This is the final draft of a monograph written for The International Centre for Innovation in Education, based in Paris, and published by the ICIE in 2016, ISBN 978-0-9936134-8-7 in Ulm, Germany.

I must thank Prof. Dr Taisir Subhi Yamin of the ICIE for his kind invitation, and for efficiently bringing the project to fruition.

I must, of course, take responsibility for the views herein expressed.

In Two Minds:

The interaction of moods, emotions, and purposeful thought in formal education

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Preface

As a student, then teacher, then teacher trainer, pedagogical researcher and mentor, I felt that something was missing from studies of the teaching process. A lot of attention was given to food for the intellect, but something was missing. The answer, of course, is that there is more to thinking than the intellect. In all phases of education, there has been a tendency to see emotions only as impediments to purposeful thought, and something to be suppressed when purposeful thought was practised in the classroom. The reality is that there is no thought without emotion and what might be loosely called our two 'minds', the intellectual and the emotional, interact. This interaction, however, is not always bad: sometimes it supports thinking, sometimes it makes little difference to it, and sometimes it can be – yes – bad for thought. Here, I illustrate some ways in which the interaction can affect the kinds of thinking we try to foster in students, and I suggest that we should take these effects into account in formal education, in initial teacher training, and in professional development in all phases of teaching and learning. Emotions are not something to be ignored; they are an inevitable, even necessary, part of human thought, and people could not function without them. There are enormous opportunities for educators to make the emotional labour of teaching and learning more efficient and more effective by developing approaches which help our students' two minds work together productively.

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Abstract

An aim of this account is to show that, in teaching and learning, the intellectual system is not everything. Through some kinds of purposeful thought, commonly seen as worthy of development in the classroom and familiar to teachers, the account offers examples of how the emotional system can both help and hinder that thought, and, at times, be an essential part of it. A second aim is to illustrate, albeit briefly, that when the interaction between the two systems is ignored, classroom practices can act against the success of strategies intended to support learning and develop thinking competences. Finally, it describes how this interaction may be managed so that it supports teaching and learning practices. The need for further exploration of the classroom interaction of moods, emotions and cognition is mentioned, particularly where this leads to classroom strategies for its management. It is suggested that the interaction of the emotional and the intellectual systems should be taken into account when devising and testing intellectual strategies for teaching and for learning.

1. In two minds

Introduction

Apollo and Dionysus were two sons of the Greek god, Zeus. Apollo was master of the intellect and Dionysus lived by his emotions. The intellectual system protected Apollo's interests and the emotional system took care of Dionysus. For mortals, however, the two systems interact, often below the level of consciousness, and direct and shape thought and action. This has often been seen as bad for thought. Immanual Kant (1724–1804) saw emotions as an illness of the mind, a threat to reason, and something to suppress. This tendency may be traced over two and a half millennia (e.g. Nussbaum, 2001; Oatley, 2004)[1], and was reinforced by a belief in the supremacy of *homo sapiens* who was distinguished from other species by the presence of the intellect (Plamper, 2015). In formal education, proficiency in dispassionate thought is a highly prized mental ability; and so it should be, given its extraordinary success across the disciplines (Plamper, 2015). But, to ignore the interaction of moods and emotions with the intellect puts the quality of the intellect's products at risk and ignores the potential of the emotional system to make a useful contribution. While it is clearly true that moods and emotions can hamper thought, particularly when they are strong, they can also facilitate it, shape it, and make it more productive, effectively oiling the intellect's efforts (Newton, 2014a). Once seen as 'fickle and primitive', moods and emotions are now recognised as having a rationality of their own that plays an important part in managing our lives (Labouvie-Vief; 2015, p. 1). Here, I will briefly describe our two 'minds'– the emotional and the intellectual systems – and point to how they can interact, something I will describe later in more detail, before reflecting on some implications for practices in formal education.

The emotional system

We commonly talk of emotions, moods, and dispositions. Emotions are relatively short-lived, affective responses to specific situations or events (Mulligan & Scherer, 2012). Moods generally last longer than emotions; they may be their after-effects or affective responses to the current state of well-being (e.g. Hullett, 2005). Dispositions are long-lasting, affective tendencies in how we respond to the world (e.g. George & Zhou, 2002). According to appraisal theory[2] (e.g. Lazarus, 1991; Oatley & Johnson-Laird, 1996), the emotional system quickly, automatically, and often unconsciously, appraises situations and checks them for what it perceives to be a benefit or a threat. If it finds one or the other, it can prompt a response in support of self-interest. When the situation offers some benefit, the response may be accompanied by a feeling of pleasure; if it seems to threaten self-interest, the feeling may be a painful one of anxiety or fear (e.g. Pfister & Böhm, 2008). In evolutionary terms, this has survival value: when confronted by a wolf, the emotional system generally prompts

[1] Famously, David Hume, was of the view that: 'reason is and ought to be the slave of passion' (Hume, 1739/1978). Some other philosophers were inclined to think similarly (see, Pickavé & Shapiro, 2012).

[2] Appraisal theory has variants but these do not materially affect this account. For further information, see Keltner and Horberg (2015).

retreat – an action which clearly supports well-being. On the other hand, the sight of a friend is likely to prompt approach and feelings of pleasure: there is survival value in friendship. An appraisal of personal well-being, conscious or otherwise, may result in deep sadness at events of recent years, a sadness which, perhaps, prompts a career change or change of location. Dispositions may be innate or develop over time (or both); they behave like a homeostatic setting around which our affective systems operate. This account will be concerned with the more transient affective states associated with emotions and moods (Keltner & Lerner, 2010).

It has been many millennia since physical well-being and survival were the main determinants of what constitutes a benefit or threat. Even 3000 years ago, what mattered in some cultures included self-control, hospitality, respect for elders, loyalty to friends, and keeping one's word (Pomeroy et al., 2009). Change can benefit or threaten such values and beliefs and, as a consequence, can generate emotions. In the context of formal education, this happens at various levels (for example, in school, in the classroom, in the topic currently under study, in tests and examinations) and in personal interactions (for example, between students, between the teacher and student). A forthcoming test, for instance, can produce a disabling anxiety. Similarly, students often value how others perceive them and may be intensely embarrassed by having to demonstrate a skill. But not all emotions impede thought. Interest – the pleasurable anticipation of something of personal value – is motivating and prompts approach and engagement with a task. Emotional responses can also offer information about the progress of thought. A line of thought that promises to be fruitful can produce pleasure and encourage persistence.

Of course, students not only experience emotions while they try to learn but also bring moods and emotions with them. These can affect their thinking. Someone may arrive at the classroom feeling irritated, for instance. On engaging with the task, the irritation may be taken to indicate that the line of thought is ineffective and should be abandoned. Another student might arrive feeling mildly happy and engage creatively and willingly with the task. These are only a few of the effects which moods and emotions can have on thought (Forgas, 1995). They can hinder it, enhance it, and covertly shape it, often unconsciously. It is important to note that the processes of the emotional system are not, in themselves, 'irrational': the system simply takes as given those things that matter to someone, and then weighs events and situations against them. If what matters is sound, then the response may offer useful information.

The intellectual system

The conscious, emotionless processing of information is a matter for the intellectual system. Of course, much of the mind's processing is unconscious although important conscious management and processing takes place in what has been called working memory (Johnson-Laird, 2010). The intellectual system is generally much slower than the emotional system but its deliberations are potentially open to reflection and scrutiny. The American philosopher, Charles Sanders Peirce reminded us that we think for a purpose (see Poggiani, 2012). In the classroom, a lot of effort goes into exercising various kinds of purposeful thought, that is, thinking aimed at particular ends. It includes, for example, reasoning (as in the production of a valid statement from premises (Wagner & Penner, 1984)); understanding (as in the construction of relationships to form a coherent whole (Newton, 2012a); creative thinking (constructing novel mental products with a 'rightness-of-fit' for the situation, and preferably well-crafted and parsimonious (Glück et al, 2002; Newton, 2010a; Newton, 2013)); decision-making (choosing a prudent, promising course of action (e.g. Staudinger & Glück, 2011)); and evaluating the products of thought in order to produce a position on their quality or

trustworthiness (Newton, 2014a). These kinds of thought are not, of course, mutually exclusive; what distinguishes them is their purpose and an essential presence of thought that is characteristic of that purpose and gives it its name. Developing competence in kinds of purposeful thought like these is often seen as worthwhile, and the concepts are a part of classroom life and educational discourse in all phases of education (e.g. Harman, 2011)[3]. It makes practical sense, therefore, to look at the interaction of emotions and the intellect in terms of these kinds of thought, drawing out matters of relevance for teaching and learning.

The interaction of the intellectual and emotional systems

An event, such as a classroom activity, is perceived and the information transmitted to both the intellectual and emotional systems (figure 1.1). On reaching the emotional system, it is quickly appraised or evaluated for its relevance to matters of personal consequence, concern or vested interest. If one is perceived, its presence and nature (for or against) produces a rapid response. Substances are released into the blood stream which initiate and support that response, and produce feelings we associate with, for instance, anger, annoyance, frustration, disappointment, curiosity, happiness, joy, and euphoria. In the meantime, the intellectual system processes the information, but often more slowly. Its interpretation may contradict the emotional system's concerns, so the feelings may fade. If it agrees with the appraisal, it may, of course, reinforce the response. Sometimes, the emotional system may not perceive a matter of consequence until the intellectual system has thought it through. A growing realisation of a threat or benefit then spreads to the emotional system and produces feelings like those described above. At times, the intellectual system engages with the situation and finds a way of alleviating the threats or turning them to advantage; negative emotions and responses are then likely to subside.

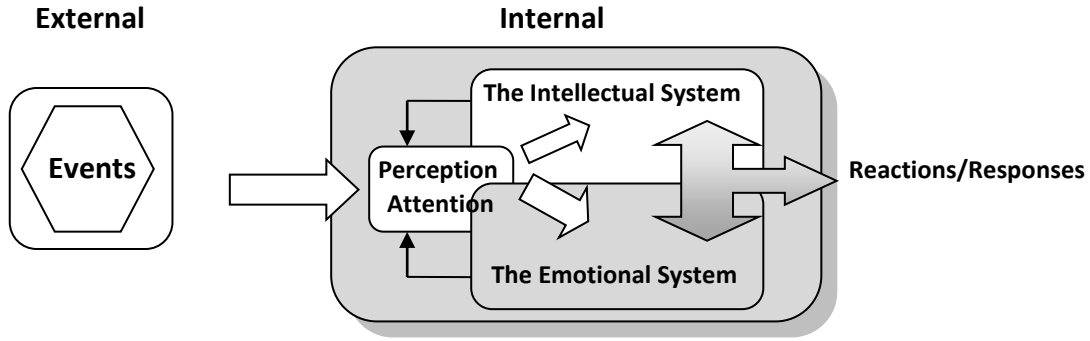

Figure 1.1: A model of a student's dual system for maintaining well-being: events are perceived, attended to, and judged for bearing upon goals, beliefs and values, leading to responses. The depicted overlap of the various systems is intended to indicate that, in neurological terms, they are not entirely separate. The emotional processing of information, however, may be privileged (LeBlanc et al., 2014).

[3]This may bring to mind the notion of 'critical thinking'. 'Critical thinking' has diverse definitions (see, e.g. Moseley et al., 2005). For some, it includes all 'good', purposeful thought or a general inclination towards 'constructive doubt' (e.g. Halpern, 1998; Hare, 2001). In this account, however, it is important to be more specific about particular kinds of thought: moods and emotions do not interact in the same way with all of them. At the same time, teachers, and the documents which direct their work, are specific about the expected kinds of purposeful thought, using terms like those used here, so what will be described may be related directly to teaching discourse and practice.

An encounter with a particular learning task may activate emotions which shape thought during the task (the so-called integral effect). At the same time, moods and emotions generated elsewhere are often brought to a task and these may have an effect on task-related thought (also known as incidental effects) (Forgas, 1995).

Elephants in the classroom

The interaction of emotions and the intellect in education has not received as much attention as might be expected (e.g. Adler & Obstfeld, 2007). John Dewey (1859–1952) is an early, partial exception in that he valued what emotions could do for motivation (e.g. Dewey, 1916). Piaget (1954/1981) similarly saw affect as 'energizing' and 'regulating' the intellect, using the analogy that affect (taken broadly to include the will or conation) is like the gasoline which activates an automobile engine: without gasoline, the engine does not function, and without emotion, there is no thought. He also believed that just as the gasoline does not modify the engine, emotions do not modify the intellect, although they can make it falter or stall. Recent studies, however, show that the emotions do more than activate the intellect: they can shape its processes and radically affect its products. Pekrun et al. (2002) have concluded that emotions in the classroom bear upon motivation, learning strategies, cognitive resources, self-regulation, and academic achievement. Such studies led Immordino-Yang and Damasio (2007) to point out that disregarding this interaction is a serious omission in education. Like it or not, teaching (and learning) is emotional labour and this needs to be recognised in planning and in teaching (Fried, 2011). Educational institutions are places where people and learning interact: people with people, and people with events. Threats to and benefits for vested interests abound, and have the potential to produce all manner of moods and emotions. Research on how to exercise the intellect and enhance the quality of cognition extends over a century and has rightly found its way into the classroom. Teachers consciously adopt specific activities because they know they exercise particular kinds of purposeful thought. But the moods and emotions which bear upon that thought generally receive little attention, other than, perhaps, in an attempt at generating interest. What is known about the interaction of the mind's two systems has yet to find its way into conscious planning for efficient and effective thinking (Newton, 2014a). Moods and emotions may still be ignored or dismissed as annoying obstacles to thought and learning. But these moods and emotions are still there and have their way with each student's cognition. The 'elephant in the room' is an idiom in English which refers to something clearly present but ignored as though it did not exist. Moods and emotions seem to be elephants in the classrooms: we know they exist but choose to ignore them or, at best, suppress them (Newton, 2014b). Instead, these elephants need to be recognised, discussed and put to good use.

Describing moods and emotions

Before continuing, a note about how moods and emotions tend to be grouped may be useful. They may, for instance, be grouped by hedonic tone or valence (positive, e.g. *joy*; negative, e.g. *sadness*), strength (moderate, e.g. *apprehension*; strong, e.g. *terror*), activation (activating, e.g. *anger*; deactivating, e.g. *serenity*), by an approach or avoidance impulse (an urge to approach, e.g. *interest*; an urge to avoid, e.g. *anxiety*), and by some combination of these (e.g. strength and tone, or activation and tone, simultaneously – note, however, that strength is often implied in the term, as in *happy* versus *ecstatic*, and *annoyance* versus *rage*). Some theorists prefer to treat each mood or emotion as essentially discrete and different in effect. For practical purposes, it can be useful to describe moods and emotions in different ways in different contexts. (For further elaboration, see, e.g., Baas et al. (2008), Leblanc et al. (2014), Pekrun and Linnenbrink-Garcia (2014).)

2. Emotions and engagement with purposeful thought

Introduction

I will begin with the phenomenon of engagement with purposeful thinking in formal education. Why do people do it? That emotions can motivate engagement and stimulate thought with events is well known. As already mentioned, it was central to Dewey's thinking about motivation in education. Since he felt the need to make it explicit, it may be that the teachers he observed did not give it much conscious attention at that time but, perhaps, this is less so now. Nevertheless, I will summarize the role of the emotional system in prompting engagement in purposeful thought and learning. To use Piaget's analogy, this is about the energizing effects of the gasoline in the engine. The gasoline can, however, be of the wrong kind, and then the engine stalls. Being motivated to engage must be contrasted with what is, for some people, a very powerful motive to disengage, namely, an expectation that their thoughts, skills and knowledge will have to be demonstrated or exposed in what I call 'public performance'. For these students, the prospect of public performance fills them with dread and may even prompt a panic-stricken withdrawal. First studied in the context of language learning, it extends to all areas of the curriculum where some form of public performance, interpreted broadly, is expected.

These two phenomena will serve to illustrate a general, but contrasting, approach-avoidance effect of emotions on motivation to engage with purposeful thinking. In later parts, I turn to those occasions when the gasoline's effects are more selective.

Motivation and engagement

Motivation is what more or less activates and sustains engagement with a learning activity (Reeve, 2001). Intrinsic motivation is generated by activities which seem to offer the satisfaction of personal psychological needs. It may come from a belief that the activity has the potential to satisfy, for example, a need to feel competent, to make sense of the world, to feel secure, to have control of events, or to explore and satisfy curiosity (Deci & Ryan, 2000). With extrinsic motivation, however, learning is instrumental in obtaining external rewards. Examples would be engaging with learning to obtain good grades in order to access a particular career, make parents proud, obtain material rewards, avoid punishment, or do better than a sibling (Newton, 1988).

There are various kinds of engagement with learning. In the classroom, intellectual engagement involving purposeful thought is generally what is expected, but it may also involve behavioural and physical engagement, for instance, to ward off boredom or experience some property or effect directly (Fletcher, 2005). Of particular relevance here is the emotional engagement in which a teacher tries to generate and attach rewarding emotions to the subject in order to make it a source of pleasure and to encourage further, intellectual engagement.

Such emotions can be shaped by the emotional behaviours of others. For instance, a teacher's enthusiasm is known to attract attention and engagement, increase on-task interaction with a topic, and lead to enhanced recall (Frenzel et al., 2009; Moé; 2015). It is as though the teacher's enthusiasm suggests to the student that the topic offers some satisfaction of a personal need (Newton, 2014a). Immediacy behaviour – when teachers reduce the physical and psychological distance between themselves and the students by, for example, moving amongst them in a relaxed way – can enhance students' mental ease, confidence, and learning (Richmond et al., 1987). Self-disclosure, when teachers (selectively and with moderation) reveal something about themselves that is relevant to the topic in hand, can have a similar effect (e.g. Downs et al., 1988). Such behaviours can make the emotional climate of a classroom (the collective, affective tone of the teacher and students) more conducive to engagement and learning (Brackett et al., 2011; Newton, 2014a). The importance of fostering a willing involvement in learning activities has given rise to pedagogies of engagement which consciously employ ways of motivating students (e.g. Mestre, 2005).

This illustrates that emotions arising from the promise of personal benefit, if strong enough, can activate motivation and engagement with thinking and learning broadly. But emotions can also impede engagement for some students, as is illustrated by the effect of emotions produced when students have to perform.

Performance emotions

Performance – demonstrating learning, skill, or ability publically – can be stressful because it is a threat to a student's public-image and self-esteem. It may be immediate, even unexpected (as when a student is called upon to answer a question or carry out a task in the presence of others), it may be initially private (as when the student sits a high-stakes examination) but has material consequences which affect, for instance, the achievement of a goal, such as a preferred career.

Most students want others to think well of them. Responding to a question in class has the potential to make a student look foolish, and so it threatens the student's self and public image. Not everyone reacts strongly to such a common classroom event but those who do can be so overwhelmed by it that they become embarrassed, tongue-tied, and unable to recall what they know, or to reason with it. For example, they become unable to construct rhymes and recall names. Crozier and Hostettler (2003) noted that such impediments can, collectively, adversely affect school grades. This effect has been fairly well described in the context of second language learning where emotions like embarrassment, anxiety, and shyness, have been called 'affective filters' or blocks to spoken language expertise (Er, 2015; Krashen, 1988; MacIntyre & Devaele, 2014). The feelings can be so intense that memory of their specific cause can last a life-time: one 8-year-old child whose second language was English, slipped into her first language in her haste to express herself and was laughed at by the class. She still recalled what was, for her, an intensely disagreeable event after some four decades (Swain, 2013). Adverse performance emotions are not, of course, confined to language learning but can occur in any subject where the student must perform in public. Emotions can effectively block their performance through a kind of stage fright; students come to dread a lesson, dislike the subject, and may drop it as soon as possible (Horwitz, 2010).

Tests or examinations can be a threat to a student's public and self-image but also to cherished goals which directly determine subsequent events, such as entry to a particular course, training, or career (He, 2013). When this is the case, they tend to be referred to as

'high stakes tests' (Pekrun, 2006). While a little anxiety can enhance performance, strong anxiety reduces it, as shown in the well-known, inverted U graph (figure 2.1). The aim is to have each student perform at the peak of the graph where the anxiety is just sufficient to make them focus on the task and treat it seriously.

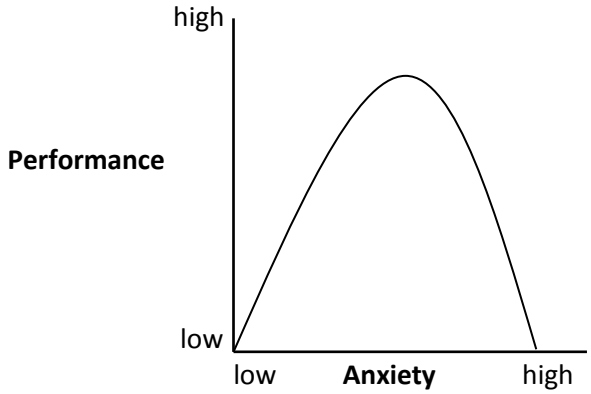

Figure 2.1: The effect of anxiety in performance

Pekrun and his colleagues (Perkun et al., 2009) identified *anticipatory anxiety*, occurring before the test, *situational anxiety*, occurring during the test, and *outcome* or *consequence anxiety*, occurring after the test (figure 2.2). Anticipatory anxiety can interfere with preparation for the test (and can be caused by a lack of effective preparation or putting off that preparation). As the test date approaches, it tends to increase. A high level of self-efficacy (a belief in a capacity to prepare effectively for such events) can alleviate anxiety (Cismas, 2009). Situational anxiety is reduced by knowledge of the test format and test procedures and by extensive practice before the event (Stipeck, 2002). Outcome and consequence anxiety grow as the date of the test result approaches (Putwain et al., 2010). They may be lessened by discussing possible actions if the worst happens (Newton, 2014a).

Before The Test After Post test result

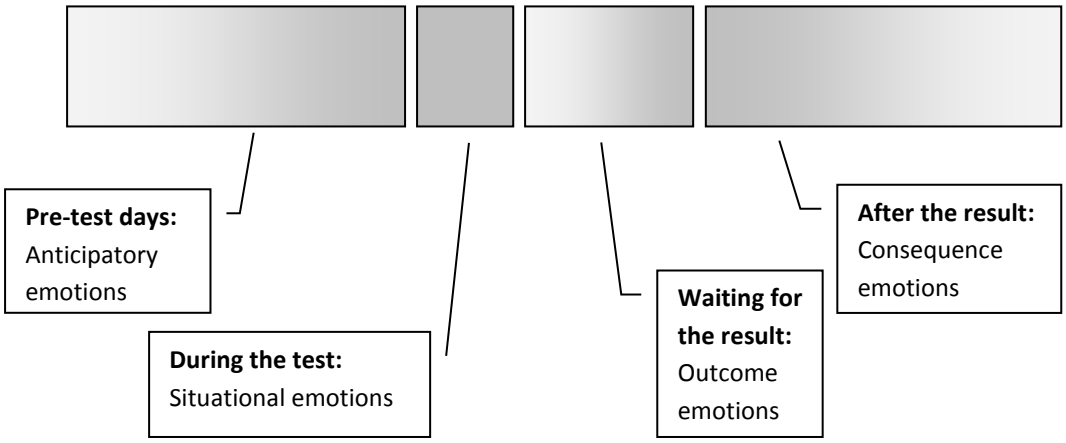

Figure 2.2: Anxiety before, during and after a high-stakes test: denser shading indicates increased anxiety felt by some students.

These serve to illustrate that, on the one hand, emotions can initiate and sustain purposeful thought, and, on the other, they can very effectively obstruct it.

In practice

Given the value of creating positive motivation in students, it is not surprising to find it listed amongst indicators of 'good' or 'best' practice in teaching. In all phases of education and all subjects of the curriculum, teachers are often urged to arouse curiosity and generate interest by relating topics to the students' world, develop competence and self-efficacy, offer affiliation using collaborative educational games, and provide autonomy in learning (e.g. Denis & Jouelot, 2005; Rasinen, Virtanen & Ikonen, 2012; Ladson-Billings, 1997; Sanders, 2012). Nevertheless, the frequency of articles which refer to motivation in practice suggests that it is not always easy to plan for or achieve. In part, this may be due to the wide spread of students' interests and concerns so that what motivates one student leaves another unmoved. Values, goals and beliefs also change with time and place so that particular approaches can become anachronistic, and may not be transferable between cultures.

The effect of emotions on certain kinds of performance, like speaking a foreign language, has also received some attention. But, at the same time, teachers are reminded that trying to transmit knowledge to passive students is not always the best way to foster learning (e.g. Straits & Wilke, 2007). As a consequence, they may do their best to make learning active and participatory. Unfortunately, this can be counter-productive for those students who are easily embarrassed, have stage-fright, or feel overly anxious as they wait their turn for public interrogation. This can be made worse by teachers who allow little time for thought, correct errors immediately as they are made, and interact in ways perceived to be discouraging and

lacking in empathy (Zarrinabadi, 2014). Active participation, however, really means mental participation and need not begin with public performance (Newton, 2012a). Digital technology may be able to offer some respite for the student by acting as a surrogate teacher and enabling private performance while still keeping the teacher informed of progress (e.g. Evans, 2009). It is important that teachers do not use teaching strategies without discrimination, whatever success has been claimed for them – what suits a student of one temperament may not suit another of a different temperament (Rothbart, 2012). Teachers who put their faith in broad generalizations about fostering thinking and learning may find themselves thwarted by individual differences.

Formal examinations are often unavoidable experiences but students can be prepared for them. Unfortunately, reminding students that everything hangs on the test is not the best way of allaying excessive test anxiety (Newton, 2016). Students may need strategies for examination preparation and frequent practice to increase confidence and desensitize them to examinations. Providing formative feedback is widely recommended as a worthwhile way of bringing about change in students' thinking and performance. Once again, it can be a double-edged sword as it can also make students drop-out (Race, 1995). Young (2000) found, in his aptly titled study, 'I Might as Well Give Up', that the scrutiny of performance can demolish self-esteem, especially amongst mature students. Some see what they do as, 'only work', but, for a few, a sense of self is at stake.

I now turn to the more subtle effects of moods and emotions on particular groups of purposeful thought.

3. Methodical and constructive thought

Introduction

Clearly, emotions can affect thinking as a whole, but the emotional system also has effects that are specific to particular kinds of thought. Some kinds of thought have much in common and may be loosely grouped into families. Two will serve to illustrate contrasting effects.

Methodical thought is one such family, characterised by a relatively strong presence of analytical, logical, reasoned, rigorous, systematic or step-by-step processing of information (Newton, 2015). Deductive reasoning, a process of logical inferencing to produce a conclusion from given premises or conditions, is an example (Colman 2003). Although classroom mathematics, the sciences, and philosophy tend to be seen as archetypes of this kind of thought, it is by no means confined to these. The evaluation of mental and other products to test their match with claims, aims, or criteria is another kind of purposeful thought which normally involves at least careful, systematic thought. For instance, this is commonly expected when technology students have to evaluate the effectiveness of a potential solution to a technological problem. Again, evaluation is often expected in other areas of the curriculum. Regardless of mood and emotion, methodical thought is fallible because people have limited mental capacity to hold and manipulate variables, to apply and sustain mental effort, and to construct and explore alternatives (Johnson-Laird, 2010). It often calls for an analysis of ideas, and the careful thinking through and checking of a chain of reason. It can also suffer from bias. For instance, the evaluation of a research report can be subject to the prevailing climate of criticism (which tends to be negative in the West), bias against novelty, bias towards the confirmation of a reviewer's beliefs, opposition to what challenges those beliefs, and, surprisingly, a favouring of obscure exposition (Newton, 2010b). The process of making an inference (*if this is true, then it follows that this must also be true*) can be supported with questions that direct attention to what matters, and prompt or guide students to adopt a careful, systematic approach (Newton, 2012a). Having students work together can also support methodical evaluation, perhaps because collectively, the students' mental skills are greater than those of one student alone (Gokhale, 1995).

Constructive thought is another family of purposeful thought, characterised by a relatively strong presence of connection-making, relationship-finding, or imaginative synthesis to fuse information, knowledge and ideas into meaningful, coherent wholes (Newton, 2012a). Understanding, a much valued outcome of education, is an example. In the constructivist paradigm, it involves mentally building models of aspects of the physical and mental world (Johnson-Laird, 2010). Often, the teacher wants students to make connections which reflect those generally approved by the discipline's community, but, in some contexts, the teacher will encourage more idiosyncratic, personal understandings (Newton, 2012a). In creative thinking, for example, the emphasis is on constructing personal 'understandings' through what is commonly called imagination, the connecting of seemingly unrelated, dissimilar, or mentally distant pieces of information and ideas. These personal constructions may, more or

less tentatively, express something about the world, or solve a problem. From this perspective, understanding, creative thinking, inventing and problem solving, have something in common, and show an increasing emphasis on novelty (at least for the student) as understanding becomes creative thinking. Understanding and kinds of creative thinking are often expected in many areas of the curriculum (Newton, 2012b). To support understanding, teachers may have students recall and develop prior knowledge and draw attention to what is to be connected. One strategy is 'forced prediction' where students are asked to predict what will happen next or in certain, given circumstances. To answer meaningfully, they must construct a mental model and manipulate it appropriately (Newton, 2012a). To be creative, students may need to explore the situation or problem and tentatively try mental connections in an informed way (Newton, 2012b).

This is not, of course, to say that these examples of purposeful thought from the classroom cannot also involve other kinds of thought, but, to the extent that they exercise thought that is methodical or constructive, they can illustrate some contrary influences of moods and emotions.

Careful, methodical thought

It will not be surprising to find that strong emotions generally impede methodical thought. They tend to take up mental resources and, as a consequence, what is meant to be careful, focused thought becomes erratic, inefficient, less thorough, and, hence, more prone to error (Blanchette & Richards, 2010). Depression, with its tendency to dwell on the past and revisit unhappy experiences, also tends to distract the mind from the task in hand and displaces on-task methodical thought (Martin & Kerns, 2011; Stollstorff et al., 2013). But, at the same time, some positive moods, like a state of joy, tend to lower performance in the systematic reasoning processes of deduction. Such positive moods tend to encourage a broader kind of thinking which avoids detailed processing and engages better with generalities than with particulars (Blanchette & Richards, 2010).

Calm and mildly negative moods, like feeling a little sad, however, can *support* methodical thought and systematic reasoning. They help the mind focus attention on details, and take pains over analysis, often essential in deduction and evaluation. As a result, those feeling sad are likely to take fewer moves to solve a logical puzzle than happy people (Badcock & Allen, 2003). When evaluation is called for, someone in a happy mood can overlook errors and *non-sequiturs* that they would otherwise note if they were in a sad mood (Strain et al., 2012). Systematic thought needs, as Andrews and Thompson (2009, p. 620) have put it, 'analytical rumination', which makes 'feeling blue' somewhat useful at times. Systematic reasoning is likely to be sounder when in a slightly negative frame of mind. Subdued, somewhat sad moods tend to reduce distraction and focus attention on detail.

Carefree, constructive thought

Moderately positive moods, like being happy, tend to support the noticing of patterns, connections and relationships, that is, the construction of understandings and their application in new situations (Clore & Palmer, 2009; Um et al., 2012). It seems that feeling moderately happy suggests to the would-be thinker that the situation is safe to explore and allows mental resources to seek connections and construct explanations. It is as though there is a mental relaxation which, according to Fredrickson and Branigan (2005), supports a broaden-and-build mode of thought. Moreover, if understanding is slow to develop, happy people are more likely to widen their thinking and search for additional information to support the process (Gaspar & Zawadzki, 2012). The broaden-and-build mode of thought is especially well-

suited to creative thinking, problem solving, and invention because it encourages flexible thinking, experimentation, 'playing' with ideas, and 'what if' thinking (e.g. Fredrickson, 2004). Negative moods, however, can reduce the sensation of mental safety and narrow attention, at times inhibiting creative thought. However, in a long task, those who are happy may be less persistent than those who are sad and can be less critical of potential solutions (Schwartz & Clore, 2003). In addition, intense positive emotions like ecstasy may also obstruct constructive thought.

These specific and opposing effects of moods and emotions on purposeful thought may be something teachers accommodate in the flow of their teaching, but they may not be a matter for planning and forethought about lessons. Depending on the kind of thought and the prevailing moods and emotions, teaching strategies can, in practice, be counterproductive and even self-defeating.

In practice

These two, loose families, largely distinguished by their essential kinds of thought, are unlikely to be mutually exclusive in practice. As the train of thought shifts from one mode to another, helpful moods and emotions may become hindering moods and emotions, and *vice versa*. For instance, creative thinking, problem solving, or inventing may, at some point, call for an evaluation of ideas. Constructive, inventive thought can benefit from a moderately happy frame of mind but evaluation is probably better in a more neutral or even sad frame. If evaluation is initiated too soon, it could stifle creative thought. Those who try to blend the two kinds of thought may end up with no ideas to evaluate. (Some students may be predisposed to do this anyway and abandon an idea before its potential has been explored. There can be times when it is useful to suppress destructive doubt, and suspend disbelief.) Creative thought can also be stifled by urgency. When time is short, teachers may continually press students to complete the task. It can make the prevailing mood negative enough to curtail constructive thought and defeat the purpose of the activity. This suggests that shifting between and blending or integrating families of thought may need careful handling. In particular, the stream of affect needs to be managed, or the sequence of kinds of thought adjusted to suit the flow of affect (Newton, 2010a).

Popularly, being happy is seen as the 'correct' state of mind (at least in the West). Accordingly, experience in formal education is assumed to be good if students are 'happy' in their work. If this means forever striving for a state of continuous euphoria then it would defeat purposeful thought. Even striving to make students perpetually joyful might do little for the productivity of methodical thought when a quiet, contented mood would be better. Temporary dysphoria is a part of life and, it has been argued, has evolved because it serves a useful function in signalling that there is something about a person's well-being which needs attention. Moderately negative moods can focus attention, reduce false memories, improve judgment, reduce gullibility, reduce stereotyping, increase fairness, and make interpersonal interaction less likely to cause offence. In addition, moods and emotions can offer information so that they indicate when a train of thought seems to be unproductive and, hence, prompt the thinker to try a different approach. Conversely, positive feelings can indicate that the train of thought is making progress (Newton, 2014). In other words, moods and emotions, including the unpleasant ones, can be adaptive in some circumstances (see, for instance, Forgas, 2013). In short, as Frijda (2004) has put it, the mind has not evolved for happiness but for survival, and emotions, both positive and negative, can usefully serve that end.

Pedagogical research has identified ways of exercising the intellect but has tended to ignore the potentially confounding effects of the emotional system. We need to know under what conditions strategies are at their best. There is also a need to recognize that generalizations, at least about thinking and learning, have to be hedged with qualifications, limitations and conditions: students vary and, in this context, this means in the nature and intensity of their incidental and integral moods and emotions. One kind of lesson does not suit everyone and individual differences need to be planned for. Research now needs to turn to ways of bringing the two systems together in mutually supportive ways and to disseminate the findings amongst teachers at all stages of education. There is, however, another role of the emotional system in purposeful thinking, one which will be exemplified by the process of decision-making.

4: Decision-making

Introduction

I now turn to a kind of purposeful thought which is, arguably, the most important as it can determine the trajectory of someone's life: decision-making (e.g. Kaufman, 2009; Milbank, 1996). Decision-making is the selection of an action (mental or physical) from alternatives (including the option of inaction) to achieve a goal (e.g. Beyer, 1991). The process of decision-making can involve both methodical and constructive thought so it is open to the same effects of moods and emotions as they are. This is not, however, at the centre of interest here. Instead, attention will be on emotional responses which narrow or select from an otherwise wide field of choices and offer information about options which may facilitate the decision. Decision-making is a kind of purposeful thought where the emotions do more than pour oil or throw sand on the cogs of the intellect: they can take an active part in the decision-making process. Decisions, of course, may also affect others, so they can be fraught events which call for a careful consideration of consequences. The development of proficiency in decision-making offers support for an effective and considerate navigation of life's demands and opportunities (de Swardt, 1998), and UNESCO sees it as a basic learning need of the twenty-first century (Delors, 1996). Here, I will describe potentially enabling roles for the emotional system in personal decision-making and comment on some educational practices.

Personal decisions and emotions

Models of decision-making can give the impression that the exercise is a purely intellectual one of computation to find the logically best alternative. Once again, there is more to decision-making than the intellect (Kahneman, 1991). Note, for instance, how many people ask themselves how they *feel* about a particular opportunity.

How do I feel about it?

The emotional system evaluates situations for what it perceives to be threats and benefits to matters of personal consequence. Matters of personal consequence include values. Values can be seen as beliefs and goals to which some personal importance is attached. Someone may value family relationships for the security they bring and want to maintain them. In the process, the means of maintaining contact with the family has instrumental value. Even when the goal is avoidance, what avoidance offers is perceived as more valuable than what acceptance brings. Values may also amount to ideals, as when believing that compassion, honesty and reliability are personally important. We may also value our self-image and the judgments others make of us so we seek to defend and promote them. Goals are similarly valued ends which we pursue, as when striving to enter a particular career. In the process, success in examinations that make it possible becomes valued. Many matters of personal consequence are acquired informally, often in childhood from family, friends, the media, and experience. These become so well-integrated in the mind that they may sink below the level of awareness and direct actions without being readily open to scrutiny. Some matters of consequence, when in competition, have priority over others, but priority can be a matter of expedience (Jary & Jary, 1995). For instance, some theology students who valued

selflessness ignored someone seeking help as they hurried to an examination (e.g. Harman, 2009). Values may also change with time. For example, Pinker (2011) showed that life is more highly valued in the West than it once was. Patriotism, on the other hand, is a value which tends to wax and wane. Given the need to solve the same problems of living together, it is not surprising to find some values common to diverse cultures. Schwartz (1994) found that achievement, power, benevolence, tolerance, security, conformity, and excitement were valued in many societies (although not always to the same degree).

When the decision-maker reflects upon options, the emotional system quickly sets them against such values, and generates emotions reflecting threats or benefits to them. These emotions vary in strength and hedonic tone. The decision-maker notices them as 'good' or 'bad' feelings of an intensity which reflects the magnitude of the threat or benefit. This may then prompt acceptance, rejection or indifference to the options. Just because it comes from the emotional system, it does not mean that the judgment process itself is necessarily irrational. The emotional system takes the decision-maker's values, beliefs and goals as givens and weighs the options against them. Given that values, beliefs and goals are often only partly conscious, the information offered by emotional responses is potentially useful in quickly filtering options that are unacceptable and highlighting those that are welcome (or unwelcome). It is as though the emotional system expedites decision-making by focusing on what matters to the decision-maker, weighing often disparate values, and quickly responding with: *This is how you feel about it* (Pfister & Böhm, 2008). In this way, the emotional system provides 'a rudder to guide judgment and action' (Immordino-Yang & Damasio (2007, p. 3). Nevertheless, the rudder is only as good as the decision-maker's values, beliefs and goals, some of which may be ill-founded, maladaptive, or unacceptable to the host society (Haselton & Ketelaar, 2006).

Mistaken information

Unfortunately, moods and emotions may be brought to decision-making from elsewhere and mistaken for the answer to: 'How do I feel about it?' Imported feelings of happiness, for instance, may be taken to indicate that a particular option benefits the decision-maker. This can lead to incautious, reckless decisions or, at least, slow the process while imported emotions are differentiated from those generated by the options (Newton, 2015; Scheibehenne & von Helversen, 2015). At times, other people's emotional responses, reflecting their own enthusiasm or caution, can also be substituted for an uncertain response by the decision-maker, sometimes unwisely dispelling uncertainty and doubt (Parkinson & Simons, 2009).

Wise decision-making

Decisions vary in how much they are of concern to the decision-maker but also in how much they affect others. Figure 4.1 depicts a simple division of such decisions to illustrate the point. In quadrant A, decisions are of little personal consequence to the decision-maker and to others. (Perhaps the choice of a coffee mug from a collection of similar mugs might fall in this category.) In quadrant B, decisions matter to the decision-maker but not much to others. (At times, which sweater to buy is an example.) In quadrant C, the decision matters greatly to someone else but may be of little long-term consequence to the decision-maker. (The gaol sentence passed by a judge may be an instance.) In quadrant D, the decision matters a lot to the self and another person. (Deciding to accept employment in a distant city could greatly affect a spouse and the children.) In reality, of course, the quadrants do not do justice to the rich and personal nature of decisions and values: the variables are continuous so sharp

boundaries do not exist, and only the decision-maker can know how much something is valued – even a coffee mug may have sentimental value for someone.

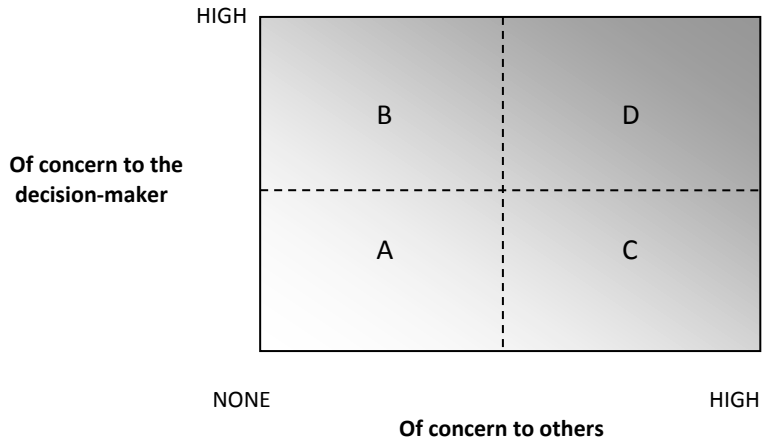

Figure 4.1: A simplified view of the personal decision space according to the perceived personal consequences of a decision.

Not only are decision makers' lives determined by their decisions, often irrevocably, but so are those of others. Many societies expect decision-makers to show an awareness of this, and to factor this into their decision-making so that decisions do not unnecessarily threaten the well-being and freedom of others, recognizing that people must live together relatively harmoniously. This can call for some empathy on the part of the decision-maker, and it also calls for a willingness to recognise the information offered by the emotional system, and to interrogate its basis.

In practice

We make an enormous number of decisions in a lifetime and we may learn from that experience but competence may not be high and may not use information on offer to its best advantage. Competence in this valuable life skill may, however, be developed through practice (Beyer, 1991). Nevertheless, having a choice is not always welcome; decisions are avoided or become anxious, unhappy events. Particular mental states, like depression and the rumination associated with it, can impede decision-making and lead to a lack of confidence in the choice, should one be achieved (Van Randenborgh & Jong-Meyer, 2010).

There is a history of teaching about decision-making, particularly for use in the workplace (e.g. in medicine, business, and in the making of military strategy). In such contexts, decision-making may be seen largely as an intellectual exercise (Slovic et al., 2005). The model of Weiss et al. (2009) gauges the value of each outcome, its likelihood and salience, and, hence, identifies the option with the maximum utility. In effect, the arithmetic indicates the best course of action. Applying this intellectual process to personal decision-making is often not feasible as probabilities may not be readily quantifiable, and there is rarely the time, ability, or inclination to engage in processing them (Zeelenberg et al., 2008). Disregarding the emotional system ignores its processing capabilities, risks overlooking unconscious values, and may produce decisions which are inappropriate for the decision-maker. The emotional system may offer help by producing 'inclinations for action that, in a given situation, most adequately serve current strivings', something which is popularly referred to as intuition (Zeelenberg et al., 2008, p. 24).

To support the teaching of decision-making, the 'informed intuition' model of Thagard (2001) allows this intuition to be the final arbiter in the decision-making process. According to Thagard, people should consciously inform the process of decision-making by clarifying the situation and then arrive at an intuitive judgment about the best course of action. This approach, however, seems better suited to adults with, amongst other things, experience, relatively stable and adaptive values, and, on occasions, some ability to decentre and see a decision from the point of view of those most affected by it. Children and young adults do not always have stable, adaptive values, beliefs and goals. If they were to rely entirely and blindly on their intuition, they could find themselves with decisions which inappropriately shaped their lives and which they later regretted. Perkins (2009), reflecting on young people's decision-making, takes a different view. He suggests that some decisions are better taken by logic and others by intuition. For instance, where there are no vested interests, choosing amongst tentative solutions to a technological problem may be made a matter of logic (de Swardt, 1998). Deciding on a career, however, is likely to involve personal values, beliefs and goals, so it could be something for intuition. Putting aside young children's ability to dichotomise situations in this way, situations may not be so conveniently divided into those for purely logical and those for purely intuitive decisions. Dichotomization could result in ignoring potentially useful information from either the intellectual or the emotional system.

To add to the problem of developing competence in decision making, some teachers can be reluctant to discuss matters of values, beliefs and goals with students (e.g. Åstrand, 2014; Carnegie, 2003). Parents may also see this as threatening values they want to teach their children, and some cultures may interpret it as being against personal freedom and the aims of a liberal education (Patterson, 2015). Instead, some underpinning skills may be developed (such as methodical thought) and awareness raised (as of 'national values'), but the parts may not be brought together and exercised (e.g. Veugelers (2000)).

Taking all together, what could be the most important kind of purposeful thought, decision-making, could have a difficult time in the classroom because teachers may be nervous about discussing personal values, they may lack a decision-making model to guide their teaching, and may be unaware of the potential role of the emotional system

5: Emotional design

Introduction

With these exemplars of purposeful thought, I set out to demonstrate that the interaction of moods, emotions and the intellect is likely, it can be helpful, and it can even make a useful contribution to the intellect's efforts. Contrary to popular belief, the emotional system is not, itself, irrational, but takes as given personal values, beliefs and goals and applies them to situations accordingly. The information offered by the intellectual and emotional systems may not always be sound but it should not be ignored. That tendered by the emotional system can draw attention to those semi-conscious matters of consequence which need to be weighed for relevance and soundness. I suggest that a productive partnership between the intellectual and the emotion systems is possible in the classroom without threatening the integrity or quality of purposeful thought; it may, in fact, be possible to enhance its efficiency and effectiveness. If Microsoft® can patent a system, however rudimentary, to detect a user's emotional responses, and take action to ameliorate what it assumes are unwelcome effects (Lloyd, 2015), surely a teacher, with a reasonable amount of understanding, forethought, empathy and sensitivity, should be able to do better[4]. In this section, I describe a way of capturing the notion of making an emotion-intellect partnership productive and describe some strategies for establishing such a partnership.

Emotional design

Plass et al. (2013, pp. 2−3) were interested in maximizing the effect of multimedia teaching materials and saw the value of enlisting the emotional system to support the effect of their instructional design. Their materials presented information in ways which activated the emotions. For example, they used anthropomorphic, cartoon-like figures to depict processes. This provision of food for the intellect, combined with food for the emotions, they called *emotional design*. Although the notion applied to a specific context, I believe it is a term which deserves to be used more generally to describe the making of fruitful partnerships between the intellectual and emotional systems in the classroom. How might a teacher go about emotional design in this broader way? Looking first at the place where the teaching takes place: few teachers can design the room where they teach, or choose its furniture, but they may be able to organize it formally or informally and set up displays which favour particular emotional climates (McGee & Fraser, 2011; Reyes, et al., 2012).

Forethought is next. When teachers plan to exercise purposeful thought, they correctly give attention to exercising the intellect. But, this forethought needs to be shaped by consideration of what will foster student engagement. For instance, learning activities need to offer some satisfaction of students' goals and psychological needs. It may be tempting to rely on the

[4] Returning briefly to the fostering of an across-the-board disposition towards critical thinking (Halpern, 1998), good thinking (Harpaz, 2005), or constructive doubt (Bertrand Russell, in Hare (2001)), perhaps students themselves should learn to reflect on the effects of moods and emotions and the information they might offer.

practical utility of the learning but much that must be acquired in formal education does not have an immediate or obvious use. An excessive reliance on utility can make motivation more difficult when students must engage with activities that simply pave the way to other thoughts. Of course, engagement with a task is not always immediately fruitful: interest does not guarantee productive methodical or constructive thought or decision-making. Tugade and Fredrickson (2007) have also pointed to the value of resilience – an ability to recover from negative emotional experiences and re-engage with a task, perhaps in a different way. To that end, they recommend cultivating positive emotions or, at least, reducing those that are negative.

Planning also involves anticipating negative responses to public performance and providing ways of engaging students in, say, practising a second language without gratuitous exposure to public scrutiny. For instance, there are some indications that using digital technologies which allow students to talk freely on their own can help (Evans, 2009). It is not, however, desirable to shield students entirely from public performance, but that exposure needs to be managed, perhaps by slowly increasing it in an attempt to develop some emotional immunity to it. This applies equally to high-stake tests which are often unavoidable. There are also implications for teachers' behaviours, some of which may produce unproductive moods and emotions in students. Humour can have a place in altering the emotional climate (and in making an intellectual point) but it can be overdone. Students may find maintaining a state of hilarity to be more attractive than the task in hand. Some teachers feel a need to control events so closely that the emotional climate discourages a free exploration of ideas. For instance, a teacher may unconsciously develop unsympathetic class management practices, and then need great self-control to break the habit when the emotional climate needs to be more amicable (Galinsky, 2010).

Forethought also needs to consider the emotions which could support productive thought during an activity (and also students' maladaptive emotions which are likely to hinder that thought). Emotional design entails thought about how favourable moods and emotions will be encouraged, and those that are unfavourable will be discouraged. At its simplest, a teacher might nudge moods in the desired direction through choice of activity, behaviour, and the nature of interpersonal relationships. Figure 5.1 depicts a theoretically supportive stream of affect in some hypothetical teaching session which calls for some creative thought.

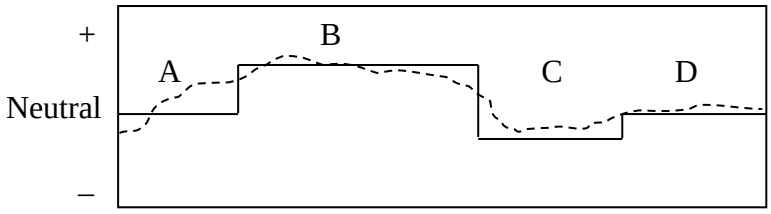

Figure 5.1: A desired stream of affect, progressing from left (start) to right (conclusion) in a lesson. The solid line is the desired stream of affect; the broken line is the track of the prevailing, emotional, classroom climate.

During A, the students are given their instructions, for which a fairly neutral mood may be seen as appropriate. During B, a period when the students are to be constructive, a lighter, more positive mood may be useful. After this, an evaluation of ideas is expected (C). This more methodical thought is expected to benefit from a neutral, calm, and even slightly low mood. To conclude, the students must collect and present their ideas (D), for which a more cheerful mood may be seen as appropriate, and also one with which to end the session.

Students, of course, do not arrive free of moods and emotions but bring them with them. (In this session, they arrive in a slightly negative frame of mind, indicated by the broken line which begins below the neutral point. From this initial state, their moods and emotions develop and change in response to the teacher, the topic, the task, the environment, and others students. In this instance, the teacher wishes to raise the mood to what is more conducive to creative thinking. During the introduction (A), the students are attracted by the teacher's enthusiasm and feel quite positive about the task, which helps them think freely and constructively to generate ideas (B). But during C, the teacher calms the class and lowers the prevailing mood. During (D), the teacher raises the emotional climate by modelling and accepting a slightly more relaxed classroom atmosphere. People and contexts vary; teachers familiar with their students, the topic, and the context are likely to know when and what kind of emotional design is needed. When it is needed, what might they do?

Influencing a stream of affect

There are various ways of influencing a stream of affect, some being more feasible in teaching contexts than others. They may be divided into those that are applied by the teacher (external influence) and those used by some students to regulate their own moods and emotions as they perceive the need (internal influence). For example,

- *External influence*
    - Potential actions taken by teachers

  There are behaviours which people adopt in social situations which experience has taught can make moods and emotions less negative. These include listening, sympathising, praising, joking, highlighting the positive side of events, and distracting attention from the source of the negative emotion. At least on a one-to-one basis, these probably have some useful effect (see, for instance, Goodwin & Judd, 2005). Similarly, behaviours which induce negative moods and emotions are those associated with criticising, ignoring, mocking, and being aggressive (Niven et al., 2007). Expressive behaviours, such as posture and facial expression, can also influence moods and emotions. For instance, a slumped posture may produce feelings of sadness; a taut posture with clenched fists may produce anger, while leaning back with face covered by the hands can lead to feelings of fear (e.g. Flack et al., 1999; Laird & Lacasse, 2014). Facial expressions and body language may be noted and understood in a quarter of a second (Martinez et al., 2015). Adjusting the pace, rhythm and pitch of the voice can also change moods and emotions (e.g. Hatfield et al., 1995). Adopting a more even, quieter and slower discourse, for instance, has a tendency to reduce the intensity of emotions and move them towards a more neutral level. Increasing the pace and injecting a note of excitement, on the other hand, indicates enthusiasm. (In excess, it can, of course, make a teacher look foolish and be the object of derision – not an emotion which most teachers would want to produce.) Emotions of other kinds can also spread through a classroom: teachers must be aware that they can influence the emotional climate unintentionally by their unconscious expression, posture and demeanour. (Students admired by their peers can similarly influence the emotional climate, but not always in the desired direction (Delvaux et al, 2016)). Of course, the need for a particular frame of mind need not be a secret. Informing students of the value of an appropriate mood or emotion at the time when it is needed could be a useful lesson in itself.

- Potential actions taken by researchers

Researchers who investigate the effects of particular emotions need to induce them as needed. For instance, sometimes they offer small gifts to generate a positive mood. They may also induce moods using cartoons and film clips showing happy or sad events. Even having people imagine such events in their lives can alter the existing mood. Social interaction and distraction through a change of activity can break the hold of an existing mood (e.g. Dosseville et al., 2012). Note, however, that there can be gender differences in susceptibility to particular strategies. Men, for instance, tend to prefer (and choose) distraction and activities they find pleasurable to change sad moods and alleviate boredom; women have shown a preference for social activities as a way of changing moods (Thayer et al., 1994). Actions, whether by the teacher or researcher, are likely to be more effective if used in combination (Thayer et al., 1994). Those who are seriously emotionally disturbed, however, are better cared for by the professional medical services (Wagner, 1995). Any intense moods or emotions that have been induced should be effectively reduced in participants before they leave the investigation.

- *Internal influence*
  - Potential actions taken by students

Ideally, students would take actions which adjust their own moods and emotions to suit the situation. In addition, people often have personal coping strategies which moderate strong emotions and unpleasant feelings (for example, counting to ten when angry) (Pekrun et al., 2002). Young children may be helped to practise such strategies through role play (Lillard et al., 2012). Teachers and counsellors may be able to teach students how to adjust their moods, particularly when these impede thinking and learning. For instance, children of about 11 years of age were taught 'optimistic thinking skills' and saw them used by their teacher and practised them. There is evidence that the programme improved their ability to cope with problems (Cunningham et al., 2002). Physical exercise has been found to make moods more positive (Hogan et al., 2013; Kubesch et al., 2009) but note that exercise can also make students respond more strongly to positive and negative feedback (Turnbull & Wolfson, 2002). Relaxation techniques, meditation and mindfulness training can lessen feelings of anxiety and stress (Chen et al., 2012; Garland et al., 2015). Mindfulness is a state in which attention is continuously focused on the present moment. It can promote well-being in young and old, and it can be taught (Brown & Ryan, 2003; Mendelson et al., 2010; Napoli et al., 2005). This can be of particular relevance when working with 'mature' students, those who return to education after some years in the workplace. Mature students tend to worry about how they compare with their younger classmates and are not always satisfied with less than perfect grades (Hanson, 1996). How students can be formally taught to regulate their moods and emotions and, hence, improve their academic success needs further investigation (Zeidner et al., 2002), but the advantages of self-regulation are self-evident: students would be able to manage their learning inside and outside the classroom, and develop an ability of lifelong value. It is possible to teach the skills. For example, an approach (aimed at improving the emotional climate of the classroom) included teacher training, student education and practice in self-managing moods and emotions in lessons, and was found to be effective (Rivers et al., 2013). This seems open to adaptation to include the interactions of moods and emotions with thinking. Of course, many factors other than moods and emotions can bear upon the endeavours of the intellect: lack of sleep, illness, and diet are examples. At the same

time, these can also affect moods and emotions; the loss of two or three hours sleep, for instance, can make mood and emotion more difficult to manage (Baum et al., 2014).

How to influence a stream of affect in acceptable ways in the classroom is a subject which could benefit from further study by both pedagogical researchers and classroom practitioners.

Teaching students to use the information which emotions offer

In personal decision-making, the emotions do not simply support or hinder purposeful thought, they signal when situations and options are perceived to threaten or benefit what matters to us. In other words, they offer information which is potentially useful for making a decision. But it must be remembered that this information comes from *perceptions* of situations and options and an *uncritical acceptance* of what we currently believe matters. What emotions have to say (popularly, how someone 'feels' about things) may be well-founded or not, but they do point to the existence of personal values, beliefs and goals which may be only partly conscious. Ignoring the proffered information could lead to poor decisions for the person concerned. The information should, at least, be interrogated for its relevance, foundations, and long-term worth. Similarly, the intellect's response is also based on perceptions which may be inappropriate, biased, and without reference to personal values below the level of awareness. Thagard (2001) leans towards an 'informed reliance' on the emotions for decision-making, which seems better suited to adults with experience and relatively stable values and goals. Perkins (2009) prefers dichotomising decisions into those for the intellect and those for the emotions when many important decisions could benefit from the application of both. Neither approach seems to give sufficient attention to the unconscious and possibly ill-founded assumptions and values of relatively inexperienced young people. Papastephanou and Angeli (2007) argue that a tendency for young people to develop a reflective disposition in decision-making is what is needed.

Accordingly, a middle way which acknowledges that both mental systems may have something useful to offer seems better, *provided that what they have to say is interrogated*. A model which may be useful for educators is offered in figure 5.2.

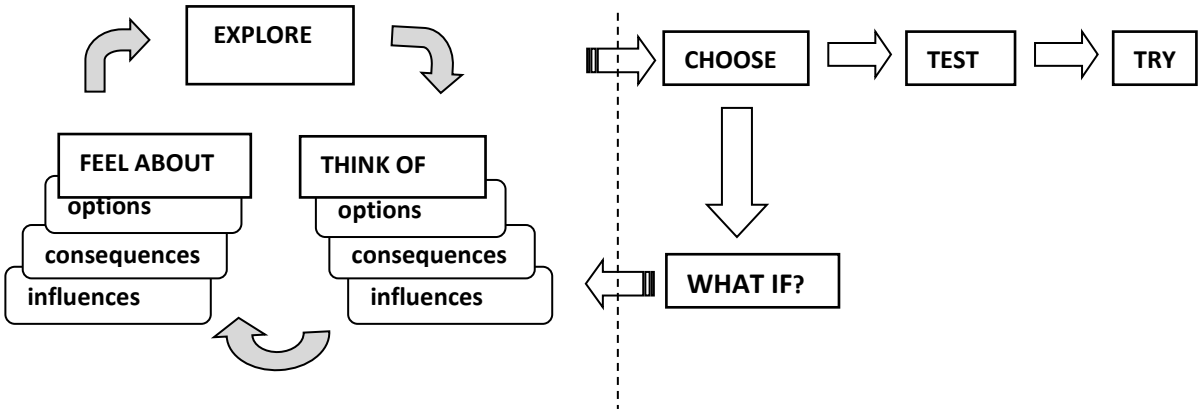

Figure 5.2: A cyclical and iterative model for guiding teaching and practising decision-making.

This involves:

EXPLORE: A process of clarifying the nature and purpose of the decision, its criteria and constraints. After an initial clarification, successive cycles around the loop contribute to options and their attributes. In practical terms, it can be supported by organising and relating the information in a mind map.

THINK OF: The process of constructing or identifying options, their consequences and likelihoods, looking for unwarranted biases and tendencies (like thoughtlessly doing what others do), and consequences for others, trying to see an option from another's point of view (strong anxiety can make this difficult (Todd et al., 2015)).The intellectual system here serves as a tool to point to logical choices which meet the criteria or constraints.

FEEL ABOUT: The process in which emotions generated by the options and their consequences are considered. The emotional system here serves as a tool to indicate threats to and benefits for matters of personal consequence. These are reflected upon to determine their sources, relevance, and suitability.

The cycle represents an iterative process involving these three elements and continues until it ceases to be productive, then it moves on to:

CHOOSE: The selection of an option which is reasonable *and* feels right and can be justified. If there is no such option, the cycle has to be re-entered to find others. Doing nothing can be an appropriate option. Speed is not a criterion for success (Bogacz et al., 2006).

WHAT IF? The world is an uncertain place so, if the decision shows signs of being the wrong one, what can be done about it? Can the decision be rescinded and another course of action taken? What would that be? Courses of action may be open to change as situations develop but some are irrevocable (Etzioni, 1989).

TEST: A process of having the decision judged by someone else, if this is feasible or appropriate. The choice is described to someone who may point out something which has been overlooked. Ideally, this person should know that the 'best' decision depends on the person. It may lead to the decision being re-considered.

TRY: Putting the decision into effect. The success or otherwise of the outcome may inform future decisions or the decision-making process.

This model should not, however, become a thoughtless routine for decision-making. There should be due reflection on bias, assumptions and values, particularly in the cyclical stage[5].

Monitoring progress in thinking

I should conclude this part with a somewhat commonplace way in which the emotional system offers information: it responds to progress in purposeful thought with emotions, some quite strong. If progress is good and offers promise of success, the emotion can be a rising

[5] The ability of teachers and students to manage the interaction between emotions and the intellect may bring to mind 'emotional intelligence' (Salovey & Mayer, 1990), a notion which has attracted various meanings, sometimes controversial. For instance, it can be an ability to recognise and regulate one's emotions (e.g. Mayer & Cobb, 2000; Mayer et al., 2008; Zeidner et al., 2012), or the acquisition and application of information from those emotions (e.g. Yadav, 2011). Another capacity, 'emotional reflexivity' (Holmes, 2015), is a response to the interpretation of feelings when interacting with others. Developing such abilities has the potential to be useful. In some circumstance, teachers' emotional intelligence and their teaching effectiveness go hand in hand (Hassan et al., 2015) – with, of course, the caveat that these terms can mean different things to different people. This account of emotion-cognition interactions in purposeful thought is largely directed at illustrating specific *effects* and how to *use them to advantage in the classroom*. While these may contribute to some kind of emotional intelligence or reflexivity, it depends on how these terms are defined.

excitement, increased enthusiasm, and intense, continued engagement. Perceived success (not necessarily what the teacher would judge to be success) can produce pleasure and even exhilaration. When progress stalls and thinking is unproductive, the emotion can be frustration and annoyance. This may prompt some students to increase their effort, and some may persist beyond what is reasonable then join those who simply abandon the task. The students need to be taught that these emotions are telling them that they seem to be having little success with their chosen approach. Instead of giving up, they need to heed the message and seek another approach (or have the one they are using checked).

6: In conclusion

Summing up

This account of the interplay between the emotional system and the intellectual system was to illustrate that the emotional system can motivate and prompt mental engagement with the topic in hand, but can also overwhelm purposeful thought when emotions are strong. It was also to show that the emotional system can support certain kinds of purposeful thought commonly expected in formal education while impeding others. Thus, methodical thought can benefit from a calm, even slightly sad mood. That which needs constructive thought and imagination can profit from a less focused, wider ranging frame of mind, such as that associated with feeling cheerful. Beyond merely supporting or hindering purposeful thought, the emotional system can also be an integral and essential part of it, as when it judges choices in decision-making, and offers information about progress towards a thinking goal. It has also been suggested that taking these effects into account in the various aspects of teaching – a process of emotional design – could enhance the quality and efficiency of purposeful thought. Indeed, there are times when commonly recommended teaching practices can be counter-productive when moods and emotions are ignored. The notion of emotional design was offered, and some ways of managing the classroom's emotional climate were described, but, as always, further research could be helpful.

While I believe these exemplars are sufficient to make the point and are very relevant to educational practice, what they illustrate does not exhaust known and particular interactions of the two systems. Reasoning, understanding, creative thinking, evaluation, and decision-making are relatively large-scale constructs, but they can involve other processes open to the influence of moods and emotions. For instance, emotionally laden material in general tends to attract attention (see, e.g., Anderson, 2005), but those in a happy frame of mind attend to general or global aspects of the information, while those who are sad or anxious tend to focus on details (Becker & Leinenger, 2011; Wegbreit et al., 2014) (a common analogy is that of drawing parallels with 'seeing the forest' and 'seeing the trees' which make up that forest (Gasper & Clore, 2002)). Moods and emotions associated with events can also make them easier to recall as memory tends to favour emotive material (Laney et al., 2003). This can be very useful; emotive events involve matters of personal consequence so storing them for future reference can be adaptive (Ferré, 2003; Lindström & Bohlin, 2011). What is stored, however, depends on the intensity of the emotion. Events which produce relatively weak emotions result in attention being spread across both central and peripheral information. Events which produce strong emotions focus attention on central matters (Heath & Erickson, 1998). Memory is a selective process, partly shaped by emotions. There is, for instance, a tendency for information associated with negative emotions to become less accessible (the 'good old days' effect) (Walker et al., 2003). While emotive events are recalled more readily than others, they also tend to be given a greater significance than they deserve, particularly when they are associated with strong negative emotions (Miron-Shatz et al., 2009). Emotions attached to events can also give rise to false memories (Kaplan et al., 2015), and recall itself may be subject to prevailing moods. Pioneering work by Bower (1981), refined later by others (see, e.g. Barry et al., 2004), found a modest tendency for a mood congruence effect in which there is better recall when the current mood is like the one attached to the event. Also

of relevance in learning is the effect of emotion on recalling something which ought to be done. Somewhat anxious and depressed people are more likely to forget to do it (Kliegel et al. 2005). Prior knowledge and experience contribute significantly to purposeful thought, but this contribution is, itself, subject to the influence of moods and emotions. Nor does this entirely exhaust the interactions of emotions and the intellect. Moral judgment is another example. While some may attempt to base morality on reason, it is more often a matter of an emotional response to, 'How do I feel about it?' which we justify later with reason (Haidt, 2001). Perhaps less noticed is the effect of emotions like disgust on the severity of someone's judgment of actions: the more disgust is felt, the harsher the judgment is likely to be (Schnall, 2011). The list of interactions is long but their nature is not always unexpected.

It probably hardly needs to be mentioned that the magnitude of an interaction depends on the person: some respond to perceived threats and benefits more strongly than others. Individual differences in how readily emotional responses are aroused, in self-regulation, and in experience seem to come from differences in genetic make-up and learning; that is, it is a nature-nurture combination (Eisenberg et al. 2010; Rothbart, 2012). Differences in culture can also produce different emotional responses to the same event (see e.g. Leersnyder et al., 2015). Furthermore, Jackson (2010) has pointed to an emotional tension between academic and social success. A student may value both but give priority to one. In some cultures, being academically successful can lead to social isolation. It can be still more complex. For instance, being collectively creative is more socially acceptable than displaying individual creativity in some cultures, while being academically successful risks being labelled, disparagingly, as a 'nerd' or 'geek' in some Western cultures (Bishop et al., 2004).

In all this concern for students' productive thought, we should not forget that the teacher is also intimately involved in the emotional enterprise of education and is potentially subject to the same effects. Teachers are not machines and must manage their own emotional responses as they try to maximise the students' quality of thought (for an overview of teachers' emotional responses, see, e.g. Uitto et al., 2015).

Putting the elephant in the classroom to work

Most teachers know that moods and emotions affect behaviour. For too long, their effects on thinking and learning in the classroom have been treated as unwelcome guests, to be ignored, suppressed, or dealt with without forethought. This does not mean that irrational thought is to be encouraged but that the emotional system is not inherently or necessarily irrational, although what it works with could be so, just as with the intellectual system. Instead, I suggest that the emotional system, with care, could be put to good use to oil the works of the intellectual system, and also offer potentially useful information to work with. Nevertheless, like all mental products, whatever their source, what these two minds have to say should be considered carefully. Most teachers are not insensitive to emotional responses and classroom climates (Hargreaves, 2000) but they may need to reflect more on the role of moods and emotions in their teaching, and build the potential for interaction with the intellect into their plans for exercising purposeful thought. To that end, their training needs to give them a vocabulary to think with and to discuss emotion-intellect interactions. It should also allow them to practise emotional design.

Nevertheless, I do not suggest that all pedagogical thought is now turned exclusively to emotions. Some research, however, needs to go beyond the finding of effective strategies to exercise the intellect alone, and should identify efficient, emotion *cum* intellect strategies for teachers to use. But educators should not think that emotions *always* have to be changed to

suit teaching needs. It is important for a teacher to be reasonable about what is and is not managed: not every mood and emotion needs to be 'adjusted'. Depending on what is to be taught, the prevailing emotional climate may be sufficient to meet the needs of the situation. The moods and emotions we would probably be particularly concerned about are those which put a low ceiling on academic success when, with a little forethought, they might be used to raise that ceiling. Some wise words of Larsen (2000, p. 140) make the point eloquently: 'I am not of the view that affective states should be regulated out of existence or that people should not have moods. We want people to have moods, but we don't necessarily want moods to have people'.

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