not reinforce disengagement in applying SRL strategies. Due to their deactivating nature, it may explain why relief does not directly significantly reinforce motivation but still being a positive emotion, it also hinders from disengaging students in applying SRL strategies. It is this reason, why deactivating emotions may show complex outcomes in a twofold manner, in that it works positively on the one hand accounting for strengthening SRL strategy use, however on the other hand, it could also account for disengaging individuals from a task at hand and thereby, having negative effects on the academic success. This could explain why relief had a positive effect on SRL strategy use and why it reinforced students to utilise these strategies, and conversely why it did not correlate with students reasonings to not utilise SRL strategies and why it did not have the positive effect on motivation.

8.2.7 Anger aspect of Part one; H2.3. Closely related to this phenomenon are also the emotions that are classified as negative activating emotions. The hypothesis stating that negative activating emotions have a negative effect on motivation and SRL strategy use was supported. Anger negatively correlated with all SRL strategy uses except frustration

regulation use, which did not have any significant correlation. Additionally, anger negatively correlated to both motivational variables. These findings are in accordance with other research in which it was established, that negative emotions usually reduce motivation and have a negative effect on SRL strategy use (Artino & Jones, 2012; Cho & Heron, 2015; Pekrun et al, 2002; Pekrun, 2006; Pekrun et al, 2010; Valinasab & Zeinali, 2019). This was already made clear when analysing negative deactivating emotions (boredom), which showed that negative emotions had a negative effect on motivation and SRL strategy use. When comparing the results of negative deactivating emotions (boredom) to those of the negative activating emotions (anger) however, a slight difference in the outcome transpires. For the negative deactivating emotions, boredom negatively correlated to all SRL strategy uses. In the case of the negative activating emotions, anger only negatively correlated to three of the SRL strategy uses. An explanation on why anger did not correlate negatively to all SRL strategy uses could be found in the findings of Artino and Jones (2012), who have analysed the relation between academic emotions and SRL behaviours. Interesting are the results concerning the negative activating emotions which in their case was the emotion frustration. Even though frustration is classified as a negative emotion, which theoretically is expected to have a negative effect on SRL, Artion and Jones (2012) noticed that frustration was a positive predictor of SRL and may enhance adaptive behavioural outcomes. Due to these findings, they have concluded that cognition, emotions, and behaviour are complex elements that work in context and that emotions classified as negative emotions could possibly also produce positive outcomes. This is also substantiated by Pekrun et al (2002), who claimed that due to being classified as a negative emotion, anger is presumed to reduce intrinsic motivation, as negative emotions tend to be contradictory with enjoyment, which denotes interest and intrinsic motivation. However, on the other hand, due to their activating nature, these emotions can also generate strong motivation so that individuals can deal with the negative events that caused them, thereby specifically strengthening extrinsic motivation. In this sense, task related anger could trigger motivation to overcome the specific difficulty (Pekrun et al, 2002) and in this sense enhance adaptive behaviour resulting to positive academic outcomes.

8.2.8 Anger aspect of Part two. In part two of the study, anger also positively correlated to all SRL discrepancies and negatively to both motivation variables. This substantiates the findings that negative emotions reduce motivation and may also have a negative effect in enhancing the use of SRL strategies. As anger has both correlated negatively to SRL strategy use and motivation and additionally, correlated positively to reasons not utilising SRL it shows that anger, being a negative emotion, does influence

motivation and SRL strategy in a negative way. Interesting however are the findings in which anger correlated to academic achievement which is discussed below. This highlights the complexity of the negative activating emotions, in that in general they do have negative effects on motivation and SRL strategy use but may at times show positive outcomes towards academic success.

8.3 Academic Achievement

8.3.1 Emotional aspect of Part one; H3 & H3.1. The discovery of the complexity between positive deactivating emotions and negative activating emotions may be able to further give an initial explanation on the outcomes that transpired regarding academic achievement. As mentioned above, the hypothesis stating on the one hand, that positive emotions, higher scores in motivation and increased SRL strategy use are related to higher academic achievement, as well as the hypothesis, that negative emotions, lower scores in motivation and decreased usage of SRL strategies are negatively related to academic achievement, was not supported. Firstly, positive emotions and SRL strategy use, did not significantly correlate to academic achievement, as well as the negative emotion boredom, that also showed no significant correlation with academic achievement.

8.3.2 Emotional aspect of Part two. This was also observed in the second part of the study, in which reasons for not utilising SRL strategies, motivation and emotions were analysed to determine their influence on academic achievement. In both parts of the study positive emotions as well as boredom did not significantly correlate to academic achievement. This could indicate that emotions are preliminary variables that contribute to academic achievement. In fact, Pekrun et al (2002) substantiates this, in which they explain, that the effects of emotions on academic achievement are mediated by cognitive and motivational processes where different emotions influence these processes in different ways. This is also made clear in the recent study, as positive emotions showed significant positive correlations with motivational and SRL strategy use, however, it did not so with academic achievement. Likewise, boredom negatively influenced motivation and SRL strategy use, but does not show any significant correlation directly linked to academic achievement. The same was detected in part two of the study, in which positive emotions showed no correlations with any SRL discrepancies and negative emotions correlated positively to all SRL discrepancies. This suggests that when experiencing positive emotions, students were less likely not to apply SRL strategies compared to when experiencing negative emotions, which revealed, that students were more likely to not engage in SRL strategy use. This indicates that emotions

could affect academic achievement positively or negatively in an indirect way by either strengthening or weakening motivation and enhancing or reducing SRL strategy use (Pekrun et al, 2002). Furthermore, taking a closer look at anger, the results could also enhance our understanding on how emotions influence and contribute to academic success. Anger had a significant positive correlation with academic achievement in both parts of the study, even though it was hypothesised in part one of the study that negative emotions have a negative effect on academic achievement. Anger, being a negative activating emotion as stated above, does not necessarily have to have negative consequences on academic success. Due to its activating nature, anger can generate strong motivation so that individuals can overcome the negative events that caused these feelings in the first place, thereby strengthening extrinsic motivation. (Pekrun et al, 2002). Task related anger could trigger motivation and therefore generate positive outcomes as it may enhance adaptive behavioural outcomes (Artino & Jones, 2012).

8.3.3 Emotional aspect of Part three. This is further substantiated in part three of the study. In this part of the study, all variables that had a significant correlation with academic achievement were further analysed to determine if they could predict academic achievement. As research on how emotions, specifically positive as well as a diversified spectrum of negative emotions, are scarce in terms of their influence on academic achievement, an extra analysis was conducted in which all emotions that had a significant correlation with academic achievement were further analysed to determine if emotions could predict academic achievement. As anger was the only emotion that correlated significantly to academic achievement, these two variables were analysed. The results showed that anger could even predict academic achievement. This shows that anger, being a negative emotion, not only generates positive outcomes related to academic success but that it can even predict academic success. In this case, anger works as an external motivation, in that it triggers individuals to overcome the negative events that caused the emotion in the first place thereby eliciting positive results. It is due to this, that the effects of emotions on academic achievement will unavoidably be complex and a reason on why emotions both positive and negative have to be taken into account more often when trying to understand students' academic success and to assess and unravel the unpremeditated relationship of emotions and their outcomes.

8.3.4 Motivational aspect of Part one; H3 & H3.1 With regards to the motivational aspect concerning both hypotheses, in that higher scores in motivation have a positive influence on academic achievement, and lower scores in motivation have a negative influence on academic achievement have also not been supported. In fact, a significant negative

correlation emerged between the two variables (motivation and academic achievement) when entered with SRL strategy use (part one of the study) as well as when entered with the SRL discrepancies (part two of the study) and emotions. This may be unclear at first, as various research has shown, that motivation has a positive influence on academic achievement (e.g., Dresel & Hall, 2013; Multon, Brown & Lent, 1991; Pintrich & Gracia, 1993; Wigfield & Eccles, 2000; Zimmermann, 2000). One explanation that could give clearance to this outcome, could be that students' self-reports about their perceptions of their beliefs about task value and self-efficacy may not correspond to their perceptions and beliefs at the time they are in fact engaging in assessment tasks (Alkharusi et al, 2013).

8.3.5 Motivational aspect of Part three. This could also be substantiated with the fact that in part three of the study, in which all variables that have significantly correlated with academic achievement were further analysed to see whether they could even predict academic achievement. The results showed that the only variable that could predict academic achievement was self-efficacy. In this sense, the higher a student scored on self-efficacy predicted students attaining academic achievement. This shows that students with the confidence in their ability to learn and their belief that they are able to perform on a task and are responsible for their own performance, succeed more often and attain academic achievements. This clearly shows a contradiction to the above-mentioned results, that revealed that students who are highly motivated achieve lower grades compared to those who are less motivated. As motivation also correlated positively to the use of SRL strategies and to positive emotions it shows that self-efficacy does have the effect of contributing towards academic achievement in a positive way. It is due to this, that one can say that motivation does play a key role concerning academic success, as it does have a positive effect towards SRL strategy use and due to the positive correlation with positive emotions, a positive reinforcement towards motivation can be observed. It is due to these results, that the negative correlation between motivation and academic achievement has to be analysed more thoroughly and it has to be taken into account that students' self-reports about their perceptions of their beliefs about task value and self-efficacy may have not corresponded to their perceptions and beliefs at the time they were in fact engaging in the assessment tasks (Alkharusi et al, 2013).

8.3.6 SRL aspect of Part one; H3 & H3.1. Furthermore, regarding the SRL strategy use aspect in both hypotheses of part one in the study namely, on the one hand, that increased usage of SRL strategy would have a positive effect on academic achievement, and on the other hand, that decreased usage of SRL strategy use would have a negative effect on

academic achievement, where also not supported. A reason for this could be explained by the findings of Foerst et al (2017) who have stated that SRL and performance do not always correlate highly together as students might have a great deal of knowledge about SRL strategies but there might still be interferences on utilising these strategies to their full potential. This could indicate on why SRL strategy use does not correlate highly with academic achievement, as students might indicate that they possess cognitive fundamentals for being able to use SRL strategies but have not yet incorporated it into their behavioural skills and consequently, do not put them into use effectively (Foerst, et al 2017). Supporting this view is that the most mentioned reason for not applying SRL strategies in the current study was “I lack the time to use this strategy”. This indicates that students have the ability to identify SRL strategies and may also be aware that they might positively contribute to their task at hand, but regardless, they still seem to hinder themselves by not utilising them to their fullest potential. This could be explained in order to be able to use SRL strategies instinctively, students have to be prepared and willing to do so. If they do not have the SRL strategies at hand and have not incorporated into their behavioural skills so that they are able to use them directly, they will not be able to apply and use them effectively (Spörer & Brunstein, 2006, as cited in Foerst et al, 2017). Furthermore, there may also be an unwillingness to apply SRL strategies due to an unfavourable cost value ratio. Supporting this view is that the second most mentioned reason in the current study for not applying SRL strategies were “using this strategy would be too arduous”, indicating a deficient willingness to actually engage in utilising SRL strategies (Nückles & Wittwer, 2014, as cited in Foerst et al, 2017). To overcome these challenges a shift from informative knowledge transfer of SRL strategies to fostering practical experiences on actually utilising these strategies has to take place (Foerst et al 2017). In this sense, students would be able to practice the usage of SRL strategies more often, thereby incorporating them into their behavioural skills, resulting them to be more aware and prepared to use these strategies more effectively and spontaneously. Due to the lack of the practical experience on utilising SRL strategies, and therefore not being able to use these strategies spontaneously, as well as the lack of willingness to engage in applying SRL strategies, due to an unfavourable cost value ratio, may explain why in the recent study, SRL strategy use did not significantly correlate either positively nor negatively with academic achievement as was hypothesised.

8.3.7 SRL aspects of Part two. In part two of the study however, a different result emerges regarding the use, or rather lack thereof, of SRL strategies and academic achievement. In this part of the study SRL discrepancies with regards to students’ motivation

and emotions were analysed to establish the influence they had on academic achievement. SRL discrepancies had a significant positive correlation with academic achievement. This indicates that students not utilising SRL strategies were attaining high academic achievements. These results seem to be misleading as they contradict a variety of studies that have demonstrated that SRL strategy use influences academic achievement in a positive way and even enhances academic success compared to students not utilising these (see Cassidy, 2011; Dresel et al, 2015; Mega et al, 2014; Wirth & Leutner, 2008; Zimmermann, 1990; Zimmermann, 2000). The findings in the current study however suggest, that SRL strategy use does not necessarily only have the effect of contributing towards students attaining academic achievements. It is also the case, that students that are not familiar with diverse SRL strategies and how they can apply these various SRL strategies spontaneously and effectively on different academic tasks, seem to also be able to achieve academic success. An initial explanation on why reduced utilisation of SRL strategies had a positive effect on academic success could be found by Ho (2004). He analysed Chinese students' academic performance and their use of SRL strategies and compared these to students in other countries. Interesting are the findings, in which it was demonstrated, that Chinese students achieved high academic grades but have not utilised SRL strategies as often as students in other countries have. This indicates that other factors, besides SRL strategy use, contribute to academic success. Specifically, it is made clear in the study of Ho (2004), that cultural value and socialisation processes have an influence on different factors contributing towards academic success and may have the effect that SRL strategy use may be less of an important factor contributing to academic achievement. It is due to this, that cultural factors have to be taken into account when trying to establish which motivational factors are important that could influence academic success. Seeing that a diverse range of students have partaken in the current study, different cultural and socialisation processes may have had the influence on why academic achievement was achieved, even though reduced SRL strategies were utilised. In addition, the students in the current study might have been extrinsically motivated in terms of trying to perform well and being able to obtain higher grades compared to their counterparts, instead of being interested in comprehending the learning content. Due to the highly competitive learning environment in which students often find themselves in, may have the effect, that student's ability to self-regulate is often diminished resulting in students lowering their ability to self-regulate their own learning and hence stray from being intrinsically motivated towards being motivated through external factors such as trying to achieve the highest grade in their course or class (Ho, 2004). Another aspect that has to be

considered, are the structure and demands of university curricula. Different exam modes may influence and trigger different cognitive strategies and may affect how students utilise SRL strategies. If for example multiple choice test are the exam mode of choice, the costs for using SRL strategies that help to gain a deeper understanding of the context, may stand to no relation to the demands of recognition that usually is required by the above-mentioned mode (Foerst et al, 2017). It is due to this, that students may therefore choose not to engage in specific SRL strategies as the proportion of learning a specific context may stand to no relation to what is then actually asked or expected of them. This again increasing the unfavourable cost value ratio resulting in students not engaging and applying SRL strategies.

9. Implications

The findings of the present study offered a better understanding of the relationship between SRL strategy use, motivation, emotion, and academic achievement. When entering higher education, competencies in SRL is seen as crucial, as it is believed to be an important prerequisite for success in academic achievement (e.g. Cassidy, 2011; Dresel et al, 2015; Wirth & Leutner, 2008). Additionally, higher education is typically characterised with complex achievement tasks which requires a considerable amount of autonomy with regards to learning organisation, learning goals, collaboration, content and procedures and usually entails having rather limited opportunities to receive external feedback (Dresel et al, 2015). It is due to this, that SRL is seen as a necessity for students to gain competencies in SRL so they can succeed in their studies (Dresel et al, 2015), and the reason that the current study has analysed factors contributing towards SRL strategy use. The current study fosters a better and holistic understanding about factors influencing SRL strategy use which could be brought to the foreground in education systems, to ascertain that student's gain a better theoretical and practical understanding on how to utilise SRL strategies in different situations and therefore succeed in the academics. It is namely known, that the mere knowledge of SRL, does not mean that students utilise these strategies to get ahead in their studies (Dresel et al, 2015; Foerst et al, 2017). Other factors, such as motivation and emotion have a profound impact why some students utilise SRL strategies while others do not (Mega et al, 2014; Pintrich & De Groot, 1990). The present study is therefore valuable as it included these three variables rather than only narrowing it to one specific factor to analyse how these influence academic achievement. This is important since motivation has an influence on the utilisation of SRL strategies and therefore has to be treated as interdependent processes to gain a more holistic understanding on students' academic achievement (Zimmermann, 1990). In addition, emotions seem to be the motivating force behind thoughts and actions (Frenzel & Stephens,

2013; Pekrun, 2006) and seem to therefore have an influence on motivation as enjoyable emotions may increase motivation while negative emotions may even decrease motivation (Artino & Jones, 2012; Pekrun, 2006). However, a directional relationship between motivation and emotions cannot be established, as the opposite also seems to hold true, in that the more motivated a student is, the more enjoyable emotions may arise of the situation (Frenzel & Stephens, 2013). It is due to this, that emotions need to also be considered when motivation is analysed to gain a better and holistic understanding how these variables influence each other and effect academic achievement. Focusing on a specific variable alone would be incongruent with the holistic construal of SRL strategy use and would overlook the role those other variables might have played in the use of SRL strategies and the effect these would have on academic achievement. Furthermore, a unique feature of the study was that it analysed student's reasons for not utilising SRL strategies and contributes to the understanding why students hinder themselves for not utilising SRL strategies even though the knowledge of the benefits of SRL is known. This understanding could be integrated in schools to convey to students the theoretical but most importantly, the practical experiences so that students become more fluent in applying various SRL strategies and therefore are better prepared in higher education to control their learning process and to get ahead in their studies successfully.

10. Limitations

The Self-Regulated Learning Questionnaire for Action and Knowledge -short version (SRL-QuAK) is an instrument developed only recently and thus further studies should be conducted to verify its validity. It is particularly important that data should be collected from different cultural contexts and settings to determine whether same or similar results are found. In this notion, it would also be important to conduct further investigation on different education systems if one could determine the same results across all systems or if there may be differences within the educational systems. For example, do students who attend Varsity in German speaking countries show the same results compared to students studying in Universities in South Africa or even compare students studying in Universities in German speaking countries with students studying at Fachhochschulen in German speaking countries. Furthermore, the possible social desirability effects in the self-reported responses should be contemplated and further investigated. In addition, it must also be contemplated that students' self-reports about their perceptions of their beliefs about task value and self-efficacy may not correspond to their perceptions and beliefs at the time they are in fact engaging in assessment tasks (Alkharusi et al, 2013) and further examination is therefore necessary.

11. Conclusion

In conclusion this study has contributed to the knowledge on SRL strategy use, motivation, emotion, and academic achievement. The analysis included all three variables to gain a better understanding how these three variables influence each other and how they effect academic achievement. This allows for a holistic exploration of the role of motivation and emotions with regards to SRL strategy use and on academic achievement. The study revealed the relationship of motivation, emotions and SRL strategy use with regards to academic achievement. Motivation showed positive correlations with various SRL strategy use and had a positive correlation with the positive activating emotion enjoyment. Additionally, motivation correlated negatively with SRL discrepancies and showed negative correlations to the negative emotions. Positive emotions had a positive correlation with various SRL strategy use while negative emotions had a negative correlation with various SRL strategy use and motivation. Additionally, negative emotions showed positive correlations with SRL discrepancies. With regards to academic achievement, SRL strategy use and positive emotions, as well as the negative emotion boredom, did not show any significant correlations. On the other hand, however, academic achievement showed positive correlations with SRL discrepancies and correlated positively with the negative emotion anger and additionally correlated negatively with motivation. With regards to further analysis the findings showed that among the three variables, self-efficacy and anger had significant predictive value for academic achievement. Even though this study contributed to the knowledge of SRL strategy use, motivation, emotions and academic achievement, more extensive and in-depth research is needed to fully understand the complexity of motivational and emotional factors that influence SRL strategy use as well as other psychological factors and cultural influences that may contribute towards attaining academic achievement.

12. References

- Alkharusi, H., Aldhafri, S. & Alnabhani, H. (2013). The Impact of Students' Perceptions of Assessment Tasks on Self-efficacy and Perception of Task Value: A Path Analysis. *Social Behaviour and Personality*, 41(10), 1681-1692. DOI 10.2224/sbp.2013.41.10.1681
- Artino, A. R. & Jones, K. D. (2012). Exploring the Complex Relations Between Achievement Emotions and Self-Regulated Learning Behaviors in Online Learning. *Elsevier*, 15, 170-175. DOI 10.1016/j.iheduc.2012.01.006
- Blömeke, S., Gustafsson, J. E. & Shavelson, R. J. (2015). Beyond Dichotomies: Competence Viewed as a Continuum. *Zeitschrift für Psychologie*, 223(1), 3-13. DOI 10.1027/2151-2604/a000194
- Cassidy, S. (2011). Self-Regulated Learning in Higher Education: Identifying Key Component Processes. *Studies in Higher Education*, 36(8), 989-1000. DOI 10.1080/03075079.2010.503269
- Cho, M. H. & Heron, M. L. (2015). Self-Regulated Learning: The Role of Motivation, Emotion, and Use of Learning Strategies in Students' Learning Experiences in a Self-Paced Online Mathematics Course. *Distance Education*, 36(1), 80-99. DOI 10.1080/01587919.2015.1019963
- Dresel, M. & Hall, N. C. (2013). Motivation. In N. C, Hall & T. Goetz (Eds.). *Emotion, Motivation, and Self-Regulation: A Handbook for Teachers* (1st ed., pp. 57-113). Bingley, UK: Emerald Group
- Dresel, M., Schmitz B., Schober, B., Spiel C., Ziegler A., Engelschalk T., Jöstl, G., Klug, J., Roth A., Wimmer B. & Steuer G. (2015). Competencies for Successful Self-Regulated Learning in Higher Education: Structural Model and Indications Drawn from Expert Interviews. *Studies in Higher Education*, 40(3), 454-470. DOI 10.1080/03075079.2015.1004236

- Eccles, J. (2009). Who Am I and What Am I Going to Do With My Life? Personal and Collective Identities as Motivators of Action. *Educational Psychologist*, 44(2), 78-89. DOI 10.1080/00461520902832368
- Feather, N. T. & Newton, J. W. (1982). Values, Expectations, and the Prediction of Social Action: An Expectancy-Valence Analysis. *Motivation and Emotion*, 6(3), 217-244. DOI 0146-7239/82/0900-0217803.00/0
- Feather, N.T. (1988). Values, Valences, and Course Enrollment: Testing the Role of Personal Values Within an Expectancy-Valence Framework. *Journal of Educational Psychology*, 80(3), 381-391. DOI 0022-0663/88/S00.75.
- Field, A. (2013). *Discovering Statistics Using IBM SPSS Statistics* (4th ed.). London: Sage.
- Foerst, N. M., Klug J., Jöstl, G., Spiel C. & Schober, B. (2017). Knowledge vs. Action: Discrepancies in University Students' Knowledge About and Self-Reported Use of Self-Regulated Learning Strategies. *Frontiers in Psychology*, 8(1288). DOI 10.3389/fpsyg.2017.01288
- Frenzel A, C. & Stephens, E. J. (2013). Emotions. In N. C. Hall & T. Goetz (Eds.). *Emotion, Motivation, and Self-Regulation: A Handbook for Teachers* (1st ed., pp. 1-51). Bingley, UK: Emerald Group
- Garcia, T. & Pintrich, P.R. (1994). Regulating Motivation and Cognition in the Classroom: The Role of Self-Schemas and Self-Regulatory Strategies. In D. H. Schunk & B. J. Zimmermann (Eds.). *Self-regulation of Learning and Performance: Issues and Educational Applications* (pp. 127-153). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Goetz, T., Nett, U. E. & Hall, N. C. (2013). Self-Regulated Learning. In N. C, Hall & T, Goetz (Eds.). *Emotion, Motivation, and Self-Regulation: A Handbook for Teachers* (1st ed., pp. 123-166). Bingley, UK: Emerald Group

- Ho, E.S. (2004). Self-Regulated Learning and Academic Achievement of Hong Kong Secondary School Students. *Educational Journal*, 32(2), 87-107. Retrieved from http://www.fed.cuhk.edu.hk/~hkcisa/articles/Ho_2004_ej_v32n2_87-107.pdf
- Lüftenegger, M., Schober, B., Van de Schoot, R., Wagner, P., Finsterwald, M., & Spiel, C. (2012). Lifelong Learning as a Goal - Do Autonomy and Self-Regulation in School Result in Well Prepared Pupils? *Learning and Instruction*, 22, 27-36. DOI 10.1016/j.learninstruc.2011.06.001
- Ma, X. (1999). A Meta-Analysis of The Relationship Between Anxiety Toward Mathematics and Achievement in Mathematics. *Journal for research in mathematics education*, 30(5), 520-541. Retrieved from https://search-proquest-com.uaccess.univie.ac.at/docview/62387746?rfr_id=info%3Axri%2Fsid%3Aprimocom
- Mega, C., Ronconi, L. & De Beni, R. (2014). What Makes a Good Student? How Emotions, Self-Regulated Learning, and Motivation Contribute to Academic Achievement. *Journal of Educational Psychology*, 106(1), 121-131. DOI 10.1037/a0033546
- Multon, K. D., Brown, S. D. & Lent, R.W. (1991). Relation of Self-Efficacy Believes to Academic Outcomes: A Meta-Analytic Investigation. *Journal of Counseling Psychology*, 38(1), 30-38. DOI 10.1037/0022-0167.38.1.30
- Pekrun, R., Goetz, T., Titz, W. & Perry, R.P. (2002). Academic Emotions in Students' Self-Regulated Learning and Achievement: A Program of Qualitative and Quantitative Research. *Educational Psychologist*, 37(2), 91-106. Retrieved from <http://nbn-resolving.de/urn:nbn:de:bsz:352-138856>
- Pekrun, R., Goetz, T. & Perry, R.P. (2005). *Achievement Emotions Questionnaire (AEQ) User's Manual*. Retrieved from https://www.researchgate.net/post/How_can_i_apply_and_access_the_Academic_Emotions_Questionnaire_by_Pekrun_et_al_2005

- Pekrun, R. (2006). The Control-Value Theory of Achievement Emotions: Assumptions, Corollaries, and Implications. *Educational Psychology Review*, 18, 315-341. DOI 10.1007/s10648-006-9029-9
- Pekrun, R., Goetz, T., Daniels L. M., Stupnisky, R. H. & Perry, R. P. (2010). Boredom in Achievement Settings: Exploring Control-Value Antecedents and Performance Outcome of a Neglected Emotion. *Journal of Educational Psychology*, 102, 531-549. DOI 10.1037/a0019243
- Pekrun, R., Goetz, T., Frenzel, A. C., Barchfeld, P & Perry, R. P. (2010). Measuring Emotions in Students' Learning and Performance: The Achievement Emotions Questionnaire (AEQ). *Contemporary Educational Psychology*, 36, 36-48. DOI 10.1016/j.cedpsych.2010.10.002
- Pintrich, P. R. & De Groot, E.V. (1990). Motivational and Self-Regulated Learning Components of Classroom Academic Performance. *Journal of educational Psychology*, 82(1), 33-40. Retrieved from <http://rhartshorne.com/fall-2012/eme6507-rh/cdisturco/eme6507eportfolio/documents/pintrich%20and%20degroodt%201990.pdf>
- Pintrich, P.R. & Gracia, T. (1993). Intraindividual Differences in Students' Motivation and Self-Regulated Learning. *Zeitschrift für Pädagogische Psychologie*, 7(3), 99-107. Retrieved from https://www.researchgate.net/publication/232445042_Intraindividual_differences_in_students'_motivation_and_self-regulated_learning
- Pintrich, P. R. & Garcia, T. (2012). Self-Regulated Learning in College Students: Knowledge, Strategies and Motivation. In P. R, Pintrich., D.R, Brown. & C. E, Weinstein (Eds.). *Student Motivation, Cognition and Learning* (1st ed.). New York, NY: Routledge.

- Pintrich, P.R., Smith, D.A.F., Garcia, T. & McKeachie, W.J. (1991). A manual for the use of the motivated strategies questionnaire (MSLQ). Ann Arbor, MI: University of Michigan, National Centre for Research to Improve Postsecondary Teaching and Learning
- Roth, A., Ogrin, S. & Schmitz, B. (2015). Assessing Self-Regulated Learning in Higher Education: A Systematic Literature Review of Self-Report Instruments. *Springer Science & Business Media*, 28, 225-250. DOI 10.1007/s11092-015-9229-2
- Schober, B., Klug, J., Jöstl, G., Spiel, C., Dresel, M., Steuer, G., Schmitz, B. & Ziegler, A. (2015). Gaining Substantial New Insights into University Students' Self-Regulated Learning Competencies. How Can We Succeed? *Zeitschrift für Psychologie*, 223(1), 64-65. DOI 10.1027/2151-2604/a000201
- Schunk, D.H. & Greene, J.A. (2018). Historical, Contemporary, and Future Perspectives on Self-Regulated Learning and Performance. In Schunk, D.H. & Greene, J.A. (Ed.). *Handbook of Self-Regulation of Learning and Performance* (2nd ed., pp. 1-15). New York: Routledge
- Sitzmann, T. & Ely, K. (2011). A Meta-analysis of Self-regulated Learning in Work-related Training and Educational Attainment: What We Know and Where We Need to Go. *Psychological Bulletin*, 137(3), 421–42. DOI org/10.1037/a0022777.supp
- Streblow, L. & Schiefele, U. (2006). Lernstrategien im Studium. In H. Mandl & H. F. Friedrich (Eds.). *Handbuch Lernstrategien* (1st ed., pp. 352-364). Göttingen, Germany: Hogrefe.
- Valinasab, S. & Zeinali, A. (2019). The Mediational Pathway Among Academic Emotions, Self-Regulated Learning, and Academic Motivation with Academic Achievement of High School Students. *Educational and Psychological Research*, (3), 255-261. DOI 10.4103/jep.3_17

- Van Eekelen, I.M., Boshuizen, H.P.A. & Vermunt, J.D. (2005). Self-Regulation in Higher Education Teacher Learning. *Higher Education* 50, 447-471. DOI 10.1007/s10734-004-6362-0
- Wigfield, A. & Eccles, J.S. (1992). The Development of Achievement Task-Values: A Theoretical Analysis. *Developmental Review* 12, 265-310. Retrieved from https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Wigfield%2C+A.%2C+%26+Eccles%2C+J.+S.+%281992%29.+The+development+of+achievement+task+values%3A+A+theoretical+analysis&btnG=
- Wigfield, A. & Eccles, J. S. (2000). Expectancy–Value Theory of Achievement Motivation. *Contemporary Educational Psychology*, 25, 68-81. DOI 10.1006/ceps.1999.1015
- Winne, P.H., & Perry, N.E. (2000). Measuring Self-Regulated Learning. In M. Boekaerts, P.R. Pintrich & M. Zeidner (Eds.), *Handbook of Self-regulation*, (pp. 531–566). San Diego, CA: Academic Press.
- Wirth, J. & Leutner, D. (2008). Self-Regulated Learning as a Competence: Implications of Theoretical Models for Assessment Methods. *Journal of Psychology*, 216(2), 102-110. DOI 10.1027/0044-3409.216.2.102
- Wondimu, A. (2017). Motivation and Self-Regulated Learning: A Multivariate Multilevel Analysis. *International Journal of Psychology and Educational Studies*, 4(3), 1-11. Retrieved from <http://dx.doi.org/10.17220/ijpes.2017.03.001>
- Zimmermann, B.J. (1990). Self-Regulated Learning and Academic Achievement: An Overview. *Educational Psychologist*, 25(1), 3-17. DOI 10.1207/s15326985ep2501_2
- Zimmermann, B.J. (2000). Attaining Self-Regulation: A Social Cognitive Perspective. In M. Boekaerts, P. Pintrich & M. Zeidner (Eds.). *Handbook of Self-regulation*, (pp. 13-39). San Diego, CA: Academic Press.

Zimmermann, B.J. (2008). Investigating Self-Regulation and Motivation: Historical Background, Methodological Developments, and Future Prospects. *American Educational Research Journal*, 45(1), 166-183. DOI 10.3102/0002831207312909

13. Appendices

13.1 Appendix A

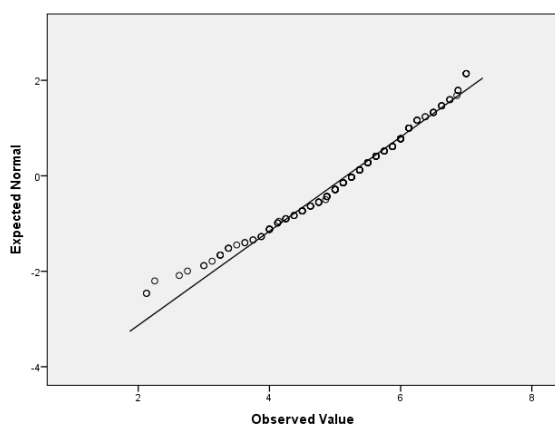


Figure 1

Q-Q Plot of self-efficacy

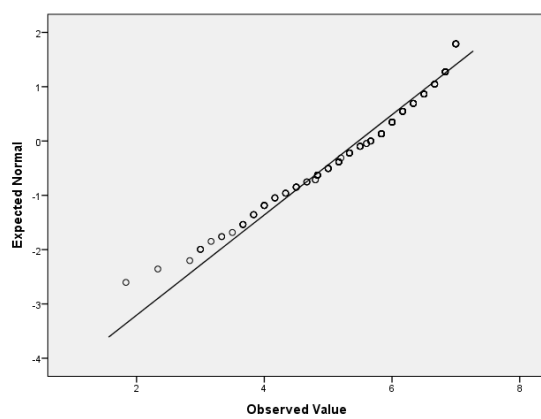


Figure 2

Q-Q Plot of task value

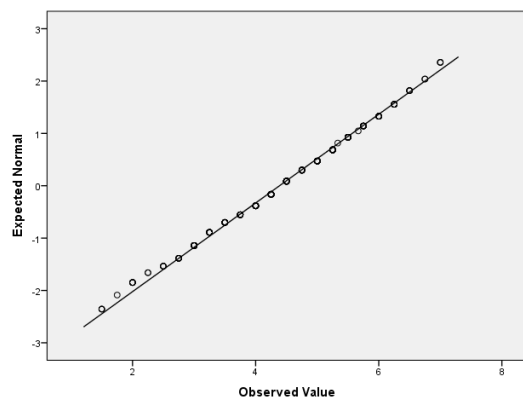


Figure 3
Q-Q Plot of boredom regulation use

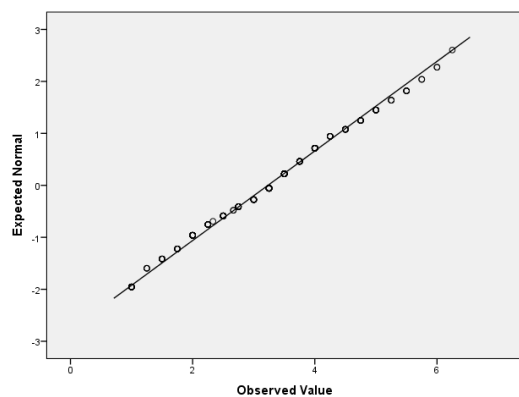


Figure 4
Q-Q Plot of boredom discrepancy

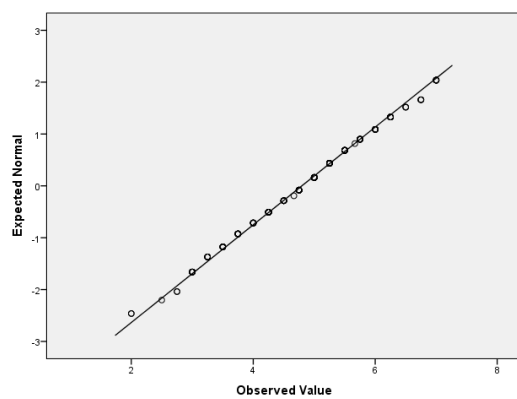


Figure 5
Q-Q Plot of cognitive strategy use

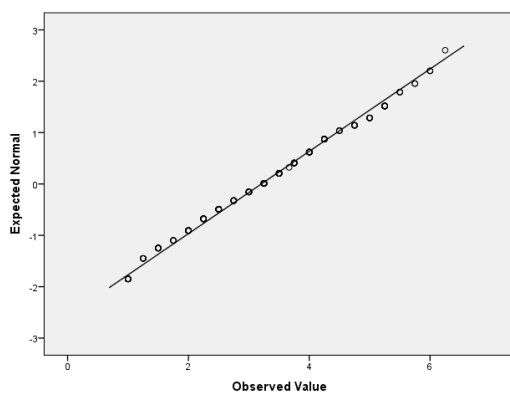


Figure 6

Q-Q Plot of cognitive discrepancy

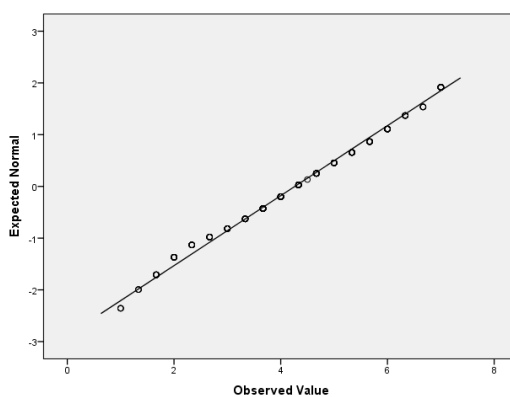


Figure 7

Q-Q Plot of frustration regulation use

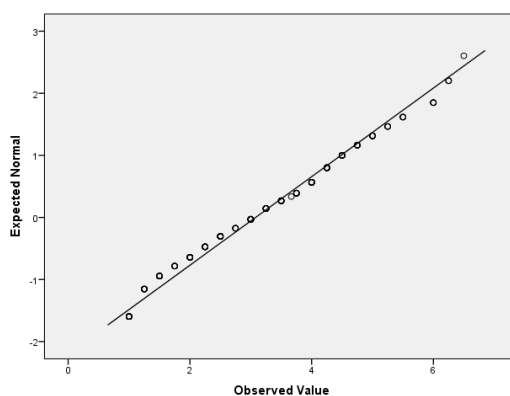


Figure 8

Q-Q Plot of frustration discrepancy

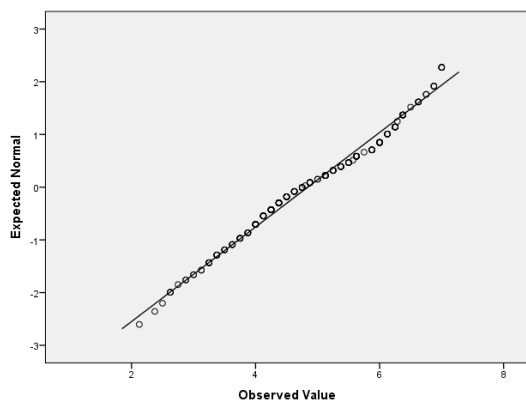


Figure 9

Q-Q Plot of metacognitive strategy use

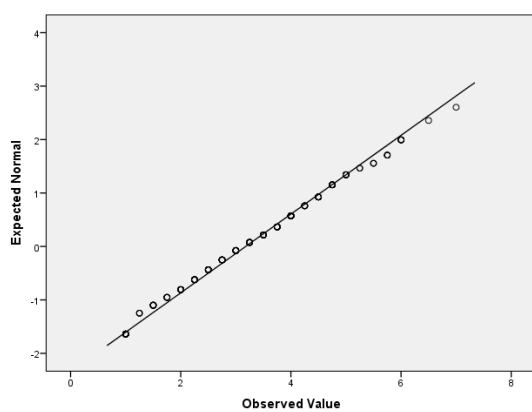


Figure 10

Q-Q Plot of metacognitive discrepancy

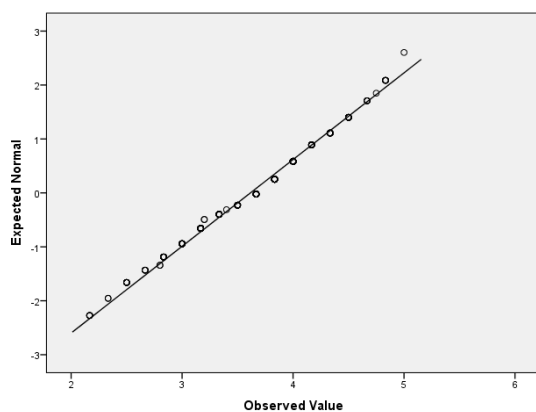


Figure 11

Q-Q Plot of enjoyment

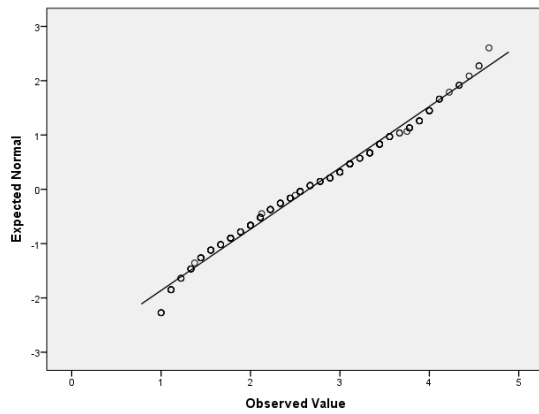


Figure 12

Q-Q Plot of boredom

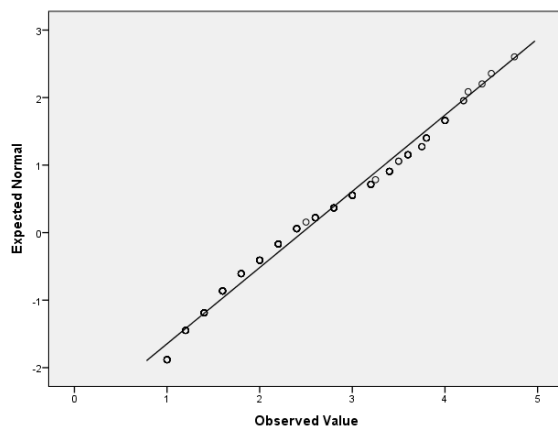


Figure 13

Q-Q Plot of anger

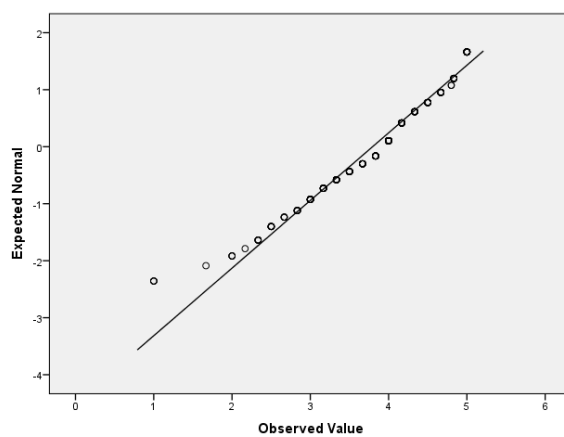


Figure 14

Q-Q Plot of relief

13.2 Appendix B

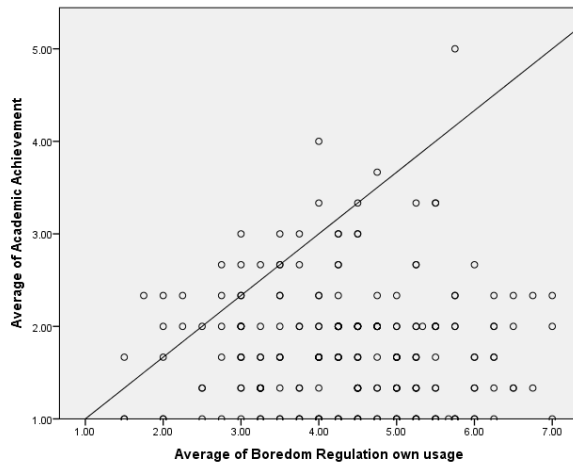


Figure 15

Scatterplot of academic achievement & boredom regulation use

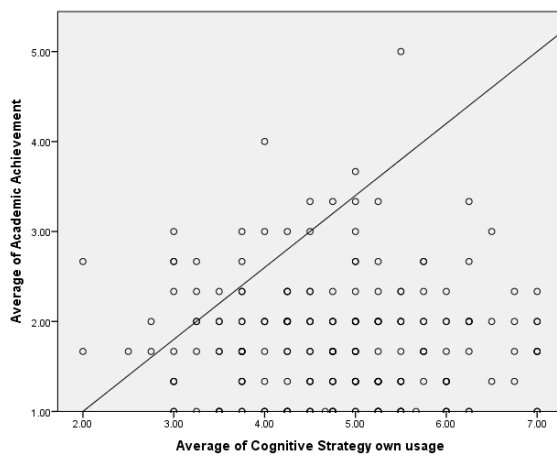


Figure 16

Scatterplot of academic achievement & cognitive strategy use

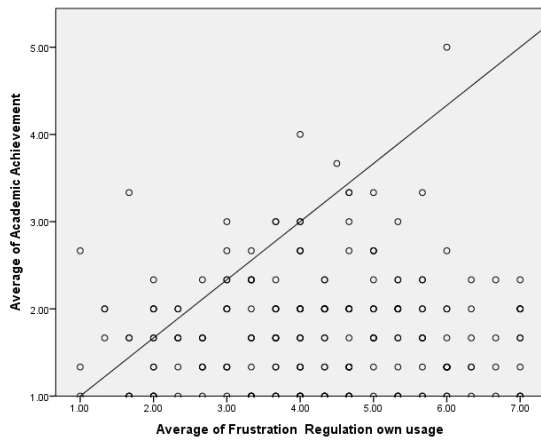


Figure 17

Scatterplot of academic achievement & frustration regulation use

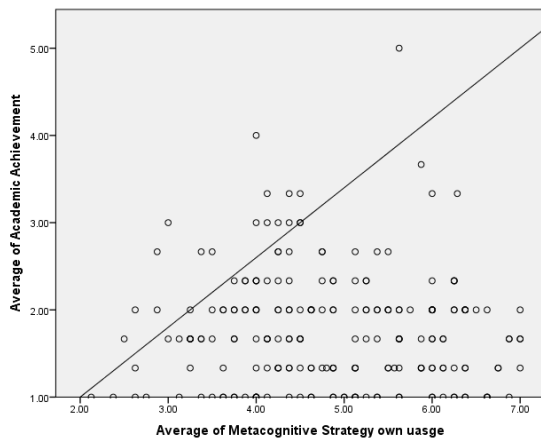


Figure 18

Scatterplot of academic achievement & metacognitive strategy use

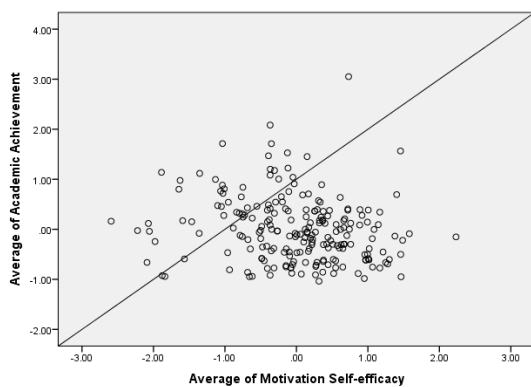


Figure 19

Scatterplot of academic achievement & self-efficacy

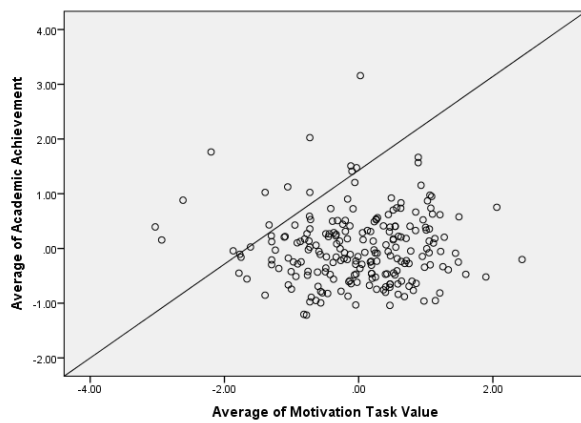


Figure 20

Scatterplot of academic achievement & task value

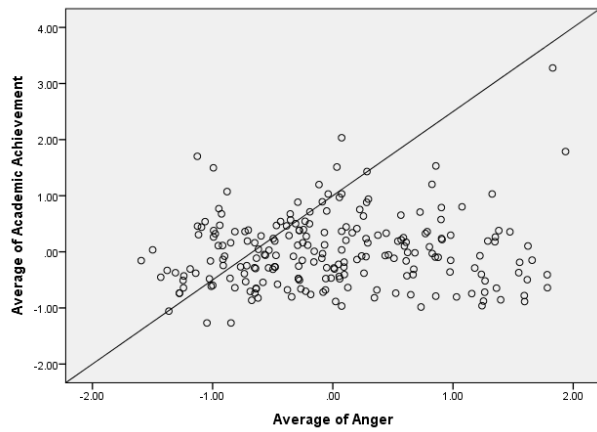


Figure 21

Scatterplot of academic achievement & anger

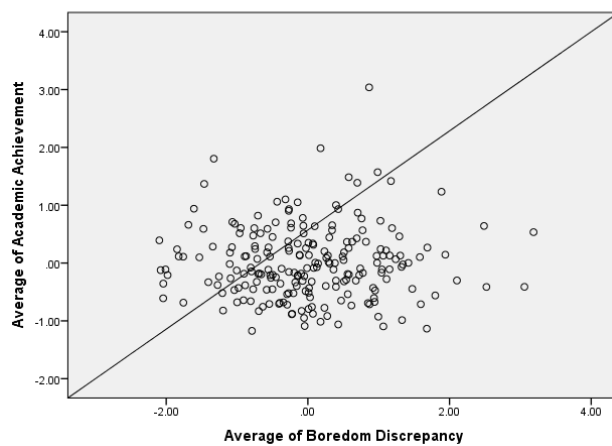


Figure 22

Scatterplot of academic achievement & boredom discrepancy

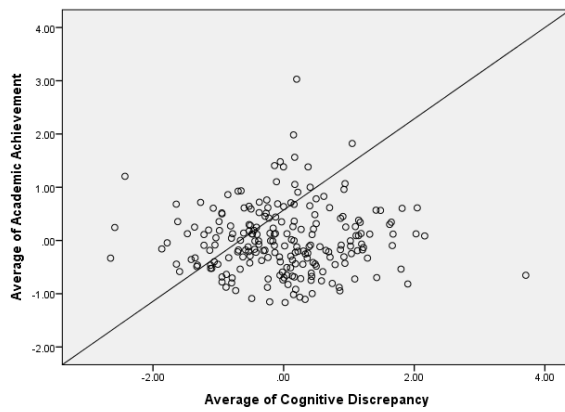


Figure 23

Scatterplot of academic achievement & cognitive discrepancy

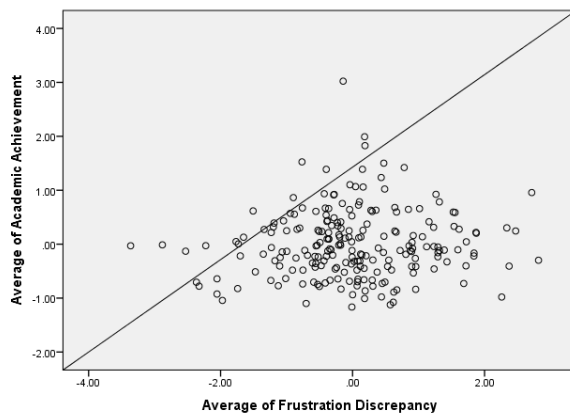


Figure 24

Scatterplot of academic achievement & frustration discrepancy

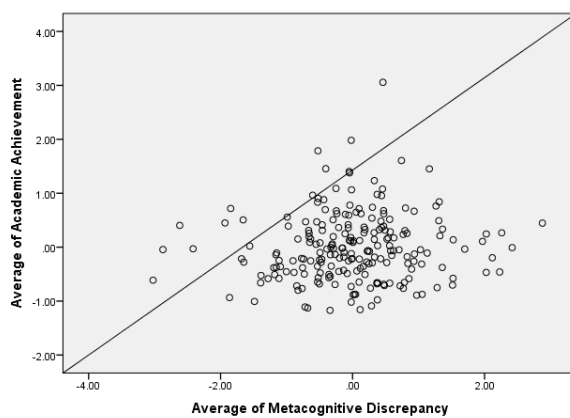


Figure 25

Scatterplot of academic achievement & metacognitive discrepancy

14. Abstract

The present study investigated the relationship between self-regulated learning (SRL) and students' academic achievements, while considering both motivation and emotion in the analysis. Two hundred and sixteen students from various countries and in different progress stages within their studies, completed online questionnaires assessing their self-regulated learning, motivation, emotions, and academic achievements. The study revealed that there were significant correlations between motivation (self-efficacy and task value) and various self-regulated strategy use variables including cognitive strategy use, metacognitive strategy use and boredom regulation use, indicating that motivation enhances SRL strategy use. Furthermore, positive emotions such as enjoyment and relief showed significant correlations with all four self-regulated strategy use variables (cognitive strategy use, metacognitive strategy use, boredom regulation use and frustration regulation use) and had a significant positive correlation with both motivational variables. In contrast, both negative emotions, boredom and anger, had a significant negative correlation with most of the self-regulated strategy use variables. Both negative emotions had a significant negative correlation to both motivational variables. Furthermore, both motivational variables had a significant negative correlation with all four self-regulated learning discrepancies indicating the higher the motivation of students the more focus on the activity is given and problem-solving skills seem to be utilised more often. Contributing to this finding, is that negative emotions had a significant positive correlation with SRL discrepancies, indicating that the more one experienced negative emotions, the more likely SRL strategy use were not applied. Anger and self-efficacy were the only two variables who predicted academic achievement. These findings enhance our understanding in that anger does not necessarily have negative consequences and may even contribute to enhancing motivation, positively influencing academic success. Motivation and specifically self-efficacy show that students with the confidence in their ability to learn and their belief that they are able to perform on a task and are responsible for their own performance, seem to succeed more often and attain academic achievements.

Die vorliegende Studie untersuchte den Zusammenhang zwischen Selbstreguliertem Lernen (SRL) und den akademischen Leistungen der Studierenden, wobei sowohl Motivation, als auch Emotion in der Analyse berücksichtigt wurden. 216 Studierende aus verschiedenen

Ländern und in unterschiedlichen Fortschrittsphasen ihres Studiums füllten Online-Fragebögen aus, in denen sie ihr SRL, Motivation, Emotion und akademische Leistungen bewerteten. Die Studie ergab, dass es signifikante Korrelationen zwischen der Motivation (Selbstwirksamkeit und Aufgabenwert) und der Anwendung verschiedener SRL-Strategien gab, die unter anderem Kognitive-, Metakognitive Strategien und Langeweile-Regulierung inkludierten. Dieses scheint darauf hinzudeuten, dass Motivation die Anwendung von SRL-Strategien fördert. Darüber hinaus zeigten positive Emotionen, wie Freude und Erleichterung, signifikante Korrelationen mit der Anwendung aller vier SRL-Strategien (Kognitive-, Metakognitive Strategie, Langeweile-Regulation und Frustrations-Regulation) und hatten eine signifikante positive Korrelation mit beiden Motivationsvariablen. Im Gegensatz dazu, hatten beide negativen Emotionen (Langeweile und Wut) eine signifikante negative Korrelation mit der Anwendung der meisten SRL-Strategien. Zudem hatten beide negativen Emotionen eine signifikante negative Korrelation zu beiden Motivationsvariablen. Des Weiteren hatten beide Motivationsvariablen eine signifikant negative Korrelation mit allen vier SRL-Diskrepanzen, was möglicherweise darauf hindeutet, dass eine höhere Motivation bei den Studierenden zu einem größeren Fokus auf eine lösungsorientierte Arbeitsweise führt und gleichzeitig diverse Problemlösungsfähigkeiten eher genutzt werden. Dieses wird auch mit dem Ergebnis bezüglich negativer Emotionen unterstützt. Negative Emotionen wiesen nämlich eine signifikante positive Korrelation mit SRL-Diskrepanzen auf, was ein Indiz dafür sein könnte, dass ein höheres Maß an erlebten negativen Emotionen die Wahrscheinlichkeit der Anwendung verschiedener SRL-Strategien verringert. Wut und Selbstwirksamkeit waren die einzigen beiden Variablen, die akademische Leistungen vorhersagten. Diese Erkenntnisse erweitern unser Wissen, dass Wut nicht zwangsläufig negative Folgen haben muss, sondern sogar zur Steigerung der Motivation und somit auch zum Studienerfolg positiv beitragen könnte. Motivation und insbesondere Selbstwirksamkeit lassen vermuten, dass Studierende, welche Vertrauen in ihre Lernfähigkeit haben, daran glauben eine Aufgabe meistern zu können und für ihre eigene Leistung verantwortlich sind, häufiger erfolgreich sind und akademische Leistungen erzielen können.