Analysis of the Emotions and Emotional Skills of University Students in Processing Distance Formative Feedback

Analyse des émotions et des compétences émotionnelles d'étudiants universitaires dans le traitement d'un feedback formatif à distance

Análise das emoções e das competências emocionais de estudantes universitários no processamento de um feedback formativo à distância

Matthieu Hausman
ID ORCID : orcid.org/0000-0001-8979-7746
Université de Liège

Laurent Leduc
ID ORCID : 0009-0001-1314-0139
Université de Liège

Laura Malay
ID ORCID : 0009-0000-4135-3337
Université de Liège

Sophie Delvaux
ID ORCID : 0000-0002-3557-4835
Université de Liège

Pascal Detroz
ID ORCID : 0000-0001-5471-623X
Université de Liège

Keywords: emotional competencies, emotions, feedback, students, university

Abstract: The aim of this study is to better understand the emotions that emerge in university students when processing feedback, how they affect the process, and the influence of emotional competencies and motivational beliefs. To this end, a questionnaire was developed to measure students' emotional competencies, intensity of emotions associated with processing distance formative feedback, several components of motivational beliefs, and perceived usefulness of targeted feedback. This paper presents the results obtained from 52 students. The analyses show that the students' emotional competencies are well developed, and that they experience a wide range of emotions when processing feedback. It was not possible to identify any significant links between the variables measured and the perceived usefulness of feedback. However, some are linked to the emotions experienced by students and their intensity, such as the score obtained and, to a lesser extent, certain motivational beliefs.

Mots clés : compétences émotionnelles, émotions, étudiants, feedback, université

Dans cette étude, nous avons entrepris de mesurer les compétences émotionnelles des étudiants et d'analyser leur mobilisation dans le traitement d'un feedback formatif à l'université. Nous avons pour cela réalisé un questionnaire mesurant les compétences émotionnelles des étudiants, l'intensité des émotions associées au traitement d'un feedback formatif à distance, plusieurs composantes des croyances motivationnelles et la perception d'utilité du feedback ciblé. Cet article présente les résultats obtenus à partir des réponses de 52 étudiants. Nos analyses attestent notamment du bon niveau des compétences émotionnelles des étudiants et de la pluralité des émotions vécues dans le cadre du traitement d'un feedback. Nous n'avons pas pu établir de liens significatifs entre les variables mesurées et la perception d'utilité du feedback en évidence. Cependant, certaines d'entre elles sont liées aux émotions vécues par les étudiants et à leur intensité, comme le score obtenu et, dans une moindre mesure, certaines croyances motivationnelles.

Authors' note: Correspondence regarding to this article may be addressed to m.hausman@uliege.be.

Palavras-chave: competências emocionais, emoções, estudantes, feedback, universidade

Neste estudo, procuramos medir as competências emocionais dos estudantes e analisar a sua mobilização no tratamento de um feedback formativo na universidade. Para isso, realizamos um questionário para medir as competências emocionais dos estudantes, a intensidade das emoções associadas ao tratamento de um feedback formativo à distância, várias componentes das crenças motivacionais e a perceção de utilidade do feedback direcionado. Este artigo apresenta os resultados obtidos considerando as respostas de 52 estudantes. As nossas análises atestam especialmente o bom nível das competências emocionais dos estudantes e a pluralidade das emoções vividas no contexto do tratamento de um feedback. Não conseguimos estabelecer ligações significativas entre as variáveis medidas e a percepção de utilidade do feedback evidenciado. Contudo, algumas delas estão relacionadas às emoções vividas pelos estudantes e à sua intensidade, como a pontuação obtida e, em menor medida, algumas crenças motivacionais.

Introduction

Does the feedback students receive in higher education trigger emotions? If so, which emotions? And what are the consequences for learning?

Such questions have fueled the work of a growing community of researchers and scholars over the last fifteen years or so. It is now clearly established that students do indeed experience emotions in feedback situations (Hill et al., 2021; Rowe, 2017; Shields, 2015). It has also been established that these emotions can be rather pleasant or unpleasant and that their intensity ranges from low to high (Sander & Scherer, 2019). Given that emotions color feedback situations, we suggest that receiving feedback is not simply registering new information in the cognitive structure, and even less a neutral and passive process. On the contrary, the information is decoded and given a specific meaning, hence feedback processing is dynamic, complex and subjective (Lipnevich et al., 2016; Lipnevich & Panadero, 2021; Lipnevich & Smith, 2022; Panadero & Lipnevich, 2022).

This understanding of feedback processing means the student is active from the outset, which is an advantage. They are the main agents in the feedback process, particularly when it comes to attributing a particular meaning to the feedback and interpreting it. The scientific literature

tells us that students' emotions influence feedback processing, hence the role of emotions is currently attracting the interest of many researchers (Dozot & Romainville, 2022; Fong et al., 2018a, 2018b; Fong & Schallert, 2022; Girardet, 2021; Goetz et al., 2018; Hausman et al., 2022a, 2022b, 2023; Molloy et al., 2019; Pitt, 2019; Poulos & Mahony, 2008; Ryan & Henderson, 2018; Värlander, 2008).

The present study, and our previous work (Dancot et al., 2021; Hausman et al., 2022a, 2022b, 2023), are consistent with the aims of the research: To better understand how emotions emerge in students when processing feedback, and their influence on students' motivational beliefs and learning strategies. More specifically, this study focuses on how students enrolled in the preparatory year of the Master of Education perceived the usefulness of feedback sent to their phone via a dedicated application following a formative online assessment. We attempted to identify emotions, and their intensity, experienced by students when processing feedback. In order to uncover potential explanations for the perceived usefulness of feedback and the emotions associated with its interpretation, we measured several determinants considered relevant to this process. Among these determinants, we measured students' emotional competencies (Mikolajczak, 2020a) in their entirety. We also measured several attitudinal variables (Genoud & Guillod, 2014) associated with students' motivational beliefs (Berger & Büchel, 2012), such as the value attributed to the course, the perceived control over learning activities and their outcomes, and their perceived level of competence in the target domain. Finally, we included the level of performance obtained in the formative test in our variables. Analysis of these variables and their interactions should enable us to gain a better understanding of how distance feedback is processed emotionally, and how motivational beliefs influence this process.

Theoretical Framework

Feedback in a Learning Context

There are several definitions of the concept of feedback in the field of education. Feedback became a clearly identified subject of research in our discipline during the 1980s and 1990s, with work by Ramaprasad (1983), Kulhavy and Stock (1989), Sadler (1989) and Bangert-Drowns et al. (1991), to name a few. Indeed, although feedback is frequently integrated into the process of self-regulated learning (Butler & Winne, 1995; Nicol & Macfarlane-Dick, 2006), it is also a specific construct with its own functions and characteristics.

The body of research into feedback has grown over the four decades between the works mentioned above and our own work. Among the many definitions produced, we subscribe to Shute's definition of feedback as "... information communicated to the learner, which is intended to modify the learner's thinking or behavior in order to improve learning" (Shute, 2008, p. 154). We chose this definition as it clearly situates information as the nodal point of feedback, and specifies that it aims to emancipate the learner, who is responsible for using it to regulate or self-regulate their learning.

However, while it seemed there was nothing new to say about feedback after seminal works by Hattie and Timperley (2007) and Brookhart (2008), for example, this rich concept has attracted renewed interest in the scientific community in recent years. This phenomenon has crystallized around what Carless and Boud (2018) have called *Student Feedback Literacy*. Building on the work done by Sutton (2012), they proposed a theoretical model of feedback processing, extending the nature of the concept to the treatment process, whereas most previous definitions had focused on the product (information). This model supports the (pro)active engagement of the learner and identifies four key skills to be mobilized in order to make the most of feedback in a learning context. These skills are: (a) understanding feedback, (b) making evaluative judgment, (c) managing affect, and (d) engaging in action(s) following the processing of information transmitted by an external resource or produced by the student themself (Carless & Boud, 2018). Since the publication of this model, it has been used in many research studies (Nieminen & Carless, 2023). Various empirical studies (Han & Xu, 2020; Little et al., 2023) are validating and operationalizing the model. It should be noted that it has also seen the emergence, in mirror form, of skills specific to teachers (Boud & Dawson, 2021; Carless & Winstone, 2023; de Kleijn, 2021).

While it seems entirely appropriate to develop such skills in learners, this model has certain limitations, including a certain lack of clarity and nuance with regard to affect management. The term 'affect' refers to all affective manifestations in the individual (Mikolajczak, 2020b). It does not, however, address characteristics essential for distinguishing emotions, such as determinants, intensity, duration and, most importantly, an individual's awareness of their emotions and their capacity to control them. It is therefore difficult to consider the concept of affect as central to the definition of an aptitude to be developed in learners with a view to optimizing the beneficial effect of feedback on their learning.

For this reason, we prefer the more specific concept of emotion which seems to intrinsically respond to the logic of (pro)active management of affective-type manifestations, as advocated by Carless and Boud (2018). They included this particular ability in their model because of the deleterious effects of negative affect on feedback processing (Mercer & Gulseren, 2023), and therefore on regulating and self-regulating learning. They recommend that practitioners ensure students avoid experiencing such affects, and that they aim for an affective balance in students to avoid a defensive response to feedback. These recommendations seem questionable in terms of content, to say the least, and not very effective in terms of form. We therefore feel compelled to qualify them and clarify their implementation.

Emotions and their Management in the Learning Context

As mentioned earlier, we prefer to use the concept of emotion to affect in the context of feedback processing, as not all affects seem relevant to the control logic supported by Carless and Boud (2018). Thus temperament, moods, emotions, or feelings cannot be considered as synonyms. Each of these constructs has its own attributes and, in this respect, some appear more convincing than others in the mobilization of skills dedicated to the consideration of the affective dimension in feedback situations. We believe that this is the case for emotions.

Research into the role of emotions in learning situations is a relatively recent subject in our domain. The first significant works – and they are scarce – date from the 1990s, with a slight increase in the 2000s, and finally, an active trend from the 2010s (Audrin, 2020). Emotions have long been neglected by the scientific community in education, as it was believed they disrupted rational thought, which has always been recognized as virtuous and inseparable from learning.

Recent developments in the field have provided highly instructive insights into emotions and their functions. For example, they play a very useful role in certain processes, long considered to be exclusively cognitive, such as information processing, memorization, and decision-making (Sander & Scherer, 2019). Furthermore, it appears what individuals do with their emotions determines their influence in various areas of everyday life, as much as the emotions themselves. Similarly, we now know that the way in which learners manage or fail to manage their emotions adequately is likely to support or hinder their learning (Mazzietti & Sander, 2015).

But what exactly is an emotion? According to Luminet (2002, cited in Mikolajczak, 2020b, p. 15, our translation) "[...] emotions are relatively brief states caused by a specific stimulus or situation and are expressed at the physiological, behavioral and subjective levels". It is therefore a complex process, involving a range of components. In its simplest form, there is a trigger phase and a response phase, expressed at different levels: cognitive, experiential, physiological, expressive, and behavioral. Emotions also fulfill several functions, one of the most important being to prepare individuals to respond to particular circumstances. This is the adaptive function of emotions (Grandjean & Scherer, 2019), which can logically be considered applicable in an academic context, to adjust learning strategies according to the results obtained previously or to assess the realistic and achievable nature of the learning goals pursued, with a view to maintaining or modifying them, for example.

In a learning context, emotions are grouped together under the heading of "academic emotions" (Pekrun et al., 2002; Pekrun & Perry, 2014) and are divided into different categories, depending on the nature of the object or event to which they relate. There are epistemic emotions, associated with the activities of developing or acquiring knowledge (e.g., interest, confusion, surprise, boredom, etc.); emotions of achievement, triggered by progress of learning activities and/or results (e.g., joy, pride, relief, disappointment, anger, anxiety, etc.); thematic emotions triggered by the learning process and the results of learning activities (e.g., satisfaction, satisfaction, disappointment, anger, anxiety, etc.); other thematic emotions triggered by the individual's relationship with their domain (e.g., enthusiasm, pleasure, disgust, etc.); and, finally, social emotions, characterized by a focus on other individuals involved in learning situations (e.g., jealousy, gratitude, envy, etc.).

Several studies attest to the experience of academic emotions by students at different points in their learning journey, with relatively nuanced effects. While positive emotions[1] are generally linked to better performance, particularly because they promote learner motivation,

1. We use the terms "positive emotions" and "negative emotions" to characterize agreeable and disagreeable emotions, or pleasant and unpleasant emotions. The valence of emotions is more frequently expressed in this way, particularly in English-language literature, hence our choice to use these terms. However, they may suggest that emotions are good or bad for the individual. In reality, this is not the case, as emotions act as signals for needs to be met or goals to be achieved, thus fulfilling their adaptive function. In itself, no emotion is intrinsically bad or harmful to the individual.

negative emotions do not always have the opposite effect (Rowe & Fitness, 2018). Some unpleasant emotions actually act as impulses that (re)mobilize students in learning activities (Fischer et al., 2020). Furthermore, the absence of emotions or, more precisely, the use of inhibitory control of the expression of emotions, or their negation, do not seem to promote better performance in learners (Govaerts & Grégoire, 2008; Pekrun et al., 2007).

These observations indicate that the role of emotions in the way students learn, particularly when they receive, analyze, and use feedback, is very unclear, especially as it is not entirely dependent on their pleasant or unpleasant nature. Pekrun's Control-Value Theory (2006) adds additional characteristics to the valence of emotions to give us a better understanding of how they work and their implications. Emotions also activate or deactivate, prompting the individual to (re)act or not. In a learning context, activation reflects the main motivational theories, where learner behavior responds to needs to be satisfied (Ryan & Deci, 2000) and/or to personal goals to be achieved (Dweck, 1986). Thus, an unpleasant but activating emotion can support learning or its regulation, by prompting the individual to (re)mobilize with positive learning strategies for achieving their goals. Excessive control of the emotional process, aimed at avoiding certain emotions or repressing them once they have arisen, can be counterproductive for the learner, unable to adjust to the situation or event that triggered the emotional episode. It therefore seems preferable to seek to understand one's emotions and use them as resources.

These last elements bring us back to affect management or, more accurately, emotion management in the context of Student Feedback Literacy (Carless & Boud, 2018). In their article, the authors do not describe this particular skill, nor do they explain how to use it. How students can manage emotions when receiving, then interpreting feedback, and with what benefits, remains a fairly open question. That said, a growing body of research is shedding light on the process and we are learning that feedback does arouse emotions in students (Girardet, 2021), that emotions are strongly linked to the context in which the feedback is provided (Lipnevich & Smith, 2022), and that emotions can support or hinder the processing of feedback (Pitt & Norton, 2017; Winstone et al., 2017), particularly through their impact on students' sense of self-efficacy and/or self-esteem (Hill et al., 2021; Shields, 2015). Studies aimed at identifying the specific mechanisms by which emotions positively or negatively affect feedback processing are scarce (Goetz et al., 2018).

Our research highlights that student who interpreted negative feedback honestly engaged various emotional regulation strategies. These strategies aimed at reducing the intensity of their emotions and refining their perception of the feedback by comparing it with another perspective (Hausman et al., 2023). Students' ability to regulate their emotions, and more particularly their negative emotions as Carless and Boud (2018) suggest, is part of a wide range of skills relating to emotion management. These are now recognized as emotional competencies (Brasseur et al., 2013).

Originally proposed by Saarni (1988, cited in Mikolajczak, 2020a), emotional competencies represent the evolution of the concept of emotional intelligence, popularized in 1995 by Goleman and developed by many authors since (Mayer et al. 2004). Mikolajczak defines emotional competencies as the way individuals identify, understand, express, regulate and use their own and others' emotions (2020a, p. 7). These ten skills are complementary, and proficiency can be broken down into three levels, which corresponds to taxonomic logic. The first is proficiency in knowledge about the emotional process. This knowledge can then progressively evolve towards an individual's ability to use it during an emotional episode (Sander & Scherer, 2019), and then towards its integration into the individual's personal dispositions. An individual with such a high level of emotional competency can spontaneously mobilize their emotions, and more importantly, anticipate them.

We choose to use emotional competencies for their incremental nature and the learning potential they afford, rather than for their link with emotional intelligence. In 2011, Nelis et al. set up a relatively short training program in which participants worked for 18 hours (divided into different modules) on developing their emotional competencies. The research analyzed the effect of this training on learning and the development of emotional competencies on all the participants. Positive effects were observed at the physical (improved lifestyle), psychological (improved well-being), social (improved relationships), and professional (improved employability) levels. Changes in personality traits were also stable (e.g., reduced pessimism) up to six months after the end of the program. These personality traits influence the way students react to feedback they receive, and pessimism appears to be a particular obstacle to constructive processing (Lipnevich et al., 2021). In an academic context, Leroy et al. (2012) carried out experimental studies to highlight the benefits for students of developing their emotional competencies and, in particular, the emotion

regulation strategy known as cognitive reappraisal (Gross, 1998). This strategy was found to be beneficial for performance and for maintaining students' enthusiasm for carrying out tasks assigned to them. This was also the case for resisting distractions likely to generate pleasant emotions in the short term, as well as unpleasant emotions in the long term.

Therefore, there is reason to believe that emotional competencies have potential for influencing how university students constructively process feedback, including the affective dimension of this process. Emotional episodes triggered by feedback processing constantly feed into what Malecka et al. (2022) have called "students' personal history of feedback", determining how they perceive feedback during their university journey. As a result, it is important to define how emotional competencies can help students convert feedback into a positive message.

Study Objectives and Research Hypotheses

Our study had multiple aims. Firstly, we wanted to verify that students experience academic emotions when processing feedback at university. To do so, we examined feedback delivered remotely, via a dedicated app, following an optional formative assessment. Where appropriate, we planned to characterize them for their valence, temporality, activation potential, and intensity. In addition, the study also focuses on measuring and describing students' emotional competencies. We wanted to determine whether there was a link between the level of students' emotional competencies and the intensity of their emotions when receiving feedback. As feedback is a main theme in our study, we also aimed to determine whether there is a link between emotional competencies and students' perception of the usefulness of targeted feedback. To determine the importance of this link, we tested other variables that may influence the perception of the usefulness of feedback. We analyzed the results obtained in the corresponding test, the value attributed to the course followed, the perception of controllability in the course, and the students' feeling of competence in the domain concerned.

These objectives are reflected in the following assumptions, which were verified using a quantitative approach:

1) Processing feedback generates emotions in students.
2) The level of emotional competencies is positively correlated with the intensity of the emotions felt when receiving the final formative feedback for a course.

3) The level of emotional competence is positively correlated with the perceived usefulness of feedback.

1) The level of emotional competencies is positively correlated with the components of students' motivational beliefs, namely the value attributed to the course, the perception of controllability, and the feeling of competence in the domain.

Methodology

The Ethical Framework

This study is part of a research program analyzing the use of the FB4You, approved by the ethics committee of the Faculty of Psychology, Logopedics and Education Sciences of the University of Liège (Belgium) under reference 2021-104.

The Context of the Study

This study was carried out during the second four-month period of the 2021-2022 academic year, as part of the course entitled Evaluation Issues, which is part of the program for the preparatory year of the master's degree in educational sciences at the University of Liège (Belgium). This master's degree is offered with a staggered timetable to accommodate students who work during the day. As a result, students enrolled have varied demographic characteristics for age, family situation, occupation, and professional experience. For example, while some students pursue this course as a continuation of a bachelor's degree with a view to becoming a teacher, others are already working in the field of education and returning to studies.

In addition to classroom sessions, registered students were offered six formative tests to complete on the Eduflow online platform. Participation in these tests was optional. They systematically focused on the content presented during the previous session and each took the form of five or six true-false questions. The assessment scale was as follows: One point awarded for each correct answer, one point deducted for each incorrect answer, and no points awarded or deducted for omissions[2]. After each answer, the platform indicated to the participant whether it was correct or incorrect, without a score or any other corrective element. A few days later, students were offered more detailed feedback via the FB4You app. We

2. This scale is identical to the one applied later in the course examination.

developed this application inhouse in our laboratory. The main purpose was to provide semi-automated feedback to students via their phones. Test results are imported into the app and the teacher can either completely or partially integrate them into feedback, commenting on them freely, in a general and/or more targeted way according to the performance categories established. Students also have access to their overall score, by section when applicable, and their ranking in the group.

We questioned students after the last formative test at the end of the course about the feedback received. We chose to focus on this feedback for two reasons: (a) Our approach is part of the wider analysis into rollout of the FB4You application[3], and (b) Emotional episodes are always associated with a specific event. We considered that by the time students received final feedback, they would be accustomed to the form and content of feedback, and that such a key event marking the end of their course would be easier to recall

The last test went online on the Eduflow platform on May 1st, 2022. It consisted of six questions. On May 13th, participants received feedback via FB4You. This included the following information:

- Individual test score out of 20;
- Individual rankings within the cohort in numerical and graphical form, with distribution of students[4] by performance levels;
- A general comment from the teacher specifying the lesson and test to which the feedback related;
- A specific comment from the teacher, depending on the result obtained:
  - Students with less than 10/20 received an encouraging comment where the teacher highlighted the students' investment in the course shown by their participation in the optional test and made reassuring remarks about their potential for passing the exam.
  - Students with at least 10 out of 20 received the teacher's congratulations for their commitment and their result and their encouragement for continuing on the road to success for the exam.

3. We do not report these results in this article.
4. All information about the cohort is anonymous. It is impossible for a user of the app to know the result of another student.

The Questionnaire

We used the Qualtrics tool to submit an online questionnaire to the students at the end of the course, sent my email by the course tutor. The email contained the objectives of the study as well as a direct link to the online questionnaire. Students were given the opportunity to complete the questionnaire over a three-week period, from May 13th to June 3rd, 2022. The full version of the questionnaire contained 122 items and the estimated time for completion was 30 minutes. Students were offered incentive in the form of a cinema ticket to encourage them to complete the questionnaire. To optimize the number of students able to complete the questionnaire, particularly the section addressing the measurement of emotional competencies, participation in the last formative test was not a condition for participating in our study. Respondents who had not participated in the last formative test could therefore answer the first six parts out of ten.

The dimensions comprising the questionnaire were measured using items taken in whole or in part from various existing French-language tools and validated by previous studies. For each of the scales or subscales selected, we followed the response procedures defined by their authors. Details of the dimensions investigated and, where applicable, the original measurement tool are given in the description of the questionnaire, presented below:

1) Socio-demographic data: Gender, age, first-time enrollment in the course or not.
2) Emotional competencies: We used the complete version of the Emotional Competence Profile (Brasseur et al., 2013). This tool measures the five dimensions of an individual's emotional competencies, both intrapersonal and interpersonal. Five items are used to measure each of the ten dimensions. The original questionnaire consisted of 50 items, to which participants responded by choosing a value between 1 and 5 on a Likert scale: 1 = never and 5 = very frequently. The original tool was tested and validated in 6 different samples, for a total of 5,676 subjects aged between 15 and 84, from a wide range of socio-professional backgrounds, including higher education.
3) Motivational beliefs: Based on Pekrun's (2006) theory of academic emotions, we chose to measure three dimensions relating to motivational beliefs we considered appropriate for describing

control and value. We used part of Genoud and Guillod's socio-affective attitude scale (2014)[5]. Of the various subscales proposed, we considered it relevant to use perceived value, controllability, and level of competence. These dimensions were assessed by 5 items for value and controllability, and by 6 items for the feeling of competence. The response modalities were six-point Likert scales ranging from 0 to 5: 0 = strongly disagree and 5 = strongly agree. We used the original items, taking care to replace the subject of the various statements with the subject of the course where necessary.

4) Participation in the course's formative tests: Choice of the number of tests taken, between 0 and 6.
5) Participation in the last formative test of the course: Yes or no.
6) Reasons for taking (or not taking) the last formative test of the course: Respondents were given 15 possible reasons for taking the test and 15 possible reasons for not taking the test. The reasons covered both organizational and motivational aspects. The response methods were five-point Likert scales for influence of the reason on the student's choice: 1 = no influence and 5 = strong influence. Students were asked to answer according to whether they had taken the test or not. For respondents who had not taken the last test, this sixth sections was the end of the questionnaire.
7) The score obtained in the last formative test of the course: choice of a value between 0 and 20.
8) Feedback method(s) consulted: Indication of the channel(s) used for consulting the test feedback, Eduflow and/or FB4You.
9) The perception of emotions: 15 academic emotions (mainly achievement emotions) were offered to the students: joy, shame, sadness, pride, satisfaction, anger, relief, disappointment, gratitude, hope, anxiety, enthusiasm, helplessness, confusion, and interest. They were asked to select the intensity with which they had experienced each of these emotions, using a five-point Likert scale from 0 to 4: 0 = zero intensity i.e. they had not felt the emotion to 4 = they had felt the emotion intensely.

5. The authors have developed and validated their tool in the context of learning mathematics in compulsory education.

10) The perceived usefulness of feedback: The perceived usefulness of feedback received via FB4You was measured using Calone and Lafontaine's subscale (2018), which compared the effect of normative and elaborative feedback on the performance and sense of competence of compulsory school pupils. The subscale consisted of five statements on which respondents were asked to position themselves on a four-point Likert scale: 1 = strongly disagree and 4 = strongly agree.

Analysis

Only asking students about last course feedback had two direct and negative consequences on participation in the study. Firstly, they had not all taken part in the last test. Also, not all the test participants had consulted their feedback in FB4You, so they were not able to complete the entire questionnaire.

Our initial intention was to conduct exploratory factor analyses between the different dimensions of the questionnaire to determine their interaction when processing targeted feedback. However, the number of respondents was insufficient for this type of analysis. We therefore conducted essentially descriptive analysis of the data collected, using response frequencies to test potential correlations between the constructs measured. In addition, despite validation by their authors, we also recalculated the internal consistency indices (omega) of the different (sub)scales drawn from the literature. All statistical analyses were performed using SAS 9.4 software.

Results

Participation in the Last Formative Test

Twenty-eight students took part in the final formative test which is less than a quarter (21.9%) of the 128 students who took the course exam at the end of the semester. Of those who took part, 12 scored 10 out of 20 or higher, while 16 scored below the cut-off point of 10 out of 20. The average score was 11.6 out of 20.

The feedback distributed via FB4You was sent to the 28 students, of which 24 actually received it on their phone[6], of which 21 consulted it at least once[7],with an average of three consultations per student and a maximum of seven times by the same person.

6. This means that four of the feedback recipients had not installed FB4You on their phone.
7. There was no notification function at this stage of FB4You's development. It is therefore possible that students who did not consult their feedback simply did not think to do so.

Responses to the Questionnaire and Socio-demographic Characteristics of Respondents

The questionnaire was completed by 52 students of which 47 women and 5 men; 27 (51.9%) aged between 20 and 24, 9 (17.3%) between 25 and 29, 3 (5.77%) between 30 and 34, 5 (9.62%) between 35 and 39, 4 (7.69%) between 40 and 44, and 4 (7.69%) were aged 45 or over. For 45 (86.54%), it was their first participation in the course, and the second for the other 7 (13.46%).

Of the 52 respondents, 23 students (44.23%) took the test, while 29 (55.77%) did not. Of the 23 who took part in the test, 12 students (52%) consulted their feedback in FB4You.

Measuring Emotional Competencies

Table 1 below gives details of the average score obtained for the five competencies overall, for the intrapersonal component, and for the interpersonal component. The average level of students' emotional skills is 3.4 out of 5, and interpersonal skills (3.5) score slightly higher than intrapersonal skills (3.3).

Table 1
Emotional competence scores

Subscales		**Average (n = 52)**	**Standard deviation (σ)**	**…**
	Identification	3.5	0.7	0.6321
	Understanding	3.6	0.8	0.7651
	Expression	3.3	0.9	0.7132
	Regulation	2.6	0.8	0.6838
	Use	3.6	0.9	0.8507
Interpersonal skills	Identification	3.9	0.7	0.7833
	Understanding	3.7	0.6	0.6241
	Expression	4.0	0.8	0.6956
	Regulation	3.1	0.7	0.7386
	Use	2.7	0.8	0.7903
Dimensions	Intrapersonal EC	3.3	0.5	0.8520
	Interpersonal EC	3.5	0.5	0.8717
Overall score	General EC	3.4	0.4	0.8929

Students were quite capable of identifying (3.5), understanding (3.6), expressing (3.3), and using (3.6) their own emotions. However, they scored lower for emotion regulation (2.6). This skill is the weakest in all our measures.

For interpersonal competencies, the students scored 3.9 for identifying, 3.7 for understanding, 4 for expressing and 3.1 for regulating other people's emotions. The lowest score (2.7) was for using emotions experienced by others.

No significant relationship was observed between emotional competence and other constructs: Age, gender, test score, perceived controllability, or feelings of competence. However, we did find a positive correlation with the value attributed to the course ($r=0.294$; $p=0.034$). Consequently, the fourth hypothesis was only partially verified, as only one of the three variables inherent in motivational beliefs was linked to the development of emotional competencies.

Motivational Beliefs

The scores for respondents' motivational beliefs are shown in Table 2 below.

Table 2
Scores for motivational beliefs

Subscales	**Average (n = 52)**	**Standard deviation (σ)**	**Consistency (ω)**
Value assigned to the course	3.7	0.8	0.6464
Perception of controllability	3.6	0.8	0.5757
Sense of competence	2.3	0.8	0.7810

The results suggest that students regard the course as relatively important (3.7) and that they feel their learning and performance depends on themselves and their work (3.6), without necessarily feeling they are capable of performing brilliantly, as the lowest score (2.3) is for the feeling of competence.

In the previous section, we reported on the positive correlation between course value and emotional competence. We also tested the existence of links between motivational beliefs and the score obtained on the test, the number of tests taken, and participation in the last test. No correlation was found between these variables. However, several links were found to be significant with the experience of certain academic emotions. These are detailed in the next section.

Emotions Experienced on Receiving Feedback

The emotions experienced by the students and their average intensity are shown in Table 3 below. They are presented in the order of the average intensity calculated. Twenty-two students responded to this part of the questionnaire.

Table 3
Test results and emotions experienced by participants on receiving the corresponding feedback (n = 22)

Test score	Interest	Relief	Satisfaction	Joy	Anxiety	Disappointment	Hope	Gratitude	Pride	Enthusiasm	Shame	Confusion	Sadness	Helplessness	Anger	Number of emotions experienced
Frequency (*n* = 22)	17	12	13	13	15	7	15	14	13	12	11	6	8	6	4	7.5
Average intensity	3.2	3.1	2.9	2.8	2.6	2.6	2.5	2.5	2.5	2.4	2.1	2	1.6	1.3	1	1.4
Standard deviation	1	1.2	1.2	0.8	1.2	1.2	1.2	1.3	1.1	1	1	0.6	0.7	0.5	0	

The Variety of Emotions Experienced

Firstly, we observed that the students felt an average of 7 different emotions when processing feedback on the last formative test of the course. In addition to this average, there was a large inter-individual difference between respondents: One felt anger only, while another indicated intensity of at least 1 out of 4 for each of the 15 emotions proposed.

The most frequent emotions were Interest (*n*=17), Hope and Anxiety (*n*=15), Gratitude (*n*=14), Joy, Pride and Satisfaction (*n*=13), followed by Relief and Enthusiasm (*n*=12). The emotions least often reported were Anger (*n*=4) and Helplessness and Confusion (*n*=6). It is interesting to note that the emotion most frequently experienced is an epistemic emotion and not an achievement emotion followed by two anticipatory achievement emotions. While they differ markedly in valence, they each refer to a later temporality that can reasonably be deduced as examination. Furthermore, the three emotions most often reported are activating, i.e., they prompt the individual to take action. These various observations suggest that the students clearly perceived the formative function of the feedback, and that they considered it as an opportunity to learn and progress towards a future assessment where the stakes were undoubtedly higher.

The intensity of these emotions was fairly moderate on average (1.4 out of 4). This can be partly explained by the formative and optional nature of the test and, consequently, by the possible low stakes attached to it by the students. In addition, similar to the number of emotions experienced, significant inter-individual disparities appear in the standard deviations, for example for gratitude which jumps to 1.3.

Based on these results, we can consider that the first hypothesis is verified and that feedback does generate emotional episodes in students. In this context, they are characterized by a limited intensity, but they also present a certain complexity for the students, given the significant number of emotions experienced simultaneously.

The Influence of the Score

The students who passed the test (n=16) all felt Pride, Joy, and Satisfaction. Among the students who failed (n=7), there was no Joy, Satisfaction, Relief, Pride, Gratitude, or Enthusiasm, but a little Hope (n=3) and Interest (n=4). These students felt mostly unpleasant emotions, including Disappointment (n=5), Shame (n=4), Anxiety (n=3), Sadness (n=2), and Helplessness (n=1).

The correlations tested between the intensity of the emotions and the other variables in the questionnaire proved to be insignificant, except for the score obtained in the test. The latter was positively correlated with 7 of the 15 academic emotions proposed in the questionnaire. This is shown in Table 4 below. This shows that they are all significant, but not equivalent.

Table 4
Correlations between test score and academic emotions

	r	p
Joy	0.865	<0.0001
Enthusiasm	0.783	<0.0001
Relief	0.781	<0.0001
Satisfaction	0.723	0.0003
Pride	0.720	0.0002
Hope	0.599	<0.0001
Gratitude	0.551	0.0178

The test score, which in the context of our study strongly determines the valence of the feedback, seems to be a trigger of emotional episodes related to feedback processing. Of all the pleasant emotions proposed in the questionnaire, only the emotion of interest showed no significant correlation with the test score. This seems to indicate that this epistemic emotion is aroused by processing information that is more complex for students to interpret. Although this was the weakest correlation among those found to be significant, it is worth noting the presence in this table of gratitude (the only social emotion among the suggestions), which potentially attests to a form of gratitude on the part of the students towards the teacher or towards a peer who helped them prepare for the test. The other six are achievement emotions, logically oriented towards the result of the test and its implications. Among these, hope and enthusiasm refer to a later assessment which, in the case of our study, was the end-of-year exam.

No Link With Emotional Competencies

None of the correlations established between emotional competencies and the intensity of the emotions experienced by the respondents were statistically significant. Consequently, we cannot validate the second hypothesis, according to which the level of intensity of the emotions experienced during the interpretation of the feedback is linked to the level of the students' emotional skills.

Links With Motivational Beliefs

We also tested the correlation between the intensity of the emotions felt when processing feedback and the value attributed to the course, the perception of controllability, and the students' feeling of competence.

The value attributed to the course was not significantly correlated with any of the 15 academic emotions listed in the questionnaire. Perceived controllability was negatively correlated with Shame ($r=-0.462$; $p=0.046$) and Helplessness ($r=-0.612$; $p=0.005$). In other words, the more students felt their performance was linked to their commitment, the less shame and despair they felt when processing subsequent feedback. The feeling of competence was negatively correlated with Sadness ($r=-0.540$; $p=0.021$) and Helplessness ($r=-0.709$; $p=0.001$). Therefore, the more students feel competent in the domain concerned, the less sadness and helplessness they experienced when processing targeted feedback. These links are probably mediated by other variables such as the test score, the effort invested in preparation, or the student's attributional system. However, we were unable to carry out the analyses required to verify these hypotheses.

The Usefulness of Feedback Received via FB4You

On average, the perceived usefulness of the feedback associated with the last test (ϖ=0.7561) was 2.93 out of 5, with a standard deviation of 0.6 (n=12).

In addition to the level of perception determined by the Calone and Lafontaine (2018) subscale, we included several personal items[8] in the questionnaire. Among these, the respondents particularly indicated that the feedback strengthened their autonomy to study (3.5 out of 5 on average) and that it encouraged them (3.1 out of 5 on average). These two items are significantly correlated with emotional skills, at 0.601 (p=0.039) for autonomy and 0.066 (p=0.018) for encouragement. We can assume that the higher the students' emotional competencies, the better their capability of perceiving the benefits of feedback as responding to their needs for autonomy and affiliation.

Apart from the two correlations mentioned above, we were unable to find any significant correlation between perceived usefulness of feedback (as a unified variable) and emotional competencies, test scores, or the various components of motivational beliefs we measured. The third hypothesis, that perceived usefulness of feedback is linked to emotional competencies, was therefore not verified.

Discussion

Emotions Associated With Feedback

The average intensity of the emotions experienced by respondents when processing feedback was 1.4 out of 4. According to Pekrun's theory (2006), the intensity of academic emotions is mainly associated with the value of the activity. The stronger the perceived value, the more intense the emotion. Given the formative nature of the test and its optional nature, the result obtained seems consistent with the high stakes involved. It is likely that intensity would be greater in the case of feedback for a summative assessment such an exam.

8. These additional items, five in number, were not incorporated into the Calone and Lafontaine (2018) subscale because the number of respondents did not allow the internal consistency of the construct to be validated following these additions.

Furthermore, the type of feedback offered following this assessment may also be a plausible explanation for this low level of emotional intensity. The generalist and prescriptive nature of this feedback may limit students' engagement in its analysis, as it contains few elements that are directly actionable to regulate their learning (Winstone et al., 2017). However, if the students have no strategies for adjusting their learning behaviors, and the information offers no such strategies, the processing of the feedback is likely to be limited (Jonsson, 2013). For example, Winstone et al. (2021) found that similar feedback offered to students on an institutional platform was processed in a particularly perfunctory manner.

In contrast to their intensity, the diversity of emotions associated with feedback is rather unexpected. Although we are aware that a single emotional episode can encompass several emotions, the average number in the context of this study seems particularly high. We think this is partly due to the direct presentation of these emotions to the students in the questionnaire. There would probably be less diversity in response to an open question. In addition, the number of emotions experienced by the students also merits attention. With an average of seven emotions per student, several of them said they felt four or five, while others mentioned nine or ten. The scores obtained by the students for their skill of identifying their own emotions indicate these figures are realistic, and that they are probably important. This finding attests to the subjectivity, but also the complexity, of the emotional episodes that students experience in feedback situations in particular, and prompts more questions about practices teachers can use to support students in managing these emotions.

Finally, we found that the most convincing predictor of emotional responses to feedback processing was the test score. While we observed few significant correlations between motivational beliefs and the emotions experienced by students, this result proved to be much more significant. However, as the feedback itself highlighted this score and offered few actionable elements in the comments, it is understandable that the students focused on this information. In 2008, Lipnevich and Smith showed that scores or grades referred students to their self-perception and, as a result, was likely to generate affective responses. In addition, this result is consistent with studies comparing the effect of scores and comments on feedback processing. The findings showed that students use cognitive resources for scores, to the detriment of comments when offered together (Lipnevich & Smith, 2009).

Level of Emotional Competencies

The average level of respondents' emotional skills (3.4) corresponds closely to that identified by Brasseur et al. (2013) when they validated their questionnaire with an audience of adults of various ages: 3.38 out of 5. This attests to a certain normality in the level of emotional competencies of the students who took part in this study. These authors observed slightly lower average scores for the intrapersonal dimension than for the interpersonal dimension, for both men and women. We also observed this slight difference in our sample. It is, however, important to note that this is an overall trend, but that some students are more competent in intrapersonal competencies.

A third interesting finding is the similarity with the original study by Brasseur et al. (2013) for the skills of identifying, understanding, and expressing other people's emotions. These competencies obtain the highest scores both in this study and for the authors of the questionnaire. However, the emotional competencies of regulating and using emotions are also less developed.

A fourth and final similarity concerns the weakest emotional skill. In the original study, the ability to regulate one's own emotions was lowest scoring competence for women, while for men it was the expression of emotions that scored lowest. We observed the same trend in our sample, comprising mainly women. The fact that we obtained a result similar to that of the study of Brasseur et al. (2013) raises questions about opportunities offered to students to learn to regulate their emotions in a functional way from the point of view of learning, throughout their education, and then their academic journey. This also raises the axiological question of the place we give to emotions in education given we know that emotion regulation is frequently necessary when processing feedback (Hausman et al., 2023). Other researchers have shown concern about this issue. Drawing on their work on learning in higher education, Fischer et al. (2022) argue for the inclusion of teaching time devoted to emotion regulation, starting in compulsory education. Finally, in view of findings by Pitt and Norton (2017), attesting to students' dissatisfaction with the feedback they receive at university, particularly due to the negative emotions it triggers, we believe that strengthening students' ability to regulate their emotions could improve how they process feedback, to optimize the construction impact. The skill of emotion regulation seems to be particularly relevant in embodying what the Carless and Boud model advocates in terms of affect management (2018).

Limits and Prospects

Sampling

Our study suffers from certain limitations and we observe that the results do not live up to our initial ambitions. This is mainly due to the low number of respondents to our questionnaire, especially in the final sections. Indeed, the decision to focus on one feedback item limited the number of respondents when the questionnaire items began to address targeted feedback and its corollaries. Given the small number of respondents, we were unable to conduct the more complex analyses we intended from an inferential perspective, by investigating the interactions between the different variables measured. In addition, the limited number of participants in our study meant caution was necessary when interpreting the data and writing up our results.

Nevertheless, our descriptive analyses provide us with some interesting results, particularly for shedding light on the level of emotional competencies of university students; the importance of the challenging task students undertake and the intensity of subsequent emotional episodes; and finally, the variety of emotions experienced and their significant links with the score, compared with motivational beliefs.

We would appreciate the opportunity to repeat this study in a similar context and with diversified feedback. We would be able to repeat our analyses with a larger database and work towards a possible generalization of our results through the implementation of much richer and more complex analyses.

Apart from the number of respondents to the questionnaire, voluntary participation encouraged by an incentive may have generated a selection bias in our study. In addition, since the data was self-reported, it is possible that a social desirability bias may have influence the students' responses. Finally, we did not carry out a preliminary analysis in order to determine the sample size needed to conduct and ensure the robustness of the planned statistical analyses.

Feedback Expectations and Learning Goals

The implicit theories that fuel students' expectations of feedback were not included in the questionnaire. They would, however, have been a relevant variable for our research. In particular, we could have asked the students about their expected or hoped-for test result and observe

the consequent effects of the external feedback provided via the application. In addition, the specific context of the feedback addressed must be considered when explaining our results. The challenge of the task for which feedback was given, as well as the informative value[9] (Hattie & Timperley, 2007; Nicol & Macfarlane-Dick, 2006) of the feedback, probably influenced the students' responses. As a result, questioning students about feedback for a task with higher stakes would generate interesting results about the intensity of the associated emotions. In the light of the results obtained, it seems obvious to us that this variable plays a predominant role in students' perception of the usefulness of feedback.

It would also be interesting to question students about their goals, to observe any differences according to the type of goals pursued (e.g., performance approach/avoidance or mastery, see Dweck, 1986). However, for this and the other possibilities mentioned above, the length of the questionnaire and our choice to focus on the dimensions central to Pekrun's theory (2006) limited the scope of our investigations.

The Multicomponential Approach to Emotions

The multicomponential approach to emotions (Sander et al., 2005; Scherer, 2001) proposes a series of criteria potentially mobilized during the cognitive appraisal of a significant event (novelty, valence, goal relatedness, potential for mastery, and agreement with norms). To conduct further, more detailed analysis of how the emotional process unfolds, we could have questioned students on how they took these criteria into account in the interpretation of the targeted feedback. For example, this would have enabled us to make the link between the complexity of the process and the level of emotional competencies.

The Use of Emotional Competencies

The FB4You usage data showed that students consulted the same feedback several times. It would have been relevant to question them about changes to cognitive, emotional and behavioral levels for the different consultations of the same feedback, and to link changes in how the feedback was perceived with each consultation with emotional competencies, to better understand how students mobilize them.

9. In his plan, the teacher had planned to come back to the previous test during the next class session, mainly to correct it and answer any questions the students might have.

In addition, we used a generalist tool to measure students' emotional competencies. A tool designed precisely for measuring some of these skills more specifically, such as the CERQ by Garnefski et al., 2001, for cognitive emotion regulation, may provide interesting results e.g., identifying adaptative and non-adaptive strategies would point to how students regulate their emotions. This would deepen our understanding of how students use their emotion regulation skills to process feedback at university, especially for regulating their own emotions. This approach is even more pertinent given our observation that regulating their own emotions is one of the least developed skills in students.

Diversifying Feedback

As part of this study, we questioned the students on a number of dimensions and, in particular, on their perception of the usefulness of a particular piece of feedback. As this feedback is obviously not representative of the diversity of possibilities in this field (even if we limit ourselves to the framework of our app), in future iteration of our study, it would be relevant to analyze a variety of contexts to check the stability of the different variables we measured.

This reflection highlight the perfectible nature of our study, but also suggests a number of interesting perspectives for researchers, but also for teachers, who would gain from awareness of the emotions their feedback triggers in students so they can take them into account when giving feedback.

Conclusions

This study is part of an analysis of the use of FB4You, an app for smartphones we developed to provide remote feedback to students at the University of Liège (Belgium). As a result, we were interested in how students' emotions influence feedback processing. In this study, we aimed to identify the emotions felt by students, and their intensity, when processing specific feedback. We also aimed to measure students' emotional competencies and test how these interact with other variables involved in the emotional process, such as task value and perceived controllability. Finally, we aimed to understand how these different variables might interact and influence the perceived usefulness of the targeted feedback.

To achieve these objectives, we proposed an online questionnaire to students enrolled in the preparatory year for the master's degree in education, at the end of the Evaluation Issues course, where they were offered six optional online formative tests. The questionnaire included several general dimensions, while others focused directly on the final feedback given to students via the app. We then analyzed the students' responses and processed them using an essentially descriptive approach.

Our results attest to the variety of emotions experienced by students when processing feedback, but also to the low average intensity of these emotions in the case of formative feedback, which was the object of our study. Few variables were found to be significantly correlated with these emotions. The most important was the score obtained on the test (included in the feedback provided to the students). The measurement of students' emotional competencies proved to be very similar to results obtained by Brasseur et al. (2013) in their original study, conducted in a variety of contexts, including higher education. Our results show that students have a certain skill deficit for regulating their emotions. We therefore call for reflection on how to develop emotional competencies in our pupils and students, particularly for regulating their emotions and maintaining their adaptive function. Finally, aware of the limitations of our study, particularly the small number of participants, we stress the need for caution when interpreting our results and propose questions to be raised and paths for improvement for future iteration of the study.

REFERENCES

Audrin, C. (2020). Les émotions dans la formation enseignante : une perspective historique. *Recherches en éducation*, (41). https://doi.org/10.4000/ree.541

Bangert-Drowns, R. L., Kulik, C. L. C., Kulik, J. A. & Morgan, M. (1991). The instructional effect of feedback in test-like events. *Review of educational research*, *61*(2), 213-238. https://journals.sagepub.com/doi/10.3102/00346543061002213

Berger, J. L. & Büchel, F. (2012). Métacognition et croyances motivationnelles : un mariage de raison. *Revue française de pédagogie. Recherches en éducation*, (179), 95-128. https://doi.org/10.4000/rfp.3705

Boud, D. & Dawson, P. (2021). What feedback literate teachers do: an empirically-derived competency framework. *Assessment & Evaluation in Higher Education*, 1-14. https://doi.org/10.1080/02602938.2021.1910928

Brasseur, S., Grégoire, J., Bourdu, R. & Mikolajczak, M. (2013). The profile of emotional competence (PEC): Development and validation of a self-reported measure that fits dimensions of emotional competence theory. *PloS one*, *8*(5), e62635. https://doi.org/10.1371/journal.pone.0062635

Brookhart, S. M. (2008). *How to give effective feedback to your students*. Ascd. http://www.ascd.org/publications/books/116066.aspx

Butler, D. L. & Winne, P. H. (1995). Feedback and self-regulated learning: A theoretical synthesis. *Review of educational research*, *65*(3), 245-281. https://doi.org/10.3102%2F00346543065003245

Calone, A. & Lafontaine, D. (2018). Feedback normatif vs feedback élaboré : quel impact sur la performance et le sentiment de contrôlabilité des élèves ? *e-JIREF*, 4(2), 47-76. https://journal.admee.org/index.php/ejiref/article/view/156

Carless, D. & Boud, D. (2018). The development of student feedback literacy: enabling uptake of feedback. *Assessment & Evaluation in Higher Education*, *43*(8), 1315-1325. https://doi.org/10.1080/02602938.2018.1463354

Carless, D. & Winstone, N. (2023). Teacher feedback literacy and its interplay with student feedback literacy. *Teaching in Higher Education*, *28*(1), 150-163. https://doi.org/10.1080/13562517.2020.1782372

Dancot, J., Hausman, M., Pétré, B., Detroz, P. & Guillaume, M. (2021). Feedback reception during internship and self-esteem in Nursing Students: An existential phenomenological study. (Under review).

de Kleijn, R. A. (2021). Supporting student and teacher feedback literacy: an instructional model for student feedback processes. *Assessment & Evaluation in Higher Education*, *48*(2), 186-200. https://doi.org/10.1080/02602938.2021.1967283

Dozot, C. & Romainville, M. (2022). Rôle de l'estime de soi et des émotions dans le traitement des feedbacks. *Carrefours de l'éducation*, (2), 127-143. https://doi.org/10.3917/cdle.054.0127

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist*, *41*(10), 1040-1048. https://doi.org/10.1037/0003-066X.41.10.1040

Fischer L., Romainville M. & Philippot P. (2020). Vivre des émotions en situation d'étude, tenter de les réguler et s'en croire capable : exploration de la régulation émotionnelle des étudiant·e·s universitaires primo-arrivant·e·s en situation de préparation d'examens. *L'Orientation Scolaire et Professionnelle*, *49*(1), 119-146. https://doi.org/10.4000/osp.11816

Fischer, L., Romainville, M. & Philippot, P. (2022). Accompagner les étudiant·es universitaires dans la régulation des émotions vécues dans l'apprentissage: pistes d'intervention. *L'orientation scolaire et professionnelle*, *51*(1), CLXXXI-CCIV. https://doi.org/10.4000/osp.15520

Fong, C. J. & Schallert, D. L. (2022). "Feedback to the future": Advancing motivational and emotional perspectives in feedback research. *Educational Psychologist*, 1-16. https://doi.org/10.1080/00461520.2022.2134135

Fong, C. J., Schallert, D. L., Williams, K. M., Williamson, Z. H., Warner, J. R., Lin, S. & Kim, Y. W. (2018a). When feedback signals failure but offers hope for improvement: A process model of constructive criticism. *Thinking Skills and Creativity*, *30*, 42-53. https://doi.org/10.1016/j.tsc.2018.02.014

Fong, C. J., Williams, K. M., Williamson, Z. H., Lin, S., Kim, Y. W. & Schallert, D. L. (2018b). "Inside out": Appraisals for achievement emotions from constructive, positive, and negative feedback on writing. *Motivation and emotion*, *42*, 236-257. https://doi.org/10.1007/s11031-017-9658-y

Garnefski, N., Kraaij, V. & Spinhoven, P. (2001). Negative life events, cognitive emotion regulation and emotional problems. *Personality and Individual differences*, *30*(8), 1311-1327. https://doi.org/10.1016/S0191-8869(00)00113-6

Genoud, P. A. & Guillod, M. (2014). Développement et validation d'un questionnaire évaluant les attitudes socio-affectives en maths. *Recherches en éducation*, (20). https://doi.org/10.4000/ree.8149

Girardet, C. (2021). Lorsque les étudiant·es produisent et reçoivent des feedbacks entre pairs à l'université : Les émotions pour apprendre. *La Revue LEeE*, (5). https://doi.org/10.48325/rleee.005.01

Goetz, T., Lipnevich, A. A., Krannich, M. & Gogol, K. (2018). Performance Feedback and Emotions. Dans A. A. Lipnevich & J. K. Smith (dir.), *The Cambridge Handbook of Instructional Feedback* (p. 554-574). Cambridge University Press. https://doi.org/10.1017/9781316832134.027

Goleman, D. (1995). *Emotional intelligence*. Bantam Books Inc.

Govaerts, S. & Grégoire, J. (2008). Development and construct validation of an academic emotions scale. *International Journal of Testing*, *8*(1), 34-54. https://doi.org/10.1080/15305050701808649

Grandjean, D. & Scherer, K. (2014). Chapitre 2. Théorie de l'évaluation cognitive et dynamique des processus émotionnels. Dans David Sander (dir.), *Traité de psychologie des émotions* (p. 51-87). Dunod. https://doi.org/10.3917/dunod.sande.2014.01.0051

Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of general psychology*, *2*(3), 271-299. https://doi.org/10.1037/1089-2680.2.3.271

Han, Y. & Xu, Y. (2020). The development of student feedback literacy: the influences of teacher feedback on peer feedback. *Assessment & Evaluation in Higher Education*, *45*(5), 680-696. https://doi.org/10.1080/02602938.2019.1689545

Hausman, M., Dancot, J., Pétré, B., Guillaume, M. & Detroz, P. (2022a). 'I don't know if people realize the impact of their words': how does feedback during internship impact nursing student learning? *Assessment & Evaluation in Higher Education*, *48*(6), 777-789. https://doi.org/10.1080/02602938.2022.2130168

Hausman, M., Detroz, P., Pétré, B., Guillaume, M. & Dancot, J. (2023). Feedback processing and emotion regulation in nursing students during internship. *Learning and Instruction*, *87*, 101804. https://doi.org/10.1016/j.learninstruc.2023.101804

Hausman, M., Verpoorten, D. & Detroz, P. (2022b). Quelle place pour les émotions des étudiants lorsqu'ils reçoivent des feedbacks à l'université : Entame d'une recherche par théorisation ancrée. *Spirale - Revue de recherches en éducation*, *69*, 37-46. https://doi.org/10.3917/spir.069.0037

Hattie, J. & Timperley, H. (2007). The Power of Feedback. *Review of Educational Research*, *77*(1), 81–112. https://doi.org/10.3102/003465430298487

Hill, J., Berlin, K., Choate, J., Cravens-Brown, L., McKendrick-Calder, L. & Smith, S. (2021). Exploring the emotional responses of undergraduate students to assessment feedback: Implications for instructors. *Teaching and Learning Inquiry: The ISSOTL Journal*, *9*(1), 294-316. https://doi.org/10.20343/teachlearninqu.9.1.20

Jonsson, A. (2013). Facilitating productive use of feedback in higher education. *Active Learning in Higher Education*, *14*(1), 63-76. https://doi.org/10.1177/1469787412467125

Kulhavy, R. W. & Stock, W. A. (1989). Feedback in written instruction: The place of response certitude. *Educational psychology review*, *1*, 279-308. https://doi.org/10.1007/BF01320096

Leroy, V., Grégoire, J., Magen, E., Gross, J. J. & Mikolajczak, M. (2012). Resisting the sirens of temptation while studying: Using reappraisal to increase focus, enthusiasm, and performance. *Learning and individual differences*, *22*(2), 263-268. https://doi.org/10.1016/j.lindif.2011.10.003

Lipnevich, A. A., Berg, D. A. & Smith, J. K. (2016). Toward a model of student response to feedback. Dans G. T. L. Brown & L. R. Harris (dir.), *Handbook of Human and Social Conditions in Assessment* (p. 169-185). Routledge. https://doi.org/10.4324/9781315749136

Lipnevich, A. A., Gjicali, K., Asil, M. & Smith, J. K. (2021). Development of a measure of receptivity to instructional feedback and examination of its links to personality. *Personality and Individual Differences*, *169*, 110086. https://doi.org/10.1016/j.paid.2020.110086

Lipnevich, A. A. & Panadero, E. (2021). A Review of Feedback Models and Theories: Descriptions, Definitions, and Conclusions. *Frontiers in Education*, *6*, 1-29. https://doi.org/10.3389/feduc.2021.720195

Lipnevich, A. A. & Smith, J. K. (2008). Response to assessment feedback: The effects of grades, praise, and source of information. *ETS Research Report Series*, *2008* (1), i-57. https://doi.org/10.1002/j.2333-8504.2008.tb02116.x

Lipnevich, A. A. & Smith, J. K. (2009). Effects of differential feedback on students' examination performance. *Journal of Experimental Psychology: Applied*, *15*(4), 319-333. https://doi.org/10.1037/a0017841

Lipnevich, A. A. & Smith, J. K. (2022). Student–Feedback Interaction Model: Revised. *Studies in Educational Evaluation*, *75*, 101208. https://doi.org/10.1016/j.stueduc.2022.101208

Little, T., Dawson, P., Boud, D. & Tai, J. (2023). Can students' feedback literacy be improved? A scoping review of interventions. *Assessment & Evaluation in Higher Education*, 1-14. https://doi.org/10.1080/02602938.2023.2177613

Malecka, B., Boud, D., Tai, J. & Ajjawi, R. (2022). Navigating feedback practices across learning contexts: implications for feedback literacy. *Assessment & Evaluation in Higher Education*, *47*(8), 1330-1344. https://doi.org/10.1080/02602938.2022.2041544

Mayer, J. D., Salovey, P. & Caruso, D. R. (2004). Emotional intelligence: Theory, findings, and implications. *Psychological Inquiry*, *15*(3), 197–215. https://doi.org/10.1207/s15327965pli1503_02

Mazzietti, A. & Sander, D. (2015). Les émotions au service de l'apprentissage : appraisal, pertinence et attention émotionnelle. *ANAE-Approche Neuropsychologique des Apprentissages chez l'Enfant*, *27*(139), 537-544.

Mercer, M. & Gulseren, D. B. (2023). When negative feedback harms: a systematic review of the unintended consequences of negative feedback on psychological, attitudinal, and behavioral responses. *Studies in Higher Education*, 1-16. https://doi.org/10.1080/03075079.2023.2248490

Mikolajczak, M. (2020a). Les compétences émotionnelles : historique et conceptualisation. Dans M. Mikolajczak, J. Quoidbach, I. Kotsou & D. Nelis (dir.) *Les compétences émotionnelles* (p. 1-10). Dunod.

Mikolajczak, M. (2020b). Les émotions. Dans M. Mikolajczak, J. Quoidbach, I. Kotsou & D. Nelis (dir.), *Les compétences émotionnelles* (p. 11-36). Dunod.

Molloy, E., Noble, C., Ajjawi, R. (2019). Attending to Emotion in Feedback. Dans M. Henderson, R. Ajjawi, D. Boud, E. Molloy (dir.) The Impact of Feedback in Higher Education. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-25112-3_6

Nelis, D., Kotsou, I., Quoidbach, J., Hansenne, M., Weytens, F., Dupuis, P. & Mikolajczak, M. (2011). Increasing emotional competence improves psychological and physical well-being, social relationships, and employability. *Emotion*, *11*(2), 354-366. https://doi.org/10.1037/a0021554

Nicol, D. J. & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in higher education*, *31*(2), 199-218. https://doi.org/10.1080/03075070600572090

Nieminen, J. H. & Carless, D. (2023). Feedback literacy: A critical review of an emerging concept. *Higher Education*, *85*(6), 1381-1400. https://doi.org/10.1007/s10734-022-00895-9

Panadero, E. & Lipnevich, A. A. (2022). A review of feedback models and typologies: Towards an integrative model of feedback elements. *Educational Research Review*, *35*, 100416. https://doi.org/10.1016/j.edurev.2021.100416

Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational psychology review*, *18*(4), 315-341. https://doi.org/10.1007/s10648-006-9029-9

Pekrun, R., Frenzel, A. C., Goetz, T. & Perry, R. P. (2007). The Control-Value Theory of Achievement Emotions. Dans P. A. Schultz & R. Pekrun (dir.), *Emotion in Education* (p. 13-36). Elsevier. https://doi.org/10.1016/B978-012372545-5/50003-4

Pekrun, R., Goetz, T., Titz, W. & Perry, R. P. (2002). Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research. *Educational psychologist*, *37*(2), 91-105. https://doi.org/10.1207/S15326985EP3702_4

Pekrun, R. & Perry, R. P. (2014). Control-value theory of achievement emotions. Dans R. Pekrun & L. Linnenbrink-Garcia (dir.), *International handbook of emotions in education* (p. 120–141). Routledge/Taylor & Francis Group.

Pitt, E. (2019). Developing emotional literacy in assessment and feedback. Dans C. Bryan & K. Clegg (dir.), *Innovative Assessment in Higher Education* (p. 121-128). Routledge. https://doi.org/10.4324/9780429506857

Pitt, E. & Norton, L. (2017). 'Now that's the feedback I want! 'Students' reactions to feedback on graded work and what they do with it. *Assessment & Evaluation in Higher Education*, *42*(4), 499-516. https://doi.org/10.1080/02602938.2016.1142500

Poulos, A. & Mahony, M. J. (2008). Effectiveness of feedback: The students' perspective. *Assessment & Evaluation in Higher Education*, *33*(2), 143-154. https://doi.org/10.1080/02602930601127869

Ramaprasad, A. (1983). On the definition of feedback. *Behavioral Science*, *28*(1), 4-13. https://doi.org/10.1002/bs.3830280103

Rowe, A. D. (2017). Feelings About Feedback: The Role of Emotions in Assessment for Learning. Dans D. Carless, S. Bridges, C. Chan & R. Glofcheski (dir.), *Scaling up Assessment for Learning in Higher Education. The Enabling Power of Assessment* (p. 159-172). Springer. https://doi.org/10.1007/978-981-10-3045-1_11

Rowe, A. D. & Fitness, J. (2018). Understanding the role of negative emotions in adult learning and achievement: A social functional perspective. *Behavioral sciences*, *8*(2), 27. https://doi.org/10.3390/bs8020027

Ryan, R. M. & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68-78. https://doi.org/10.1037/0003-066X.55.1.68

Ryan, T. & Henderson, M. (2018). Feeling feedback: students' emotional responses to educator feedback. *Assessment & Evaluation in Higher Education*, *43*(6), 880-892. https://doi.org/10.1080/02602938.2017.1416456

Ryan, T., Henderson, M., Ryan, K. & Kennedy, G. (2022). Feedback in higher education: Aligning academic intent and student sensemaking. *Teaching in Higher Education*, 1-16. https://doi.org/10.1080/13562517.2022.2029394

Sadler, D. R. (1989). Formative assessment and the design of instructional systems. *Instructional science*, *18*(2), 119-144. https://doi.org/10.1007/BF00117714

Sander, D., Grandjean, D. & Scherer, K. R. (2005). A systems approach to appraisal mechanisms in emotion. *Neural networks*, *18*(4), 317-352. https://doi.org/10.1016/j.neunet.2005.03.001

Sander, D. & Scherer, K. (2019). Chapitre 1. La psychologie des émotions : survol des théories et débats essentiels. Dans David Sander (dir.), *Traité de psychologie des émotions* (p. 11-50). Dunod. https://doi.org/10.3917/dunod.sande.2014.01.0011

Scherer, K. R. (2001). Appraisal considered as a process of multilevel sequential checking. Dans K. R. Scherer, A. Schorr & T. Johnstone (dir.), *Appraisal processes in emotion: Theory, methods, research* (p. 92–120). Oxford University Press.

Shields, S. (2015). 'My work is bleeding': exploring students' emotional responses to first-year assignment feedback. *Teaching in Higher Education*, *20*(6), 614-624. https://doi.org/10.1080/13562517.2015.1052786

Shute, V. J. (2008). Focus on Formative Feedback. *Review of Educational Research*, *78*(1), 153–189. https://doi.org/10.3102/0034654307313795

Sutton, P. (2012). Conceptualizing feedback literacy: Knowing, being, and acting. *Innovations in Education and Teaching International*, *49*(1), 31-40. https://doi.org/10.1080/14703297.2012.647781

Värlander, S. (2008). The role of students' emotions in formal feedback situations. *Teaching in higher education*, *13*(2), 145-156. https://doi.org/10.1080/13562510801923195

Winstone, N., Bourne, J., Medland, E., Niculescu, I. & Rees, R. (2021). "Check the grade, log out": students' engagement with feedback in learning management systems. *Assessment & Evaluation in Higher Education*, *46*(4), 631-643. https://doi.org/10.1080/02602938.2020.1787331

Winstone, N. E., Nash, R. A., Rowntree, J. & Parker, M. (2017). 'It'd be useful, but I wouldn't use it': barriers to university students' feedback seeking and recipience. *Studies in Higher Education*, *42*(11), 2026-2041. https://doi.org/10.1080/03075079.2015.1130032