

Achieving information-seeking skills: exploring information-seeking emotions through an appraisal theory framework

Abstract

Introduction. *The paper explores the proposed appraisal theory framework in a study of primary teacher students' emotions in the process of learning and achieving information-seeking skills. Studying this process is important for teacher students' academic success and future research-informed practice. The relevance of applying the framework, Scherer's (2005) semantic space of emotions and Pekrun's (2006) control-value theory of achievement emotions, is presented, elucidated and discussed.*

Method. *Concepts and elements of the semantic space of emotions and control-value theory of achievement emotions are presented.*

Analysis and results. *Viewed together, Scherer's (2005) semantic space of emotions and Pekrun's (2006) control-value theory of achievement emotions constitute an appropriate analytical tool to investigate teacher students' emotions in learning and achieving information-seeking skills. It offers an understanding and explanation of the nature of information-seeking emotions and their interplay with cognitive appraisals.*

Conclusion. *Given the limited body of literature on affective behaviours in library and information science research in general and in relation to appraisal theories in an educational context in particular, it is hoped that the paper provides a valuable conceptual and theoretical contribution to the field.*

Introduction

Given the identified instrumental role of emotions in learning and academic success (e.g., Kuhlthau, 1993; Linnenbrink and Pintrich, 2002; Pekrun, 2006), it seems crucial to understand emotions and their role in an individual's meaning-making learning process. This paper reports on a work-in-progress study, aiming to contribute to this understanding by exploring teacher students' emotions in learning information-seeking skills.

The object of study is primary teacher students at a Swedish university. The importance of understanding how they learn and achieve information-seeking skills is assumed to be crucial for academic success and future practice informed by research of teaching pupils in their important early formative years. The study conceptualises information-seeking skills as a normative outcome of learning; a core ability studied in information literacy research.

Information literacy is commonly defined as an individual's ability to identify the need, seek, critically evaluate, and use information in different contexts (e.g., Limberg, Sundin, and Talja, 2012; Lloyd, 2017). It is increasingly acknowledged as fundamental for academic success and future practices. Consequently, the body of literature on information literacy is constantly growing. Besides researchers, librarians and other practitioners are major contributors to this practice-oriented literature, especially in an educational learning setting. The need for formal information literacy learning outcomes is reflected in guidelines and frameworks in which normative sets of skills, including information-seeking, are outlined (e.g., Bent and Stubbings, 2011; ACRL, 2000, 2016).

Although it considers teacher students in an information literacy context, the study is positioned within information-seeking behaviour research. The emotions studied are considered non-observable internal behaviours; this holistic approach is compatible with how many researchers (e.g., Wilson, 2016; Nahl, 2007) conceptualise information-seeking behaviours.

A cognitive appraisal perspective on emotions

Probably anyone can relate to and has an idea of what emotions are; we all have feelings and can relate to them. However, wanting to understand what characterises emotions and differentiate them from each other and how they relate to cognitive behaviours and the learning process, shows that

understanding emotions is a complex task. Appraisal theories offer an understanding of these complex relations.

The appraisal theorists Shuman and Scherer (2014, pp. 15-16) define *emotions* as events or episodes of significance for the individual that “consist of multiple components: a subjective *feeling* component, a motor component, a physiological component, an action tendency component, a motor activity component, and an *appraisal* component”. Since the 1950s, social science researchers have acknowledged this cognitive appraisal component as a fundamental part of emotions.

All major theories of emotions acknowledge an appraisal component; however, appraisal theories suggest that emotions are driven by cognitive appraisals, and other components of emotions are affected by them. Changes in appraisal impact other emotional components in a constant process of interactions. The extent to which emotions contribute to the individual’s well-being – pleasant or unpleasant – is appraised. If the emotion is bad or unpleasant, further appraisal occurs, eliciting more complex and multi-dimensional emotional states (Ellsworth and Scherer, 2003; Lazarus and Smith, 1988; Shuman and Scherer, 2014).

Since cognitive appraisals have this meaning-making function, they are part of the constructive learning process and are compatible with a cognitive constructivist meta-theoretical perspective on learning (Kuhlthau, 1993; Talja et al., 2005). In a learning context, awareness of and targeting the cognitive appraisals has potential for learning designs and support structures that are beneficial for and promote students’ learning (Pekrun, 2006).

Appraisal theories in library and information science and educational research

Previous theoretical discussions and applications of appraisal theories in library and information science are limited, particularly in information-seeking behaviour research. Nahl’s (2005) contribution stands out with her affective load theory. Uncertainty and time pressure experienced are the cognitive appraisals that determine the affective, which impacts cognitive processes. Savolainen’s conceptual papers also offer some insights, drawing on appraisal theories; Kuhlthau’s information search process model is scrutinized solely in one study (Savolainen, 2016) and compared to Nahl’s (2007) social-biological information technology model in another (Savolainen, 2015). In a review, Savolainen (2016) applied an appraisal theory framework to analyse affective barriers and their impact on information-seeking activities.

Although recognised as instrumental for learning and academic success, studies of emotions in educational research have been neglected to a large extent. Researchers (e.g., Pekrun, 2019; Pekrun and Linnenbrink-Garcia, 2014) have identified that studies have only started to increase in the last 30 years, especially regarding learning in higher education and from an educational psychology perspective. Two handbooks (*Emotion in education*, 2007; *International handbook of emotions in education*, 2014) are indicative of this growing attention as well as prominent appraisal theoretical contributions, among which, Linnenbrink and Pintrich’s (2002) *Asymmetrical bidirectional model* and Pekrun’s (2006) *Control-value theory of achievement emotions* stand out as frequently cited and applied.

Aim and research questions

An appraisal theory framework is presented in the paper. The relevance of applying it to understand cognitive appraisals and emotions in the process of learning and achieving information-seeking skills is elucidated and discussed. The research question (RQ) guiding the paper is:

RQ1: How can Scherer’s (2005) semantic space of emotions and Pekrun’s (2006) control-value theory of achievement emotions – explain:

- The characteristics of information-seeking emotions?
- The relationship and interplay between cognitive appraisals and emotions in the learning process of achieving information-seeking skills?

In the following, the theoretical framework is presented. Next, the framework is discussed relative to an information-seeking skills learning context.

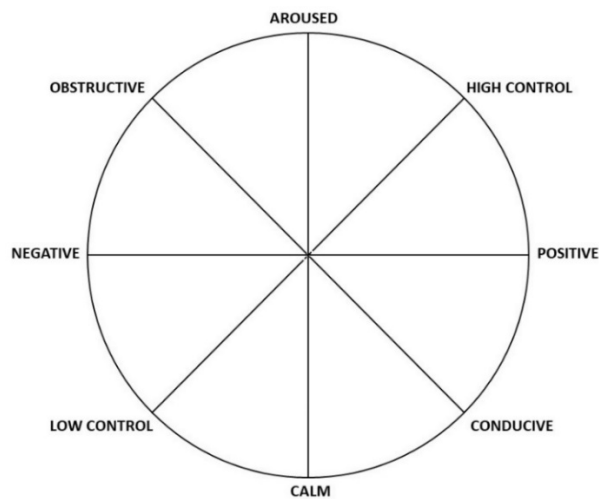
A cognitive appraisal theory framework

The semantic space of emotions

Scherer (2005) proposes that an individual's natural language expressions of emotions, the subjective *feeling* component, is the best and most accurate way to capture the variety and nuances of emotions. These expressions of feelings have led to the development of the Geneva affect label coder, an instrument for identifying and categorising feelings as expressed in different languages.

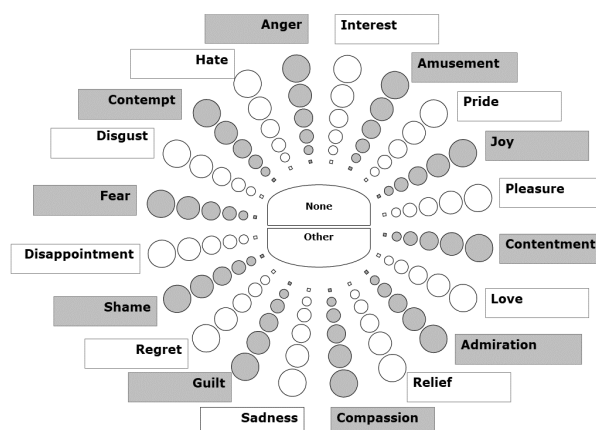
To fully understand these feelings from an appraisal theory perspective, Scherer (2005) suggests that two appraisal dimensions are integrated in Russell's (1980) classical two-dimensional model (valence: positive-negative; intensity: calm-arousal). By adding appraisals of control (low-high) and goal expectancy (conducive- obstructive), four characteristics describe the emotions in the model, called the semantic space of emotions (see Figure 1.) Thus, an appraisal theory-derived and more nuanced understanding of the complex nature of emotions is provided.

Figure 1: Scherer's (2006, p. 720) Semantic space of emotions



The semantic space of emotions constitutes the basis for the development of the well-established emotion measurement instrument, the Geneva emotion wheel (see Figure 2). Twenty families or categories are identified as the core emotional experiences.

Figure 2: Scherer's (2005) Geneva emotion wheel



The control-value theory of achievement emotions

Pekrun’s (2006) control-value theory of achievement emotions, with some modifications (2007; 2014), provides an integrated theoretical approach (e.g., personality, motivational and expectancy theories) for the understanding of emotions in the learning or achievement process. The basic assumption of the theory is that emotions have a fundamental impact on the process of learning and achievement. Another is that this process involves certain emotions that otherwise would not be present, and a third is that these achievement emotions result from control and value appraisals, types of appraisals that are the most important in a learning and achievement context. Specific structures of relationships and interplay between these appraisals are posited to determine specific achievement emotions.

Pekrun and Perry (2014, p. 121) define achievement emotions as “affective arousal that is tied directly to achievement activities (e.g., studying) or achievement outcomes (success and failure)”. Thus, achievement emotions have a different focus: activity and outcome. Achievement activity emotions are related to achievement activities, and the attentional focus is on the action. When the focus is directed towards a future expected (*prospective*) or past experienced (*retrospective*) outcome, achievement outcome emotions are experienced.

Integrated with the valence (positive-negative) and intensity (arousal/activating, calm/deactivation) dimensions in Russell’s (1980) circumplex model, a three-dimensional taxonomy of achievement emotions is provided (see Table 1).

Object focus	Positive, pleasant emotion		Negative, unpleasant emotion	
Activity	Activating <i>Enjoyment</i>	Deactivating <i>Relaxation</i>	Activating <i>Anger, Frustration</i>	Deactivating <i>Boredom</i>
Outcome	<i>Joy, Hope, Pride, Gratitude</i>	<i>Contentment, Relief</i>	<i>Anxiety, Shame, Anger</i>	<i>Sadness, Disappointment, Hopelessness</i>

Table 1: Adapted from Pekrun, Frenzel, Goetz and Perry’s (2007) three-dimensional taxonomy of achievement emotions

Control and value appraisals. Achievement emotions are posited to be functions of specific structures of individuals’ perceived control (future and past) and subjective values (positive-negative) regarding activities and outcomes. If any appraisals are missing, no emotion will be triggered. There are three types of value appraisals. Intrinsic values refer to the importance experienced through performing activities and achieving the outcomes regardless of external factors. If the perceived importance is induced by external factors such as getting grades necessary for a future profession, values are extrinsic. A third type of value appraisal concerns values of expected or experienced outcomes, positive (success) or negative (failure). Depending on the type of achievement emotion – prospective outcome, retrospective outcome, or activity – control and value have different functions and importance.

Achievement emotions. For *prospective outcome emotions*, positive (success) and negative (failure) value appraisals of expected outcome interplay with control appraisals of the expected outcome on different levels. Together, they elicit specific emotions (See Table 2).

Object focus	Cognitive appraisal		Emotions
	Outcome-value expectancy	Outcome-control expectancy	
Outcome, prospective	Positive - success	High	<i>Anticipatory joy</i>
		Medium	<i>Hope</i>
		Low	<i>Hopelessness</i>
	Negative - failure	High	<i>Anticipatory relief</i>
		Medium	<i>Anxiety</i>
		Low	<i>Hopelessness</i>

Table 2: Prospective outcome emotions and their cognitive appraisals. Adapted from Pekrun (2006, p. 320)

Retrospective outcome emotions (see Table 3) are experienced after the achievement of learning outcomes. The emotion experienced is a joint product of positive (success) and negative (failure) experienced values and causes of controllability.

Object focus	Cognitive appraisal	Cognitive appraisal	Emotions
Outcome, retrospective	Positive - Success	Irrelevant	<i>Joy</i>
		Self	<i>Pride</i>
		Other	<i>Gratitude</i>
	Negative - Failure	Irrelevant	<i>Sadness</i>
		Self	<i>Shame</i>
		Other	<i>Anger</i>

Table 3: Retrospective outcome emotions and their cognitive appraisals. Adapted from Pekrun (2006, p. 320)

Activity emotions (see Table 4) are tied to the activity itself. Specific emotions are functions of the expected ability to control actions and the perceived importance of performing the activities, or their subjective intrinsic values.

Object focus	Cognitive appraisal	Cognitive appraisal	Emotions
Activity	Action intrinsic value	Action-control-expectancy	
	Positive	High	<i>Enjoyment</i>
	Negative	High	<i>Anger</i>
	Positive/Negative	Low	<i>Frustration</i>
	None	Low	<i>Boredom</i>

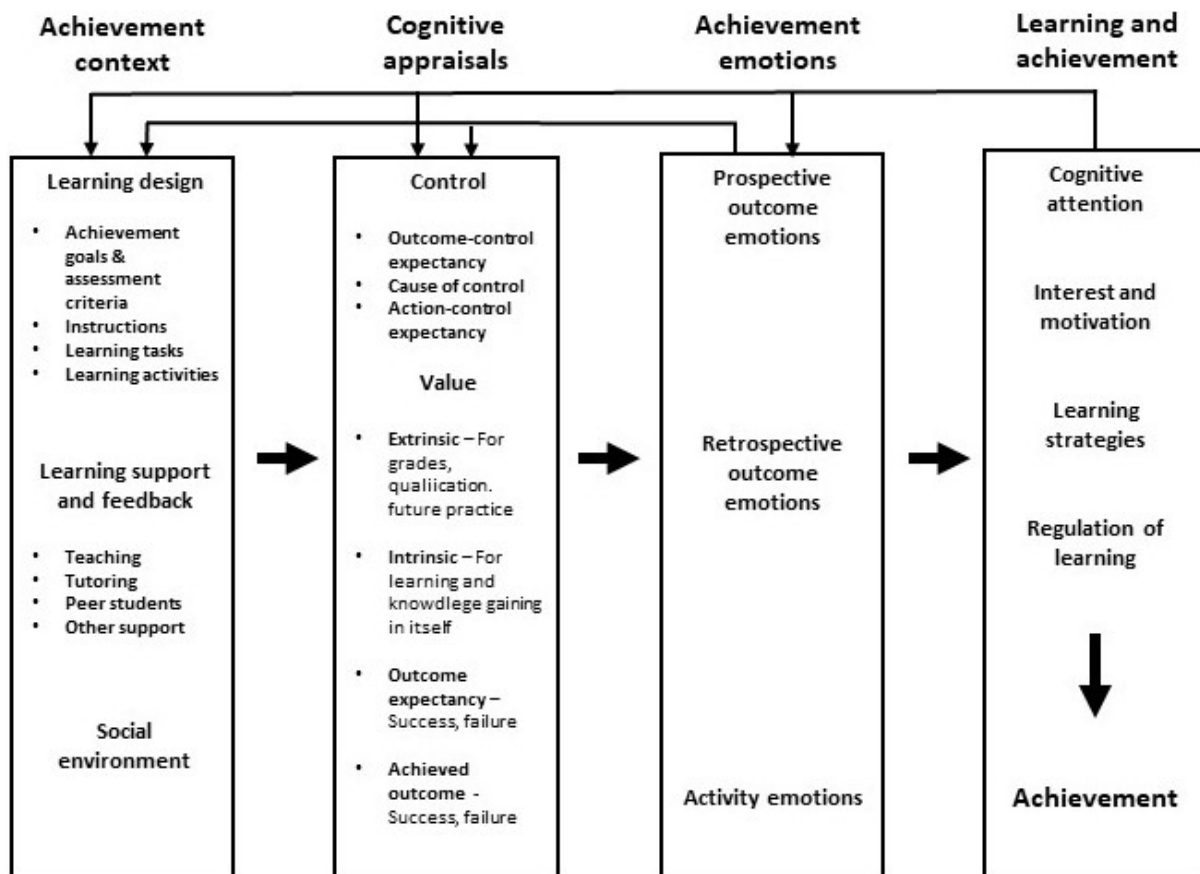
Table 4: Activity emotions and their cognitive appraisals. Adapted from Pekrun (2006, p. 320)

Elements, structure and dynamics of the theory. Figure 3 presents the structure of the theory with its elements. Besides achievement emotions and cognitive appraisals, the elements of *achievement context* and *learning and achievement* are integrated. Their content is elaborated on in the discussion that follows.

The achievement context plays a role, as it shapes and organises cognitive appraisals and achievement emotions in different ways. In turn, emotions are posited to impact learning processes that influence learning outcomes. From the reciprocal causation with feedback loops between the elements suggested in the theory (see Figure 3), it follows that the learning and achievement processes reciprocally affect emotions, appraisals and the context in a dynamic, non-linear way.

The reciprocal causation and feedback loops imply that changes in one element impact the other elements, and vice versa. For example, targeting cognitive appraisals that lead to higher perceived control by the learner results in a more pleasant achievement emotion, which affects the appraisals through feedback loops and has a positive impact on learning and achievement outcomes. Another implication is that emotions, although short-lived, can have an impact over a long period. If a negative emotion that has a negative impact on learning is not targeted and changed (e.g., by increasing perceived control), it might result in failure to achieve learning outcomes.

Figure 3: The control-value theory of achievement emotions. Adapted from Pekrun (2006, p. 328)



Discussion

The appraisal theory framework has the potential to be an appropriate analytic tool to study teacher students' cognitive appraisals and emotions in the process of learning and achieving information-seeking skills. In the following, the theoretical elements and content necessary for applying the framework in this context are discussed.

A semantic space of information-seeking emotions

The Geneva affect label coder, provides a methodological tool for identifying students' subjective emotional experiences, the feelings component of emotions. Distributed over the semantic space, the characteristics of the emotion (positive-negative; calmness-arousal) is visualised and understood, and consequently, how they relate to each other is visualised, for example, in categories with the help of the Geneva emotion wheel.

Since it is sometimes difficult to differentiate between appraisals and emotions, the semantic space also provides some concepts that could be interpreted as expressions of control (e.g., confidence, satisfaction) or lack thereof (e.g., uncertainty, doubt). The goal-expectancy appraisal (conductive-obstructive) and the control appraisal (low-high) integrated in the semantic space also contribute to an appraisal theory explanation. A more nuanced understanding of the control appraisal is offered and can potentially complement the control appraisal in the control-value theory.

A control-value theoretical perspective on information-seeking emotions

A basic assumption of the control-value theory is the presence of explicit learning outcomes and achievement goals. Thus, an *information-seeking skills achievement goal* needs to be present for information-seeking achievement emotions to be elicited. Emotions tied to this goal with activities constitute the different types of achievement emotions.

Information-seeking achievement emotions. The type of achievement emotions is determined by the focus the emotions have. Thus, to discover the different types of achievement emotions, students must be studied in relation to the specific focus: activity or outcome.

Activity emotions can be identified if students express their feelings relative to actions in specific situations. Feelings experienced in relation to a future expected achievement goal or learning outcome, reveal students' *prospective outcome emotions*. By letting students reflect on their feelings towards an achieved and assessed outcome, *retrospective outcome emotions* can be identified.

The nuances and variations of the emotions offered in the semantic space have the potential to reveal a rich amount of such emotions, more than suggested in the theory. If needed, the Geneva emotion wheel offers guidance to identify closely related emotions and the possibility to categorise emotions in accordance with the emotions of the theory.

Control and value appraisals. Specific achievement emotions are determined by certain structures and relations between control and value appraisals. To detect these, students must reflect on the reasons for the achievement emotions they experience.

The theory suggests that expected levels of control over prospective outcomes and activities are appraised on different levels (see Tables 2 and 4). Regarding retrospective achieved outcomes (see Table 3), the causes of control are appraised. Since it might be hard for students to express experienced control in a detailed level, concepts describing controllability would be helpful. However, the theory do not provide any conceptual guidance. Thus, descriptive negative (e.g., uncertainty, doubt) and positive (e.g., satisfaction, confidence) concepts might be helpful in exploring control experiences. This can partly be done with the assistance of semantic space, which provides some control appraisal concepts.

Appraisals of control have been explored in information-seeking behaviour literature, however, not explicitly concerning achievement emotions. Nahl (2005), in affective load theory, and Savolainen (2015) in Kuhlthau's information search process, have identified *uncertainty* as the main low-level control appraisal that has a fundamental impact on information-seeking emotions. Further, Nahl's time pressure appraisal might also be interpreted as a low-level control appraisal.

Students' perceived importance of achievement activities and outcomes constitutes their extrinsic and intrinsic value appraisals (see Figure 3). Asking students about their interests, motivation, attitudes, beliefs and goals can identify such appraisals. A distinction depending on the focus of the appraisal also needs exploration; that is, to investigate if the perceived importance of external factors such as grades and qualification (extrinsic value) or perceived importance of learning and gaining knowledge per se (intrinsic value) are valued. According to the theory, intrinsic values are particularly relevant regarding activity emotions (see Table 3). In the theory, value appraisals of prospective and retrospective outcome emotions presented in the tables (see Tables 1 and 2) are understood as expected or experienced success or failure. These appraisals, such as ambitions, motivation, confidence and assessment feedback, must also be identified. Unclear in the theory, and perhaps of significance, is how extrinsic and intrinsic values of prospective and retrospective outcomes interplay with other appraisals.

Other elements in the theory

The theory posits that cognitive appraisals and emotions cannot be understood if isolated in themselves. Through reciprocal causation and feedback loops (see Figure 3), the theory implies that the relationship and interplay between appraisals and emotions affect and are affected by the other elements in the learning process of achieving information-seeking skills.

Information-seeking skills achievement context. Although acknowledging that the social context and broader academic context impact achievement emotions, the control-value theory focuses on the proximal learning context and how it affects cognitive appraisals and achievement emotions. Therefore, it is important to identify students' experiences of course design in terms of learning activities, tasks, outcomes, instructions and assessment criteria. It is also important to identify formal and informal support and feedback structures from teachers, tutors, peers and others.

Learning and achievement of information-seeking skills. All elements in the theory are part of the learning and achievement process. However, the theory indicates some cognitive factors or processes in the learning and achievement element of the theory: attentional focus, motivation to learn, learning strategies and regulation of learning. These are affected by emotions and need to be investigated and understood. Together, these processes constitute a totality of experiences that have an effect on the achievement of information-seeking skills.

The empirical study

The ambition is to apply the appraisal theory framework in a study investigating teacher students' emotions in achieving an information-seeking skills learning outcome. The learning context is a literature review assignment in an exam paper preparation course. Four literature reviews are followed through in-depth, semi-structured interviews during seven weeks. A qualitative approach is assumed to be necessary to discover students' subjective emotional experiences (their feelings) and the complex relations and interplay between emotions and appraisals in the learning and achievement process.

Conclusions

The framework has proved to be an appropriate tool for analysing teacher students' cognitive appraisals and emotions in learning and achieving information-seeking skills. Cognitive appraisals as a crucial element in this complex meaning-making process align well with the study's ambition to obtain a qualitative and deeper understanding of the role of emotions in a constructivist learning and achievement process.

It is hoped that the study will provide a much-needed contribution to the limited body of literature on affective information-seeking behaviours. Thus, it will fill an important gap identified by researchers (e.g., Krakowska, 2020; Lopatovska and Arapakis, 2011; Savolainen, 2015) in information-seeking behaviour research in general and teacher students in particular (Dahlqvist, 2021a, 2021b). In addition, the appraisal theory framework suggested in the study – the semantic space of emotions and control-value theory of achievement emotions – has not, to the knowledge of the authors, been previously applied in information-seeking behaviour or information literacy research. Thus, this paper provides a potentially valuable conceptual and theoretical contribution to library and information science research.

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